Editor's Notes

Editor's Notes

Nutritional Status of the Kinder I AM Pupils
In Bro. Martin Simpson Laboratory School:
A Proposed Feeding Program

July A. Estrada, RN
College of Nursing

Abstract

Most of the children nowadays look like they are healthy in their physical appearance but when they will be assessed thoroughly even by just taking their weight and height according to their age; the difference will then be identified. This study aims to find out who among the Kinder AM pupils in Bro. Martin Simpson Laboratory School are considered malnourished by comparing their height and weight to their age.

This study is anchored on Moyra Allen's theory which is the McGill Practice-Derived Model of Nursing that speaks of the prevalence of the individual health problems tied with family lifestyles and health habits. In lieu of this, the primary role of the nurse would then be a promoter of family health and a facilitator who actively participates in decision making regarding the individual's health. The study found that majority of the male and female respondents are malnourished, that is why most of them are sickly and usually complain of having stomachache and headache early in the morning. Thus, it is proposed that a Feeding Program should be conducted to this said group of pupils most especially for these growing children and should be followed up by a health education on proper nutrition.

I. Introduction

Background of the Study

Nutritional status is the state of a person's health in terms of the nutrients in his or her diet. This is the basis on how to categorize

4

the person's health, either he/she is well-nourished or not. Malnutrition is a disparity between the amount of food and other nutrients that the body needs and the amount that it receives. Malnutrition is the condition that occurs when your body does not get enough nutrients. This imbalance is most frequently associated with under nutrition, but it may also be due to over nutrition. American Association for Clinical Chemistry (2010).

Most of the children nowadays look like they are healthy in their physical appearance, but when they will be assessed thoroughly, even by just taking their weight and height according to their age, the difference will then be identified. The basic purpose of the researcher in formulating a purposive research is to further determine who among the chosen Kinder I AM pupils in Bro. Martin Simpson Laboratory School, are considered malnourished in comparison to their height and weight based on their age.

Review of Related Literature

According to the Food and Culture Encyclopedia, nutritional status is the balance between the intake of nutrients by an organism and the expenditure of these in the processes of growth, reproduction, and health maintenance. Because this process is highly complex and quite individualized, nutritional status assessment can be directed at a wide variety of aspects of nutriture. These range from nutrient levels in the body, to the products of their metabolism, and to the functional processes they regulate. These would now serve as the fuel of the individuals' body to function well. Lacking of some nutrients resulted to malnutrition that needs to be treated directly. Nutritional status can be measured for individuals as well as for population. Accurate measurement of individual nutritional status is required in clinical practice. Population measures are more important in research. They can be used to describe nutritional status of the group, to identify

populations or population segments at risk for nutrition-related health consequences, and to evaluate interventions.

The choice of nutritional status assessment method must be made mindful of the level at which one wants information, as well as of the validity and reliability of the method. All methods have error and produce imperfect measures that are indirect approximations of the process. Whatever method is chosen for assessment of nutritional status, the data obtained must be compared with reference data to produce an indicator of nutritional status. The quality of the available reference data is, therefore, another factor that affects the assessment data.

Ideal methods are sensitive and specific. Unfortunately, it is difficult to achieve both in the assessment of nutritional status. Sensitivity refers to the ability of a technique to correctly identify those affected by a condition (for example, undernutrition) as having that condition. Specificity refers to the ability of a technique to correctly classify normal individuals as having normal nutritional status. Body mass index $(wt/[ht]^2)$ is a global measure of nutritional status that illustrates the difference between these two constructs. Most persons who consume insufficient energy have low body mass index, so the measure is sensitive. However, there are other causes of low body mass index, including genetics and disease, so body mass index is not specific to nutritional status.

The assessment of nutritional status is commonly summarized by the mnemonic "ABCD," which stands for anthropometric measurement, biochemical or laboratory tests, clinical indicators, and dietary assessment. This study will focus on anthropometric and dietary techniques.

Statement of the Problem

This study sought to find the number of Bro. Martin Simpson Laboratory School Kinder 1 AM pupils who need further assistance with their nutritional status.

Most especially, the study aimed to determine the answer of the following questions:
1. What is the participants' demographic profile when grouped according to:
    1.1 Gender
    1.2 Weight
    1.3 Height
2. What is the participants' nutritional status?
3. What Feeding Program is appropriate for this group of participants?

Scope and Limitation

This study is limited to finding out the number of Kinder I AM pupils who are malnourished according to their height and weight based on their age. The pupils who are officially enrolled in Bro. Martin Simpson Laboratory School for the year 2009-2010 are the respondents of the study.

Significance of the Study

The outcome of the study will be beneficial to the following groups of individuals:

Administration of Br. Martin Simpson Laboratory School. This serves as a guide for them to know the well nourished pupils who are mostly participative in the classroom activities and to identify those who need further support from their parents to

develop their body and mind.

Parents: This gives them enough knowledge on the performance of their children in school nutritional imbalance which will affect their well-being.

Health Care Provider. This serves as a basis in enhancing their skills by imparting to the students the desired health education strategy which will be used in the hospital set up and for them to help their patients' maintain a healthy outlook in life.

Student Nurses. This serves as a guide for future nurses in assessing themselves on their nutritional status based on their weight and height thereby correcting their wrong concept on physical fitness.

Future Researchers. The outcome will give the future researchers an opportunity to utilize the related theories and to guide them in reassessing the respondents' status for improvement.

Definition of Terms

Nutrients. These are chemical substances that are found in the food that nourished the body by providing energy, building materials, and factors to regulate needed chemical reactions in the body.
Nutrition. It is the study of the nutrients in foods and in the body.
Nutritional Status. The individuals nourishment condition which serves as an identifier if they are healthy or not.
Kinder Pupils. Young individuals aging five (5) to six (6) years old who are learning the basic ABCs and simple counting.
Malnutrition. The condition caused by an improper balance between what an individual eats and what he requires to maintain health. This can result from eating too little (subnutrition or starvation) but may also imply dietary excess or an incorrect

balance of basic foodstuffs such as protein, fat and carbohydrate.
Feeding Program. A planned event that provides the pupils with adequate nutrients to help them attain a healthy life.

2. Methodology

This chapter presents the research design, research respondent, research setting, research instrument, data analysis and statistical treatment of data.

Research Design

This study utilized the descriptive type of research to assess the children's status based on their weight, height and age as the indicator of their nutrition level. The research took the group of respondents purposively. The said design has met the purpose of this study, which was to determine the nutrition status of the Kinder 1 AM pupils in Bro. Martin Simpson Laboratory School.

Research Respondents

The Kinder 1 AM pupils who were officially enrolled in the school year 2009-2010 in Bro. Martin Simpson Laboratory School were the respondents of the study. This group consisted of 26 pupils who were selected purposively.

This group of students was known to be the University scholars since their parents only pay a little amount for their education. They are considered as the underprivileged, and are provided with an adequate education with a little amount of payment. A lot of benefactors showed their love and concern to this group for their own success. Moreover, the university provided them different activities as sources of their income and helped those

who are craving for an education with the values and spirit of St. La Salle.

Data Gathering

The data gathering was conducted on January 27, 2010, Monday, from 8:00 AM to 9:00 AM in Bro. Martin Simpson Laboratory School Clinic of La Salle University, Ozamiz City.

Research Instruments

This study utilized the Patient Data Sheet as the data gathering tool. The pupils' weight, height and age were recorded accordingly for a comparison which would then serve as a basis of evaluating the pupils' health status.

Statistical Tools

Frequency and Percentage Distribution were used to describe the health status of the chosen pupils in Bro. Martin Simpson Laboratory School. A Feeding Program was proposed based on the finding of the study. The said program would be facilitated by the Daughters of Charity headed by Sr. Evelyn with the assistance of Ms. Shiela Marie Fajardo, the school nurse.

3. Result and Discussion

Analysis and the interpretation of data gathered from the respondents are the contents of this chapter.

The following tables show how they are classified and are concluded as individuals who fall on a malnourished group of

respondents. The normal findings chart shown below gives enough idea on the basis of how they are categorized.

Table 1
Frequency Distribution of the Pupils' Gender
According to their Age

	5 years old	*6 years old*	*7 years old*	*Frequency*	*Percentage*
Male	13	2	0	15	**57.69**
Female	7	3	1	11	**42.31**
TOTAL	**20**	**5**	**2**	**26**	**100.00**

Table 1 revealed the respondents population when grouped according to their age as to their gender. Out of 26 pupils, 15 or 57.69% were boys while 11 or 42.31% were girls. They may not be in the same number but this group of respondents could be considered even in distribution which the result may benefit both sexes.

Table 2
Frequency Distribution of the Pupils' Height According to their Gender

	Male	*Female*	*Frequency*	*Percentage*
Normal	9	3	12	**46.15**
Overheight	6	5	11	**42.31**
Underheight	0	3	3	**11.54**
TOTAL	**15**	**11**	**26**	**100.00**

Table 2 showed the distribution of the pupils' height according to their gender. The result revealed that most of the male pupils during this period possessed a normal height based on their

age; this implies that male children aging 5-7 years old are usually within normal limits during these periods, while only 5 out of 11 girls are overheight or taller than the expected. According to the author of the Disabled World website, girls often experience dramatic changes in weight, bone composition, height, and body fat distribution at their younger years which could be considered a factor for their unexpected changes. Linda Anne Silvestre (2007) also cited that during school-age, girls usually grow faster than boys, and this could be affirmed by everybody based on their observation to this group of pupils. This will then tell that tall school-aged pupils are considered well-nourished; this is now the exemption from the rule.

Table 3
Frequency Distribution of the Pupils' Weight
According to their Gender

	Male	*Female*	*Frequency*	*Percentage*
Normal	2	2	4	**15.38**
Overweight	0	1	1	**3.85**
Underweight	13	8	21	**80.77**
TOTAL	**15**	**11**	**26**	**100.00**

Table 3 displayed that majority of the respondents both from both sexes were underweight, which means that they have a low weight from the expected with 80.77 %. Linda Anne Silvestri (2007) stated that children at this age are picky eaters; they usually eat foods that they love most especially those that are presentable but are willing to try new foods. This is the stage when they increase their growth needs. That is why parents are encouraged to give their children a balance diet from foods in the Food Pyramid Guide.

Table 4
Frequency Distribution of the Pupils' Nourishment Status
According to their Gender

	Male	*Female*	*Frequency*	*Percentage*
Well-nourished	2	2	4	**15.38**
Malnourished	13	9	22	**84.62**
TOTAL	**15**	**11**	**26**	**100.00**

The result of Table 4 indicated that twenty two (22) out of twenty six (26) respondents were malnourished, which means that they may lack of the necessary nutrients needed by their body to function normally giving them a normal height and weight as to their age and gender. This group of individuals are very choosy with the food they are about to partake and oftentimes tend to manipulate their parents. Thus, parents are encouraged to provide foods rich in nutrients for the betterment of the health status of their children with strict supervision.

Proposed Feeding Program

Feeding Program to all Kinder 1 AM pupils in Bro. Martin Simpson Laboratory School is being proposed by the researcher. The said program will be facilitated by the Daughters of Charity headed by Sr. Evelyn, the direct person, assisted by Mrs. Shiela Marie Fajardo, school nurse.

Since school-aged children have increased growth needs, they are required to have a balanced diet from foods in the Food Pyramid Guide which should be the norm of both parent and child, including 2,400 Kilocalories per day. They must eat three (3) meals a day and one (1) or two (2) nutritious snacks. According to Audrey

Berman et al. (2003), children of this group need a protein-rich food at breakfast to sustain the prolonged physical and mental effort required at school. Those who skip breakfast become inattentive and restless by late morning and have decreased problem-solving ability. Pupils who are usually absent from their classes are undernourished for they become easily fatigued and would somehow face a greater risk of infection that results to hospitalization in severe cases. Increased intake of fluid must be known by the child; the benefits should be discussed to them in a nice way. Children at this age are very active; they tend to spend their vacant time playing with their classmates resulting to skip their meals. Trading their foods to sweets, toys or junk foods will result to not eating their lunch at all. In this scenario, the parents must have a close supervision to their children in order for them to maintain a balanced diet resulting to a healthy body, mind and spirit.

The child must also be encouraged to defecate everyday to lessen the possibilities of having stomachache, to brush their teeth regularly to prevent from having toothache, to have enough rest at night to decrease tardiness, and to eat regularly to stay fit and healthy.

The proposed program for this group of pupils would be done twice a week starting on February 16, 2010 up to the end of the school year 2009-2010. From time to time, health education would be provided to both pupils and parents to be aware on the various foods necessary for the normal growth of the respondents

Their weight and height will be retaken before March 20, 2010, to evaluate if there is an improvement after the program is being implemented. Its main purpose is to attain and maintain the pupils' normal height and weight according to their age for them to have a healthy body, mind and spirit.

4. Summary, Conclusion and Recommendations

This chapter presents the findings, the conclusions drawn and the recommendations formulated.

Findings

1. Compared to their age, most of the male pupils fall within the normal range with respect to their height, while majority of the females are taller than the expected.
2. Majority of them are underweight and are found to be malnourished.

Conclusion

The nutritional status of the Kinder 1 AM pupils in Bro. Martin Simpson Laboratory School is relatively in an abnormal condition. Majority of them are underweight which contradicts to their height; thus, they are not well nourished. The height and weight are said to be the indicators of the nutritional status of every individual, the results give enough idea on the health condition of the respondents.

Because of this information, a Feeding Program must be established to help these young individuals regain their normal nutritional status and prevent them from acquiring various illnesses in the future.

Recommendations

In connection to the given findings and conclusions, the researcher proposes the following recommendations:

1.	Feeding Program is highly recommended to this group of pupils for them to grow normally and to have a healthy living.

2.	After the intervention has been implemented, follow-up monitoring must be conducted to facilitate the pupils' development.

3.	School health personnel must provide adequate health education not only to the pupils but most importantly to the parents who are responsible in providing their meals and snacks which must contain appropriate nutrients for these growing individuals.

List of References

American Association for Clinical Chemistry. (2010). *Malnutrition.* Retrieved on April 2010 from World Wide Web http://www.labtestsonline.org/understanding/conditions/mal nutrition-2 html.

Baucher, H. (2007). *Failure to thrive*. In: Kliegman RM, Behrman RE, Jenson HB, Stanton BF, eds. Philadelphia, Pa: Saunders Elsevier.

Berman, A. et al. (2008) *Kozier and Erb's Fundamentals of Nursing*. 8th ed. Pearson Education, Inc.

Encyclopedia of Food and Culture. (2003). New York: The Gale Group, Inc

Heird, WC. (2007). *Food insecurity, hunger, and undernutrition*. In: Kliegman RM, Behrman RE, Jenson HB, Stanton BF, 18th ed. Philadelphia, Pa: Saunders Elsevier

Klein S. (2007) *Protein-energy malnutrition*. *In: Goldman L, Ausiello D, Cecil Medicine.* 23rd ed. Philadelphia, Pa: Saunders Elsevier.

Shadshidhar, HR. (n.d) *Malnutrition.* Retrieved on October 2008 from http://emedicine.medscape.com/article/985140-overview.

Weber, J and Kelley, J. H. (2007). *Health Assessment in Nursing*. 3rd ed. United States of America: Lippincott Williams and Wilkins.

Oral Health Habits among the Grade 1 and 2 Students of Br. Martin Simpson Laboratory School: Basis for Dental Health Program

Arlene Apao
Carol Chiong
Sheila Marie Fajardo
College of Nursing

Abstract

This study aimed to assess the oral health habits of the Grade 1 and 2 pupils of BMSLS. This study used descriptive type of research. The respondents of the study were the Grade 1 and 2 students in La Salle University Br. Martin Simpson Laboratory School. There were 82 students taken purposively as respondents. A 10 item questionnaire was developed by the researchers Percentage and Frequency Distribution were used as statistical treatment of the data. It was found out that students had a little knowledge on proper oral health habits and proper nutrition. A proposed health teaching program was designed based on the findings of the study.

1. Introduction

According to the Nationwide Oral Health Survey (NOHS), tooth decay is considered a non life-threatening disease. The survey revealed that 97 percent of six-year old Filipino school children have poor dental habits, which results to learning difficulty; thus, Education Secretary Jesli Lapus encourages colleges and universities in conducting studies on how to respond the oral health needs of school children (DepEd, 2009).

Dental health refers to all aspects of the health and functioning of the mouth especially the teeth and gums. The teeth

and gums should be free from infection because it can cause dental caries, inflammation of gums, tooth loss and bad breath. They enable people to eat, speak, and laugh. Poor dental health can also affect speech and self-esteem. To prevent from missing time from school or work because of dental pain, one should have a healthy teeth and gums. The school dentist plays an essential role in monitoring dental health and treating or preventing any problems. Regular check-up is very important to have a good dental care. Unfortunately, access to dentist is limited to some people who came from lower socio-economic groups. These groups are important targets for dental health education programs. Schools also play an important role in educating children on the importance of good oral hygiene and diet (The Basics, 2006).

Thus, the school nurse and dentist were challenged and motivated to conduct a study in relation to the oral health habits of the grade 1& 2 students after knowing the result of the annual routine dental check –up done to some students who have at least 3-5 dental caries in Br. Martin Simpson's Laboratory School. This study was conducted to help students as well as parents in the promotion of caries free teeth.

Review of Related Literature

Berkow (1999) said that to maintain healthy teeth, a person must remove plaque daily with a toothbrush and dental floss to reduce the risk of tooth decay.

According to Goss and Inga (2008), dental caries (tooth decay) can attack the teeth at any age. Caries can cause severe pain and result in tooth loss if left untreated. Losing teeth affects how you look and feel about yourself as well as your ability to chew and speak. Treating caries is also expensive. So prevention and early treatment are important.

Devine (2008) suggested that one of the most basic skills any child should know is how to brush teeth. It is very important that children should understand why they should know the skills in brushing the teeth. Inadequate brushing can take years to give the children the idea why they need to clean their teeth every night and morning.

Velma (2010) added that there should be a selection of the right kind of toothbrush. It is very important to use a toothbrush that's the right shape and size. Use the correct type of bristles to be able to do proper brushing. As a rule, you should select a brush that fits comfortably to your hand and is easy to control. Always remember to replace the toothbrush at least every 3 or 4 months. Toothbrush that is with worn, split, uneven or toothpaste clogged bristles can hurt the gums. Brushing daily in the proper way is as valued as brushing your teeth often.

According to DentalHealthSite.com (2008), flossing is necessary after brushing the teeth because it cleanses the areas which are harder for a toothbrush to reach. It also removes the food debris and plaque accumulated between the teeth. It is advisable to do flossing at least twice daily. Flossing also removes the tiny trapped food particles and also the plaque trapped between the teeth which a tooth brush cannot reach. Aside from that, it also prevents the formation of calculus or tartar which if formed can only be removed by your dentist. Gingivitis (swelling of gums) will occur if the bacteria present in the tartar (calculus) produce acids. If left untreated, leads to periodontal disease which eventually causes tooth loss.

It is suggested that by eating a balanced diet which means proper nutrition, the body can get the nutrients needed for good health. Keep in mind that every day, the body renews itself, building new muscle, bone, skin and blood. The foods eaten

provide the building blocks for these new tissues. Bear in mind that if the diet is low in the nutrients the body needs, the mouth may have a more difficult time resisting infection. If children do not eat a balanced diet, their teeth may not develop properly. In order for them to develop strong, decay-resistant teeth, children need a balanced diet with emphasis on calcium, phosphorous and proper levels of fluoride. Learn by heart that deficiencies in minerals and vitamins can also affect your oral health, as well as your general health (Healthy Teeth, n.d).

Calcium contributes to stronger teeth. Young children need lots of calcium to support the continuing growth of their jawbones and permanent teeth. Remember, the teeth form and mineralize; they need adequate calcium and phosphorus to form a hard structure. This takes place over a long period of time. Having an adequate amount of calcium and phosphorus during growth is critical for healthy teeth. Calcium also makes jawbones strong and healthy as they hold the teeth in place. Milk is also a good source of calcium in building healthy teeth. Other than calcium and phosphorus, milk also contains vitamins A and D. Vitamin A is important for maintaining the mucous membranes of the mouth and Vitamin D promotes calcium absorption for healthy bones, teeth and growth of the jaws (Medical Explorer, 2001).

According to Ann Marie Krautheim, R.D., senior vice president of Nutrition Affairs for the National Dairy Council (2008) milk is an important source of calcium which helps build and maintain strong bones, muscles and teeth in children.

It is recommended that one glass of milk alone can make a contribution to the daily recommended intake of many important nutrients for all age groups. It is highly suggested to consume milk and dairy foods as part of a healthy balanced diet. A portion of dairy may be a 200ml glass of milk, 150g or a pot of yogurt and 30g or a

matchbox sized piece of hard cheese. These dairy products contain calcium and other tooth friendly nutrients, which help teeth grow and keep them healthy. Therefore, milk is the only drink -excluding water which is recommended by dentists to be safe to consume between meals (Dairy Council, 1963)

Most toothpaste contains fluoride. It is necessary to use toothpaste with fluoride in brushing the teeth. It protects, cleans and polishes teeth. It makes oral hygiene more efficient. Aside from that, it has a fresh taste and smell that freshen the breath. Modern toothpastes contain ingredients which are essential to oral health. It is vital to brush twice a day with toothpaste because it is essential in maintaining a healthy mouth. Always remember that fluoride reduces and even prevents tooth decay, hardens the initial softening of tooth enamel in the decay process, increases the resistance of teeth to decay and decreases the formation of decay-inducing acid in dental plaque. Only a pea-sized of toothpaste should be used for small children, Toothpastes are for brushing teeth and should not be swallowed. This is worth remembering, particularly with child (Simplyteeth Limited, 2004).

Bear in mind that everyone can benefit from fluoride, not just children. Again, fluoride strengthens developing teeth in children and helps prevent decay in adults and children. Toothpastes and mouthwashes are good sources of fluoride. Dentist can prescribe stronger concentrations of fluoride through gels or rinses if you need (Healthy Teeth, 2008).

In many countries, tooth brushing with fluoridated toothpaste is thought to be the most important factor in the observed decline in dental caries. Brushing and flossing help concurrently to the fluoride application to remove bacteria from the mouth and reduce the risk of both caries and periodontal disease (The Basics, 2006).

According to Spohn (2004), going to the dentist does not even begin to approach their list of fun things to do. Dentists play an important role in maintaining your health. Dentists are about more than finding cavities; they can also save your life. Like most health advice, going to the dentist is all about prevention. Here is an advice, don't wait until you have a toothache to visit your dentist. Many problems are easily avoided by regular visits to the dentist. He or she can detect potential problems with the teeth and gums. Cavities, broken fillings, and gum disease are easily treatable in the beginning. The longer these problems go untreated; root canals, teeth removal, and gum surgery could become the only available treatment options.

Durning (2008) added, one of the reasons in visiting the dentist regularly is cancer checks. Teeth checked on a regular basis, decrease the chances of having to have work done to repair your teeth. It prevents gum disease which causes tooth loss.

Goss and Inga (2008) shared the main reason for going to the dentist regularly — every 6 months — is prevention. The goal is to prevent tooth decay, gum disease, and other disorders that put the health of your teeth and mouth at risk. During consultation, the dentist will do dental and medical history dental examination (teeth, gums, other mouth tissues, and joints of your jaws), and a professional cleaning.

Eating sugar is a major cause of tooth decay. Eating sugary foods or drink sodas frequently throughout the day will lead the enamel (protects the teeth) exposed to acids. Hard candies, cough drops, and breath mints that contain sugar are harmful. They dissolve slowly in your mouth. Many experts suggest that you take a 3-hour break between eating foods containing sugar. Sugary or

starchy foods eaten with a meal are less harmful to the teeth than when they're eaten alone, possibly because the production of saliva, which washes away the sugar and bacteria, is increased. Eating sugary foods before going to bed can be the most damaging (especially if no brushing of teeth afterward) because less saliva will be when you sleep.

O'Donnell (2003) explained that children who drank mostly fruit juices continued to develop more cavities because most juices are sugar-heavy. Keep in mind that when sugar--from soft drinks, fruit juices or any other source--hits the tooth's surface, its interaction with bacteria in the mouth produces an acid that erodes the enamel. The stronger the enamel, the more resistant it is to tooth decay.

Brushing before sleep at night is removing food and dental plaque from the teeth instead of leaving it there through the night, for cavity process can happen very fast when a person is asleep. There is lesser salivary flow to do the 'washing' and there is no movement of the mouth to achieve the ' self-cleansing' with the cheek/ tongue rubbing against the teeth surface. Bacteria would then have undisturbed activities that can potentially results in decay.

Other tips to prevent tooth decay: 1.Snacking after school, before bedtime, or other times during the day, choose something without a lot of sugar or fat. There are lots of tasty, filling snacks that are less harmful to the teeth - and the rest of the body - than foods loaded with sugars and low in nutritional value. 2. Eating the right foods can help protect from tooth decay and other diseases. Pick a food from the list inside or make up your own menu of non-sugary, low-fat snack foods from the basic food groups. (Healthy Teeth) 3. Avoid Cola and Energy Drinks. Cola drinks contain acids

such as phosphoric acid and citric acid which have damaging effect on teeth. Energy drinks contain organic acids in addition to the above which directly damage the tooth calcium. ENERGY DRINKS AND COMMERCIAL LEMONADE ARE 11 TIMES MORE HARMFUL TO TEETH THAN COLA DRINKS. Don't sip on them for a long time and do mouth rinse after drinking (Dental Health Site, 2008).

Theoretical Framework

This study is anchored on Health Belief Model. According to Journal of Dental Hygiene, (2004), the Health Belief Model is a staged theory, with each step in the decision making process dependent on the previous decision or belief. According to this theory, an individual must believe that s/he is susceptible to a condition; the condition is serious; there is a successful intervention for the condition; and can overcome all barriers to using the intervention. Each step is dependent on the previous belief. Applying this theory to an oral health condition such as early childhood caries, the primary caregiver must believe that the child is susceptible to dental caries; that primary teeth are important and dental caries is a serious threat to them; that dental caries can be prevented; and must be willing to limit the child's exposure to fermentable carbohydrates, and must assist the child in practicing good oral hygiene.

Statement of the Problem

This study aims to assess the oral health habits of Students in Br. Simpson Laboratory School. Specifically, it seeks answers to the following questions:

1. What is the dental health habits profile of the students?

In terms of:
   1.1 Proper Dental Hygiene Practices
   1.2 Proper Nutrition
2. What intervention program may be proposed based on the findings of the study?

2. Methodology

Research Design

This study used descriptive type of research. This was conducted to all Grades 1 & 2 students of Br. Martin Simpson Laboratory School, Heritage Campus. The researchers would like to identify the dental hygiene practiced by the students as well as their nutritional intake. These oral health habits are the bases in assessing the teeth of the individuals. The researcher used the 10 - item - researcher made questionnaire.

Data Gathering

After the routine dental check-up done by the school dentist, the students answered the questionnaire with the help of the adviser and the researchers. Retrieval of the questionnaire was done after answering. The study was conducted in the classrooms of Grades 1 and 2 students of Br. Martin Simpson Laboratory School, La Salle University- Ozamiz City (formerly known as Immaculate Conception College La Salle) Heritage Campus.

Research Respondents

There were 82 respondents in this study; all were the Grades 1 and 2 students of La Salle University Br. Martin Simpson

Laboratory School, Ozamiz City. The respondents were selected through the use of purposive sampling.

Research Instrument

The researcher used 10 –item - researcher made questionnaire. The items identified were about the proper dental hygiene practices and proper nutrition.

Statistical Treatment

Frequency and Percentage distribution were used in this study.

3. Results and Discussion

This study aims to assess the oral health habits of pupils in BMLS. This chapter deals with the presentation, analysis and interpretation of data gathered. The data found in this chapter are arranged according to the order of specific problems treated in this study.

A. Proper Dental Hygiene Practices

Table 1: Brushing of teeth every after a meal

	Frequency	Percent
Always	69	84
Usually	7	9
Sometimes	5	6
Seldom	1	1
Never	0	0
Total	**82**	**100**

Table 1 showed that 84 percent of the respondents brush their teeth every after meals. Only a few do not brush their teeth. This means the respondents know the importance of brushing their teeth every after meal. Proper brushing of teeth really helps prevent tooth decay and bad breath.

Table 2: Flossing of teeth after brushing

	Frequency	Percent
Always	22	27
Usually	6	7
Sometimes	9	11
Seldom	3	3
Never	42	51
Total	**82**	**100**

As shown in Table 2, 51% of the respondents do not use dental floss after brushing. This means that they are not aware that after brushing their teeth, there is a need to use dental floss. Flossing helps remove plaque and food particles from between teeth and under gum line. Dentist encourages students to use dental floss at least once a day which provides effective removal of dental plaque and cleaning between the teeth.

Table 3: Using toothpaste with fluoride in brushing the teeth

	Frequency	Percent
Always	50	61
Usually	11	13
Sometimes	14	17
Seldom	3	4
Never	4	5
Total	**82**	**100**

As presented in Table 3, 61% of the respondents use toothpaste with fluoride and there are some (5%) never use toothpaste without fluoride. Fluoride reduces and prevents tooth decay.

Most parents purchase toothpaste without reading the labels. Based on interview with some of the respondents, they confirmed that they use the toothpaste their parents buy for them. Some of them are also unaware of the importance of the presence of fluoride in toothpastes. This is perhaps one of the reasons why some of the respondents have dental problems, aside from unfamiliarity with proper tooth brushing, eating unhealthy foods, and the like.

Table 4: Visiting the dentist for a regular check-up every 6 months

	Frequency	Percent
Always	55	67
Usually	8	10
Sometimes	18	22
Seldom	0	0
Never	1	1
Total	**82**	**100**

As shown in Table 4, 67 % of the respondents visit their dentist for a regular check-up every 6 months. Results show that some of the respondents are not aware of the importance of regular dental check-up. One should visit a dentist to prevent or decrease the chances to have work done to repair the teeth. And if there's still need of repair, they are likely to be more limited than if the damage is found later on. (Durning, 2008)

B. Proper Nutrition

Table 5: Eating nutritious foods

	Frequency	Percent
Always	66	80
Usually	9	11
Sometimes	2	2
Seldom	2	2
Never	3	4
Total	**82**	**100**

As shown in Table **5**, 80 % of the respondents claim that they eat nutritious foods. There are some students who eat less or not at all nutritious foods. The respondents are aware that eating nutritious foods leads to healthy teeth and gums. Majority of the respondents claim that they do eat nutritious foods, but most of them have dental health problems. The students may have eaten balanced diets, but practice 'unhealthy' habits, which may have caused their dental problems.

Table 6: Drinking milk everyday

	Frequency	Percent
Always	9	11
Usually	9	11
Sometimes	16	20
Seldom	6	7
Never	42	51
Total	**82**	**100**

As presented in Table 6, 51% of the respondents do not drink milk every day. 20% of the students sometimes drink milk. Milk is a good source of calcium and it plays an important role in building healthy teeth. (Medical Explorer). There is a need to educate the students on the importance of milk in their body as well as to their teeth.

Table 7: Limiting between –meal snacking

	Frequency	Percent
Always	6	7
Usually	2	2
Sometimes	8	10
Seldom	4	5
Never	62	76
Total	**82**	**100**

Table 7 showed that out of 82 respondents, 62 of them never limit between - meal snacking. The between meal snacking leads the children tend to forget to brush their teeth; thus it develops tooth decay. Children should brush their teeth with fluoride toothpaste after meals and snacks especially at night.

Table 8: Limiting the amount of softdrinks, fruit-flavored drinks and other sugar-containing beverages coffee & tea with added sugar

	Frequency	Percent
Always	12	15
Usually	9	11
Sometimes	42	51
Seldom	6	7
Never	13	16
Total	**82**	**100**

As presented in Table 8, only15% of the respondents always limit the amount of softdrinks, fruit-flavored drinks and other sugar-containing beverages coffee and tea with added sugar and

only 16% never do it. As a result, some of the respondents have dental health problems. This shows that the respondents are high risk groups; they are more prone to have problems with tooth decay because they drink a lot.

Table 9: Avoid sucking on hard candies, mints or lollipops

	Frequency	Percent
Always	13	16
Usually	6	7
Sometimes	32	39
Seldom	4	5
Never	27	33
Total	**82**	**100**

Table 9 showed that out of 82 respondents, 39% sometimes avoid sucking on hard candies, mints and lollipops while 33% never do it. The respondents are not aware that these foods contain sugar that leads to tooth decay. This is one of the reasons why these students have tooth decay. According to Berkow (1999), a person who tends to develop cavities should eat sweet snacks less often and should avoid sucking of hard candies, mints and lollipops that contain sugar.

Table 10: Avoid eating after cleaning teeth at bedtime

	Frequency	Percent
Always	12	15
Usually	5	6
Sometimes	22	27
Seldom	6	7
Never	37	45
Total	**82**	**100**

As presented in Table 10, 45% of the respondents never avoid eating after cleaning teeth at bedtime and only 15% always do it. It indicates that the majority of the respondents will eat before

bedtime or after they clean their teeth; thus it contributes to tooth decay. They don't know that when someone is asleep there is a cavity process the will happen (lesser salivary flow) that results in tooth decay. The students should be reminded that brushing before going to bed is very important.

Proposed Health Teaching Program

The proposed health teaching program will help the pupils as well as the teachers and parents in ensuring healthy teeth and gums. The pupils will learn how to brush and floss the teeth properly, use toothpaste with fluoride and visit their dentist regularly. Aside from dental hygiene practices, they will also learn the importance of having proper nutrition, drinking milk everyday, limiting between meals snacking, limiting the amount of softdrinks, fruit flavored drinks and avoiding of hard candies and lollipops. The rationale behind this program is to teach and remind pupils the importance of dental health and education. Ongoing reminders throughout the year work much better than one reminder per year.

Health Teachings

Objectives

At the end of the discussion the students will be able to:

1. Identify the different ways to maintain good oral status.
2. Apply the ways on how to properly take care the teeth.
3. Discuss the procedures on brushing and flossing of the teeth every after meal.
4. Identify some other oral health tips and problems that need to be reported to the Dentist.

Content

Ways to Maintain Good Oral Health Status: (Colgate World of Care)

1. Avoid eating junk food.
2. Eat a well balanced diet and limit snacks between meals.
3. Limit sugary or starchy foods especially sticky snacks and eat a balanced diet.
4. Take enough calcium.
5. Drink water throughout the day to help cleanse teeth from excess bacteria.
6. Use soft-bristle tooth brush or sponge / cotton-tip applicators to cleanse teeth and tongue.
7. Avoid vigorous or harsh scrubbing, which can irritate your gums.

8. Replace your toothbrush every three or four months or sooner if it becomes frayed.

9. Use dental products that contain fluoride including toothpaste.
10. Floss daily to remove plaque from between your teeth and under your gum line after brushing your teeth.
11. Don't use toothpicks or other objects that aren't made to clean your teeth.
12. Brush your teeth three times a day or every after meal.

13. Visit the dentist regularly one to two times a year for professional cleanings and check – up.
14. Routinely inspect oral cavity for sores, lesions, and / or bleeding.
15. Establish regular schedule such as when performing oral care activities.

CARE OF TEETH
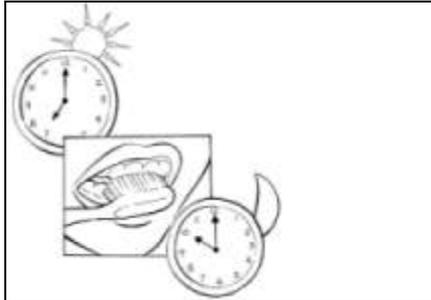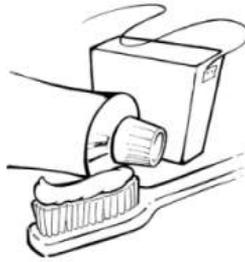
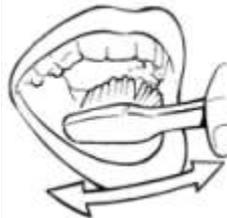|	**Brushing** Brush your teeth two times a day. Get a new toothbrush every three months.
1. Brush the outside of the teeth, side to side moving across the teeth in circles. Clean gums too.	2. Scrub the top of the teeth gently by moving the brush back and forth.
3. Clean the inside surface of the teeth in a circular motion.	4. Clean the inside surfaces of your front teeth using up and down movements.
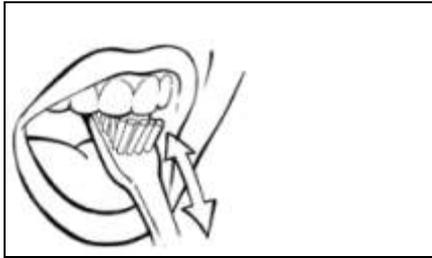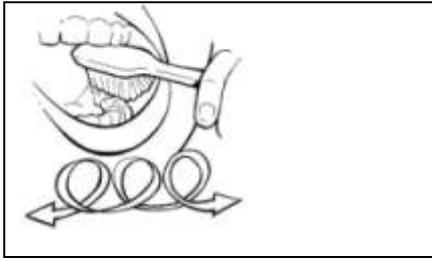
Flossing

1. Cut about 18 inches of floss and wrap it around your middle fingers.	2. Slide floss between your teeth until it reaches the gum.	3. Move the floss up and down the tooth. Use clean floss as you go.

Home Care

1. Use fluoride, which is found in toothpaste, mouth rinses and some drinking water.

2. Eat a good diet.
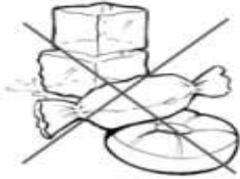
3. Do not chew hard candy or ice.

4. If you have no teeth, brush your gums with a soft toothbrush and rinse with warm water mixed with a teaspoon of salt.

5. Cigarettes snuffing and chewing tobacco can cause gum problems and cancer of the mouth. Don't use them.

6. See a dentist at the health clinic if you have red, swollen or bleeding gums.

Brushing for Oral Health (Colgate World of Care)

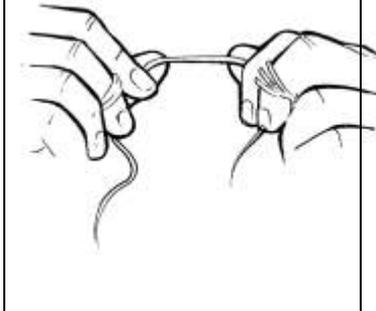Follow these tips on how to brush your teeth:

- Brush your teeth at least twice a day and ideally after every meal, using fluoride-containing toothpaste.

- Use a soft-bristled toothbrush — it's gentler on your gums.

- To brush properly, hold your toothbrush at a slight angle against your teeth and use short back-and-forth motions.

- Brush the inside and chewing surfaces of your teeth.

- Brush your teeth for about two minutes each time you brush.

- Brush your tongue.

- Avoid vigorous or harsh scrubbing, which can irritate your gums.

- Replace your toothbrush every three or four months or sooner if it becomes frayed.

- Consider using an electric toothbrush, especially if you have arthritis or other problems that make it difficult to brush well.

Flossing for Oral Health (Colgate World of Care)

A toothbrush can't reach all the tight spaces between your teeth or the areas under your gum line. That can allow plaque to build up, threatening your oral health. Flossing, though, removes those particles and improves oral health.

Follow these tips on how to floss your teeth:

- When you floss, gently ease the floss between your teeth.

- Pull the ends of the floss against the front and back surface of a tooth so that the floss forms a "C" as it wraps around the tooth.

- Gently pull the floss from the gum line to the top of the tooth to scrape off plaque.

- Floss the backs of your teeth.

- Use fresh floss as you progress through your teeth.

- If you have trouble getting floss through your teeth, try waxed floss.

- If it's hard to manipulate the floss, try using a floss holder.

Other Oral Health Care Tips

Brushing and flossing are the mainstays of good dental care and oral health. In addition to those, you may also want to consider these oral health tips:

- Use an interdental cleaner, such as a dental pick or dental stick especially designed to clean between your teeth.

- Use a mouth rinse to help reduce plaque between your teeth.

- Use oral irrigators, or devices that aim a stream of water at your teeth, to remove food particles.

- Don't use toothpicks or other objects that aren't made to clean your teeth.

Oral Health Problems to Report to your Dentist

Call your dentist promptly if you develop any of the following signs and symptoms that may suggest oral health problems:

- Red, tender or swollen gums

- Gums that bleed when you're regularly brushing and flossing

- Gums that are pulling away from your teeth, which may make your teeth seem longer

- Pus around your teeth and gums when you press on the gums

- A bad taste in your mouth

- Loose teeth

- Changes in the way your top and bottom teeth touch

- Changes in the feel of your dentures

- Sensitivity to hot and cold

4. Summary of Findings, Conclusions and Recommendations

Findings

Grade 1 and 2 pupils always brush their teeth every after meals, never do flossing after brushing the teeth, always eat nutritious foods, never drink milk everyday, and always use toothpaste with fluoride in brushing their teeth.

Most of the students always visit a dentist for a regular check-up every 6 months and never limit between meal snacking.

Sometimes the students limit the amount of softdrinks, fruit flavored drinks and other sugar containing beverages, coffee and tea with added sugar. Sometimes, they avoid sucking on hard candies, mints and lollipops and never avoid eating after cleaning their teeth at bedtime.

Conclusion

Students have a little knowledge on proper oral health habits. An intervention program should be recommended to help maintain good oral health status and prevent acquiring dental caries.

Recommendations

1. The students should be informed on the good oral health hygiene including the proper brushing and flossing of teeth every after meal.

2. Students at an early age should be taught on the proper nutrition that contributes for strong and healthy teeth.

3. Students should be given education on measures to eradicate dental caries.

4. School Nurses, teachers and parents should continue offering the pupils support, encouragement and education on proper oral health habits.

5. Nurses must contribute appropriate health education articles on Good oral health Hygiene in order to educate the students.

List of References

After I brush my teeth at night, I always eat after. Can I get cavities from doing this? (2008) Retrieved on October 3, 2010 from World Wide Web http://answers.yahoo.com/question/index?qid=20080802034359AAXx6r0

The Basics. (2006).Dental Health. Retrieved on June 11, 2010 from World Wide Web http://www.eufic.org/article/en/page/BARCHIVE/expid/basics-dental-health/

Berkow, Robert. (1999).*MERCK Manual of Medical Information Home Edition.* New York USA. Mason Publishing USA

Colgate World of Care. (2007).Oral health: Tips for proper dental care Retrieved on March 17, 2010 from World Wide Web Mayoclinic.com.http://www.colgate.com/app/Colgate/US/OC/Information/OralHealthBasics/GoodOralHygiene/OralHygieneBasics/OralHealth.cvsp

Dental Health Site. (2008). Is flossing necessary for my oral health? Retrieved on October 3, 2010 from World Wide Web DentalHealthSite.com.
http://www.dentalhealthsite.com/importance-flossing/

Dental Health Site. (2008). 10 Commandments for maintaining healthy teeth and gums Retrieved on October 3, 2010 from World Wide Web DentalHealth Site.com. http://www.dentalhealthsite.com/10-commandments-for-maintaining-healthy-teeth-and-gums/

DepEd. (2009). DepEd seeks partners in dental colleges; turns over national oral health survey. Retrieved on March 12, 2010 from
http://www.deped.gov.ph/cpanel/uploads/issuanceImg/mar12-dental.pdf

Devine, J. (2008). Teaching Children Healthy Dental Habits. Retrieved on September 29, 2010 from EzineArticles.com. http://ezinearticles.com/?Teaching-Children-Healthy-Dental-Habits&id=1623456

The Diary Council (1963). The importance of milk and dairy products as part of a healthy balanced diet. Retrieved on

September30, 2010 from World Wide Web http://www.milk.co.uk/page.aspx?intPageID=131

Durning, M. (2008). 5 great reasons to visit your dentist regularly. Retrieved on September 30, 2010 from http://blisstree.com/feel/5-great-reasons-to-visit-your-dentist-regularly-276/

Goss, L. and Inga, C. (2008).Taking Care of Your Teeth. Retrieved on September 30, 2010 from World Wide Web http://kidshealth.org/PageManager.jsp?dn=KidsHealth&lic=1& http://kidshealth.org/PageManager.jsp?dn=KidsHealth&lic=1&ps=207&cat_id=20116&article_set=20582

Journal of Dental Hygiene. (2004). Health behavior models and oral health: a review. Retrieved March 17, 2010 from Goliath http://goliath.ecnext.com/coms2/gi_0199-4745497/Health-behavior-models-and-oral.html

Medical Explorer (2006). The Milk factor in Healthy Teeth. Retrieved on September 30, 2010 from World Wide Web http://www.medical-explorer.com/teeth.php?001

National Dairy Council. (2008).New study shows calcium significantly improves children's bone health. Retrieved on September 29, 2010 from http://www.physorg.com/news136651559.html

O'Donnell, Perry. (2003). Perfect smile: support healthy teeth with calcium. Retrieved on October 3, 2010 from CBS moneywatch.com. http://findarticles.com/p/articles/mi_m0FKA/is_11_65/ai_109025922/?tag=content;col1

Shield. (2008) Healthy Teeth (Eight Steps to Dental Health). Retrieved on October 3, 2010 from World Wide Web http://www.shieldoralcare.com/healthyteeth.html

Shield. (2008). Healthy Teeth (Nutrition). Retrieved on October 3, 2010 from http://www.shieldoralcare.com/healthyteeth.html

Simplyteeth Limited. (2004). Toothpaste. Retrieved on October 3, 2010 from simplyteeth.com http://www.simplyteeth.com/category/sections/adult/caringt eethgums/Toothpastes.asp?category=adult&section=4&pag e=8#WIFAI

Spohn, R. (2004).Top 5 Reasons to Visit Your Dentist Regularly. Retrieved on October 3, 2010 from Ezine Articles http://EzineArticles.com/?expert=Rachel_Spohn

Velma, J. (2010). Flouride Rinse: Great Anti Cavity Protection. Retrieved on September 30, 2010 from EzineArticles.com.http://ezinearticles.com/?Flouride-Rinse:-Great-Anti-Cavity-Protection&id=5081114

Profile and Perceived Roles of Junior Peer Facilitators in Terms of Helping Behavior: Basis for Modular Training

Tesally Villanea
Integrated School Guidance Counselor

Abstract

Peer interactions pose greater influence during adolescence. Many resort to their peers in disclosing problems. The Junior Peer Facilitators' (JPF) Program of the Guidance Center trains students who have the potential and interest to render service to other students. This study investigated the profile of its members, their interest and perceived capability to extend academic, social and emotional support. Majority belonged to ages 14 to 16 and there were more females than males. Participants believed they were mostly capable of extending emotional support; however, 93.9% were mostly interested in providing social support. Eldest child – participants were inclined towards giving social support while the youngest, middle and only child – participants were mostly inclined towards giving emotional support.

1. Introduction

Adolescence is considered by many as a critical stage in human development. To a parent, it is challenging phase to be a parent to a teenager with greater frustrations on their adolescent's increasing demand for independence. To a teacher, it is a tough job to ensure an adolescent learns his lessons well amidst the competing influences of peers, recreation and other things that may prevent him from focusing at school work. To adolescence, however it is a rollercoaster phase of all aspects of his development from physical changes in his body states, emotional outbursts brought by a rich variety of his experiences, intellectual pressures on excelling in school to pass and get to college, moral dilemmas on choices and decisions he has to start making by himself. The

individual, who was before a child confined within the social influences at home with his parents and siblings to interact with now expands his social circle, involving the presence of peers and friends. As it was in childhood, peers continue to play a major role in the development of the individual. It was known that in childhood, peer interactions were limited to play which enhances one's creativity, socialization skills and verifying gender roles. In some ways, adolescents become closer to their peers as they grow up. They want to spend more and more time with their friends and less at home. They often feel that friends understand them better and that they are more like their friends than they are like their parents (Smart and Smart, 1973). In a study by Czikszentmikalyi (1977), adolescents do not only have three times more interactions with their peers or age mates than with adults, but that they are also happier and more relaxed when they are with their peers than when they are with adults. Peers become agents of social and emotional support. Characteristic of many adolescents is the tendency to resort to their peers in disclosing about their problems and issues that may be bothering them. Peers also greatly influence adolescent behaviors. In a study by Bronfenbrenner and Steinberg, parents feared the powerful influence of peers on adolescents' attitude and behavior, which were largely negative influences, such as influencing adolescents to engage in socially undesirable behaviors. The influence of peers extends also in socially desirable behaviors. The positive power of peers according to Fuhrmann (1986) is capitalized on in programs of peer tutoring and peer counseling. Conformity to friends and peers, according to Brown (1986) increased along third and ninth grade.

Peers, also become agents of influencing them in terms of helping behavior. Adolescents may join groups and organizations which they believe reflect their interests and with whom they can share similarities with its members.

In La Salle University Integrated School, the Guidance Center recognizes the impact of peers on students' behavior. Integral to the Guidance services is Peer Counseling and this is concretized with the establishment of the Junior Peer Facilitators' (JPF) Club. The JPF Club is a recognized student organization in La Salle University Integrated School that aims to train students who have the potential and are willing to render service to their fellow students through various programs such as peer tutorials, peer counseling and facilitating school activities and programs. It is in these areas that Junior Peer Facilitators are trained to equip them with necessary skills to enable them to extend support to others.

Review of Related Literature and Studies

This section highlights various studies which link helping behavior and demographic profile in terms of age, gender, and rank in the family.

Adolescence and Helping Behavior

Helping behavior is referred to as voluntary actions intended to help others regardless of reward. It is a type of prosocial behavior intended to help or benefit another individual or group of individuals, such as sharing, comforting, rescuing and helping (www.wikipedia.org). In a study supported by grant-in aid from Tel Aviv University, the helping behavior of 250 sixth-grade children was assessed by four different measures and related to several demographic variables. The results indicated that (a) more girls were helpful than boys; (b) more children of European-American and Israeli origin were helpful than those of Asian — (North) African origin; (c) more children having fathers with a high level of education were helpful than those having fathers with a low level of education; and (d) more second born children were helpful than firstborn.

Peers and their Functions

      Peers, contrary to how most adults perceive, generally impacts adolescence in positive ways. Fuhrmann (1986) stated that in the peer group, adolescents experience their first adult like one-to-one and group relationships. They learn what to expect from friends, develop their own unique identities through comparing themselves with their peers, compare their values and beliefs with those of others, try on and test out a variety of roles and behaviors, learn skills of leadership and followership, learn the joy of inclusion and the pain of rejection, gain social and emotional support and learn to support and understand others, learn how to manage heterosexual relationships, and establish self-concepts in relation to their peers. Within this learning context as to the function of peers, Allen (1976) found that low-achieving students, when placed in the role of tutor to younger children considerably improved their own scores in reading. Endsley (1980) further added that peer tutoring is efficient, cost-effective and provides students with tutors who are close to their own experience and better able to communicate to children.

      Fuhrmann (1986) also identified the concept of peer counseling, in which the power of peer models is used to help students cope with personal problems, survive school, and develop attitudes and behaviors in various aspects of life. Peer counseling, as defined by Fuhrmann (1986) is a variety of interpersonal helping behaviors assumed by non-professionals who undertake a helping role with others. It includes one-to one helping relationships in the form of counseling, group and discussion leadership through information dissemination on drugs, sex, and other relevant issues, advisement, tutoring and all other forms of helping or assisting fellow peers.

Age and Helping Behavior

In a theory by Jean Piaget, it stated that a child not reaching the stage when concept of egocentrism is not yet overcome, that is before he reaches 6 or 7, cannot understand another person's point of view. In Freudian view, a child has to resolve Oedipal conflict in the phallic stage for him to develop a superego morality (Zanden, 1993).

Gender and Helping Behavior

Researches also link helping behavior with gender. In a study by Spence and Helmreich (1978), the term *expressive traits* referred to emotionality, concern for others, gentleness, kindness and tact were attributed to feminity.

Rank in the Family and Helping Behavior

Adler, in his personality theory, maintained that individuals differ in personality attributes based on their birth order or rank in the family. According to his theory, first borns or the eldest child has full grasp of authority and power and will be highly supportive and dependent on authorities in later life (Ryckman, 1993). A study by Schachter (1959) revealed that first borns reported higher level of anxiety and yielded greater percentage of affiliation. Furthermore, in Adlerian perspective, the youngest on the other hand, due to being pampered most in the home, is lead to excessive dependence on others.

Peer Training

Recognizing the impact of peers in eliciting positive behaviors, it is considerable to make use of peers in greater realization of pedagogical goals such as facilitating academic,

social and emotional adjustments of students. According to Endley (1980), based on his study, tutors should be selected based on their dependability, understanding and patience with fifth and sixth graders making the best tutors for elementary children. Peer counselors must be carefully selected and trained in the use of counseling skills, supervised by competent faculty leaders, and involved in programs provided. In the brochure of Peer Helping Behavior and National Standards (http://www.peer.ca/broch.html), seven program standards were identified which include (1) the program must be led and supervised by adults specifically trained and experienced in peer helping. Trainers and supervisors must be able to demonstrate and model the skills peer helpers are expected to learn; (2)the program must include structured training sessions consisting of a proven curriculum, based on demonstrated youth needs as well as the goals and objectives of relevant support groups; (3)the training must encourage enjoyment, involvement, and self-management. The trainees must gradually be involved in the determination of training activities as well as the development and distribution of program information and services; (4) children and adolescents selected as trainees must feel their training is special and based on their needs and existing skills. Selection criteria must insure that the trainees represent the social composition of the community in which they will be working; (5) training methods must be interactive and experiential with coaching and feedback. The training sessions should include role rehearsal, homework, and practical assignments; (6) the training program and the specific roles peer helpers take on must have the support of teachers, administrators, parents and other students in a school-based setting, and the support of relevant groups and care-givers in a community-based setting; and (7) the peer helpers must have on-going supervision and continuing opportunities for learning. Supervisors must maintain a high quality relationship with the peer helpers that allow for monitoring, dealing with confidentiality, and making referrals to professionals.

Statement of the Problem

This study is geared towards investigating the helping behavior of selected High School students of La Salle University Integrated School, particularly of those belonging to the Junior Peer Facilitators' Club for SY 2009 – 2010.

This study aims to answer the following specific questions:
1. What is the profile of Junior Peer Facilitators in terms of:
    a. Age
    b. Gender
    c. Rank in the Family
2. Which kinds of peer support do the participants perceive they are capable of extending?
3. Which kind of peer support are the participants mostly interested at?
4. Which kind of peer support do the participants believe they are capable to extend when they are grouped according to their rank in the family?
5. Which kind of peer support are the participants mostly interested to extend when they are grouped according to their rank in the family?

Significance of the Study

This study on the profile and perceived roles of Junior Peer Facilitators in terms of helping behavior will serve as a tool for the Counselor to identify the Integrated School Students' potential characteristics which are geared towards preference to engage in helping behaviors, which in turn, will facilitate training of these students in this area of social skills development.

This research will also provide a background on the activities of the students who prefer to engage in service-oriented

organizations they believe they are most capable and effective at; thus these programs would be intensified.

Results of this study can also be utilized to forward to school administrators special programs of services mostly found to be preferred as ideal and satisfying among students themselves; hence, accessibility and marketing Guidance services to the rest of the school community can be expanded.

Scope and Limitations of the Study

This study focuses mainly on the demographic profile of participants limited to age, gender and rank in the family. This is also an inquisitive study on the perceived roles of participants as to which among the three areas of helping behaviors, namely academic, social and emotional support they believe they are mostly effective and which they find of interest. Although this study investigates on the potential characteristics of students engaging in helping behaviors, one of the limitations of the study is that it mainly utilized only one student organization, which is the Junior Peer Facilitators. Other student organizations that are also service-oriented such as the Student Government, the Junior Police and others are excluded.

2. Methodology

This section of the paper consists of the participants, research design used, and the general procedures in information gathering.

Participants

The participants of this study were the thirty three (33) bona fide members of the Integrated School Junior Peer Facilitators' Club for the school year 2009 – 2010. The participants are students who have voluntarily signed up for membership to the Club. Participants also come from grade levels seven to ten, or the upper grades of La Salle University Integrated School, Ozamiz City.

Research Design

This study is a descriptive type of research since it merely investigates the characteristics of the subjects, as well as their perceived roles and interests as members of the Junior Peer Facilitators' Club.

Research Tool

This study primarily used the Personal Information Sheet filled up by all the members of the Junior Peer Facilitators' Club. The form is being used as profile sheet of club members in La Salle University Integrated School. It consists of information pertaining to their demographic background such as gender, age, rank in the family as well as a selection-type checklist for peer facilitating roles which they will choose from depending on which they perceive they are capable of doing and which they are mostly interested at.

Procedure

Signing up for certain clubs regularly is scheduled during designated Activity Days of La Salle University Integrated School. Students who signed up for the Junior Peer Facilitators' Club were asked to fill up the Club Information Sheet. Responses to the Information Sheet were then recorded and tallied by the Researcher.

The variables included in this study were demographic characteristics, namely: age, gender and rank in the family; and the perceived roles of helping behavior as to providing academic, social or emotional support. Participants were allowed to indicate multiple responses in this part of the Information Sheet, depending on the kind of support which they believe they are capable (skill) and which they find interesting (interest). Results are then tabularized based on frequencies and percentages.

3. Results and Discussion

This section of the paper summarizes the findings of the said study. Data are presented in tables.

Presentation of Data

Table 1. Demographic Profile of Participants as per Age

Age	Frequency	Percentage
11	1	3.0
12	0	0
13	1	3.0
14	6	18.2
15	22	66.7
16	3	9.1
Total	33	100

Table 1 showed the distribution of participants according to age. As depicted in Table 1, majority of the respondents (66.7%) belong to the age 15, followed by 18.2% belonging to age 14 and 9.1 % belonging to age 16. Both ages 11 and 13 shared equal proportion of participants belonging to that age (3%).

Table 2. Demographic Profile of Participants as per Gender

Gender	Frequency	Percentage
Male	15	45.5
Female	18	54.5
Total	33	100

As shown in Table 2 above, there are more females than males by at least 20%. The females shared a percentage of 54.5% while the males shared 45.5% of the participants.

Table3. Profile of Participants as per Rank in Family

Rank in the Family	Frequency	Percentage
Eldest	15	45.5
Middle Child	9	27.3
Youngest	8	24.2
Only Child	1	3.0
Total	33	100

Table 3 summarized the distribution of participants according to rank in the family. A relatively large percentage of the participants belong to the eldest in the family (45.5%), followed by middle child with 27.3% and the youngest with 24.2%. There is only 1 among the participants, which constitutes the 3% that belonged to the only child category.

Table 4. Peer Support which participants believe they are capable of extending

Kind of Support Provided	Frequency	Percentage
Academic	22	66.7
Social	8	24.2
Emotional	29	87.9

In terms of skills, most of the participants (87.9%) rated themselves as having the skills to provide emotional support, followed by 66.7% who believed they are skilled to help others academically and the least percentage of 24.2% believed they can help others through social support.

Table 5. Peer support which participants are mostly interested to extend

Kind of Support Provided	Frequency	Percentage
Academic	20	60.6
Social	31	93.9
Emotional	25	75.8

Participants, as reflected in the table shown above, were found to be mostly inclined towards providing social support (93.9%), second to this is through emotional support (75.8%) and lastly, through academic support (60.6%)

Table 6. Peer Support participants are capable to extend according to their rank in the family

Kind of Support	Eldest	Middle Child	Youngest	Only Child
Academic	13	9	4	2
Social	2	4	1	2
Emotional	22	11	9	2

Table 6 showed that participants who are eldest, middle and youngest in the family rated themselves as skilled to provide emotional support; while the participants who are only child rated themselves as equally skilled in all aspects of helping behavior.

Table 7. Participants' interest in Peer support according to Rank in the Family

Kind of Support	Eldest	Middle Child	Youngest	Only Child
Academic	9	8	5	1
Social	19	12	6	1
Emotional	16	13	8	2

Table 7 summarized the participants' inclination to provide the kind of support to their peers. Eldest child participants were highly inclined towards giving social support; the middle child participants were interested to give emotional support; youngest child participants were interested in providing emotional support and the only child participants preferred to give emotional support.

4. Findings, Conclusions and Recommendations

This chapter includes findings, inferences drawn from the results as well as recommendations of the Researcher for future studies on this related topic.

Findings

Based on the results obtained from this study, the following findings were drawn:

1. Majority of the participants belong to ages 14 to 16 (9 to 67%) where predominant age is 15 (66.7%). In terms of gender, there were more females compared to males by 20%. This may be attributed to sex-role stereotypes, with the view that helping behavior is attributed more to females than to males.

2. In terms of perceived capability, most of the participants believe they are capable to extend emotional help to their

fellow students. Emotional help having the most number of responses reflect the participants' belief that they can best contribute to the objectives of the Club, hence their membership to it. In terms of academic and social support, 22% of the participants responded that they are capable to extend academic help to their peers through tutorials and only 8% believed they are capable to provide social support to their peers.

3. Responses of the participants in terms of the kind of support they can extend to their peers which they find interesting showed that they were mostly interested in providing social support (93.9%) through facilitating and organizing activities in school. This reflects the participants' interest in getting involved in spearheading social activities such as school programs. In the previous item, social support yielded the least response in terms of skill, which may connote that participants found it more interesting to provide support to their peers in the area which they also believed they are less skilled. This may shed light as to which area is to be intensified in training the Junior Peer Facilitators.

4. In terms of rank in the family, there is no marked difference or trend among eldest, middle and youngest children. All three birth orders believed they are capable to give emotional support. However, in terms of preferences, results showed that there is a trend among middle and youngest children to be inclined towards providing emotional support, while the eldest child participants were found to be interested in providing social support. Only child participants tend to also be interested in giving emotional support to peers. This may be partly due to perceived roles of eldest children to be the authority figure

in the absence of the parents, thus a preference for leading, organizing and facilitating group activities.

Conclusions

From the findings obtained in the study, the Researcher arrived at the following conclusions.

1. The Junior Peer Facilitators in La Salle University Integrated School mostly belong to age of 15 and are mostly females.
2. There is no marked difference in the kind of peer support which the respondents believe they are capable of extending if respondents will be grouped according to age and birth order. The participants believe they are capable of extending emotional support to their fellow students.
3. The LSU Junior Peer Facilitators' interest is more inclined towards providing social support to their peers.

Recommendations

Based on the findings obtained from this study, the Researcher would like to make the following recommendations:

1. The Club Moderator of the Junior Peer Facilitators' Club may need to intensify training module that will make them capable of extending social support to their peers.
2. The Guidance Counselor has to provide channels for the Junior Peer Facilitators to utilize their interest in providing social support through encouraging them to get involved in organizing, planning and implementing school programs and activities.

<ol start="3">
Further research may also include other organizations in the school that are designed to render service to students and others.

List of References

Allen,V.L., and Feldman,R.S.(1976). *Studies on the role of the tutor.*In V.L. Allen (ed.), Children as teachers:Theory and research on tutoring.New York:Academics Press.

Berndt, T.J. (1997). *Child Development*. Madison:Brown and Benchmark Publishers.

Czikszentmikalyi, M., Larson, R. and Prescott, S. (1977). *The ecology of adolescent activity and experience.* Journal of Youth and Adolescence, 281-294.

Endsley, W.R. (1980). *Peer tutorial instruction.Englewood Cliffs*, New Jersey:Educational Technology Publications

Fuhrmann, B.S. (1986). *Adolescence, Adolescents. Toronto, Canada*: Little, Brown and Company.

Ryckman, R.M. (1993). *Theories of Personality*, 5th ed. California: Brooks/Cole Publishing Company.

Smart, M. and Smart, R. (1973). *Adolescents.* London:The Macmillan Company.

Tel Aviv University (2003) Demographic correlates of adolescents' helping behavior**.** Retrieved November 2009 from World Wide Web http://www.springerlink.com/content/h14491h322867841/

Vanden Zanden, J W. (1993). *Human Development*. New York: McGraw-Hill, Inc.

On the Sum of Angles in a Projectile of the same Range with Variable Launching Heights

Merven M. Pailden
University Statistician

Abstract

This paper investigated the sum of the angles in projectiles having the same range. Results verified the widely known property that two projectiles launched at y=0 would have the same range if and only if their angles of projection are complimentary. Furthermore, it was found out that if y>0 the sum of the angles is always less that 90 and if y<0 the sum of the angles is always greater than 90. Graphical User Interface was used to clearly present the concepts.

1. Introduction

The problem of the motion of projectiles launched at an angle is essential to many introductory physics courses. If no other forces acting on it except gravity, the path is well known to be a parabola [1, 3].

As with general physics subjects, the known parametric representation of the projectile trajectory is [2, 3]

$$x = v_i t \cos \phi$$
$$y = y_i + v_i t \sin \phi - \tfrac{1}{2} g t^2 \qquad (1)$$

Note that (1) can be revised to eliminate the variable *t* and has

$$y - y_i = x \tan \phi - x^2 \frac{g}{2v_i^2} \sec^2 \phi \qquad (2)$$

--- 61

The range R is the value of x when $y=0$, one has a quadratic equation in R in (2); solving for R one can have the range equation,

$$R = \frac{v_i^2}{g}\left(\cos\phi\sin\phi + \cos\phi\sqrt{\sin^2\phi + \frac{2gy_i}{v_i^2}}\right) \quad (3)$$

This is the general equation for the range of a projectile without friction, notice that if $y_i = 0$, (3) will become $R = \frac{v_i^2}{g}\sin 2\phi$ and have the widely known fact that there are two launching angles that can have the same range and that their sum is 90 degrees (complimentary). And when these two angles are equal (45°), one can have the maximum range of the projectile.

The objective of this paper is to investigate the sum of the two angles that have the same horizontal range in more general case, i.e. when $y_i \neq 0$ and to justify on why it is true that there are complimentary angles when $y_i = 0$ on a single range.

2. Results

Using the trigonometric identity $\sec^2\phi = 1 + \tan^2\phi$, (2) can be transformed into,

$$y - y_i = x\tan\phi - \frac{gx^2}{2v_i^2}\left(1 + \tan^2\phi\right) \quad (4)$$

The range R of the projectile is the value of x in (4) when $y = 0$, and has the quadratic equation on $\tan\phi$,

$$\left(\tan\phi\right)^{2} - \frac{2v_{i}^{2}}{gR}\tan\phi + \left(1 - \frac{2y_{i}v_{i}^{2}}{gR^{2}}\right) = 0 \qquad (5)$$

Solving (5) for $\tan\phi$, one can have,

$$\tan\phi = \frac{v_{i}^{2}}{gR} \pm \sqrt{\left(\frac{v_{i}^{2}}{gR}\right)^{2} - \left(1 - \frac{2y_{i}v_{i}^{2}}{gR^{2}}\right)} \quad (6)$$

Notice that (6) gives two values of launching angles namely;

$$\begin{aligned}
\tan\phi_{1} &= \frac{v_{i}^{2}}{gR} + \sqrt{\left(\frac{v_{i}^{2}}{gR}\right)^{2} - \left(1 - \frac{2y_{i}v_{i}^{2}}{gR^{2}}\right)} \\
\tan\phi_{2} &= \frac{v_{i}^{2}}{gR} - \sqrt{\left(\frac{v_{i}^{2}}{gR}\right)^{2} - \left(1 - \frac{2y_{i}v_{i}^{2}}{gR^{2}}\right)}
\end{aligned} \qquad (7)$$

Using the trigonometric identity $\tan\phi_{1} + \tan\phi_{2} = \left(1 - \tan\phi_{1}\tan\phi_{2}\right)\tan(\phi_{1} + \phi_{2})$, adding the two angles in (7) one can have,

$$\frac{2v_{i}^{2}}{gR} = \tan(\phi_{1} + \phi_{2})\left\{1 - \left[\left(\frac{v_{i}^{2}}{gR}\right)^{2} - \left(\sqrt{\left(\frac{v_{i}^{2}}{gR}\right)^{2} - \left(1 - \frac{2y_{i}v_{i}^{2}}{gR^{2}}\right)}\right)\right]^{2}\right\}$$
$$(8)$$

By simplifying (8), one can have the sum of two launching angles with the same range,

$$\tan\left(\phi_{1} + \phi_{2}\right) = \frac{R}{y_{i}} \quad (9)$$

A graphical user interface was developed to facilitate a detailed understanding on the concept derived in equations (1-9), see figures below;

Figure 1. Given the initial conditions vertical distance $y_i = 5m$, initial velocity $v_i = 20\frac{m}{s}$, and the desired horizontal range $R = 35m$, the sum of the two angles with this range is 81.8699. Note that the y_i is positive and is located above the desired destination.

Figure 2. Given the initial conditions vertical distance $y_i = -10m$, initial velocity $v_i = 40\frac{m}{s}$, and the desired horizontal range $R = 80m$, the sum of the two angles with this range is 97.125. Note that the y_i is negative and is located below the desired destination.

Figures 1 and 2 showed an insight on the behavior of the sum of the angle with the same horizontal range. It is worth noticing that after several trials, the sum of the angles whose initial vertical distance is positive ($y_i > 0$) is always less than 90 while the sum of the angles whose initial vertical distance in negative ($y_i < 0$) is always greater than 90. Also for $y_i = 0$, the sum is always 90 (see Figure 3):
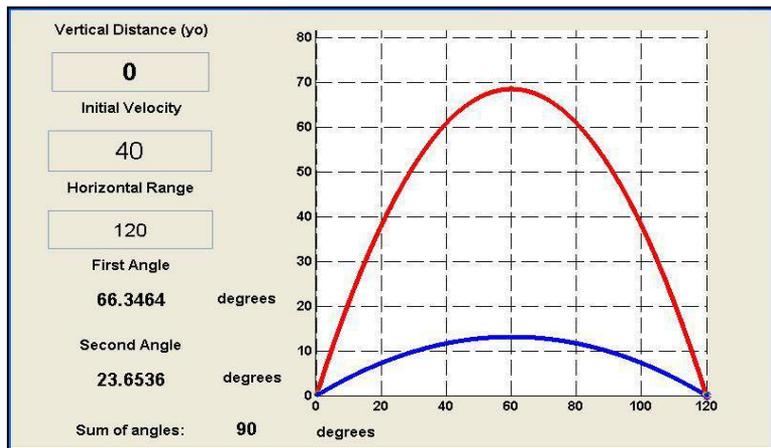
Figure 3. Given the initial conditions vertical distance $y_i = 0m$, initial velocity $v_i = 40\frac{m}{s}$, and the desired horizontal range $R = 120m$, the sum of the two angles with this range is 90.

This confirms the known fact that for $y_i = 0m$ the two angles are complimentary to one another. Going back to (9) as $y_i \rightarrow 0$, then $\tan(\phi_1 + \phi_2) \rightarrow \infty$ and therefore $\phi_1 + \phi_2 \rightarrow 90$. For maximal horizontal range when $y_i = 0m$, the two angles are the same and both are 45 (see figure 4):
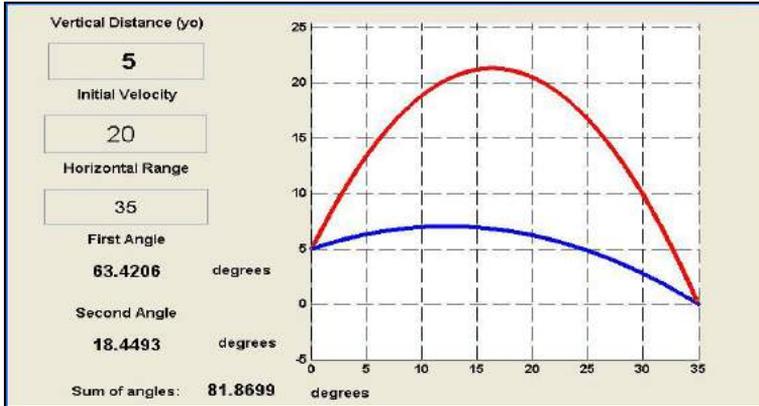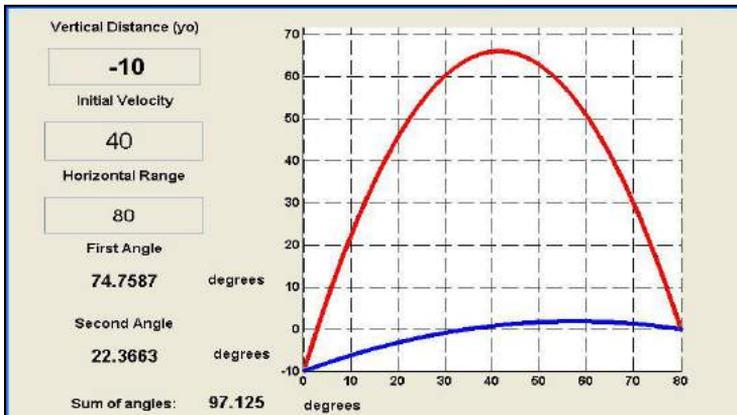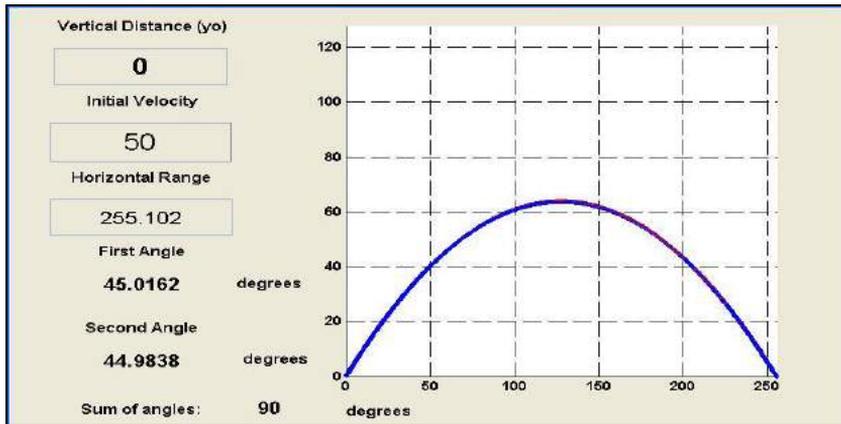
Figure 4. Given the initial conditions vertical distance $y_i = 0m$, initial velocity $v_i = 50\frac{m}{s}$, and the desired horizontal range $R = 255.102m$, the sum of the two angles with this range is 90. The discrepancy between the two angles is due to the calculations resulting to rounding and chopping errors of the machine.

3. Conclusions

As presented in the Results section, one can derived the sum of the two angles in a projectile with the same range. With the use of graphical interfaces, it was shown that for positive initial vertical distances the sum is always less than 90 while for negative initial vertical distances the sum is always greater than 90. Also for $y_i = 0$, the sum is always 90 which is a widely known property.

List of References

Chudinov, P.S. (2009) "The envelope of projectile trajectories in mid air", arxiv: physics/0511059[physics.class-ph] 10 August 2009.

Pailden, M. (2009) "On the General Sum of Angles in a Projectile with the same range and its Simple General Solution for Maximal Horizontal Range". 10th SPVM NationalPhysics Conference Procedings, pp. 169-171.

Young and Freedman. (2001) "University Physics" 10th Edition, Sandin T.R., Ford A.L. Addison Wesley Publishing Company

Statistical Analysis of Earthworm Data Using Ordination Method

Omensalam Asi
College of Arts & Sciences

Abstract

The study employed an ordination method, the Canonical Correspondence Analysis, in the analysis of species data and environmental data. It is unusual among the ordination methods used in community analysis in that the ordination of the community data matrix (species) is constrained by a multiple regression on its relationships to environmental variables. A statistical software is used for the illustration of the ordination method using a set of ecological data. It was found that the measured environmental factors significantly explain the species composition.

1. Introduction

Background of the Study

A common problem in community ecology is to discover how a multitude of species responds to external factor such as environmental variables. Statistical methods are available so far to analyze such data either assumed linear relationships or were restricted to regression analysis of the response of each species separately. Canonical Correspondence Analysis (CCA) does not require the assumption of linearity and is able to detect unimodal relationships between species and external variables.

As the name suggests, Canonical Correspondence Analysis is derived from Correspondence Analysis (CA), modified to allow environmental data to be incorporated into the analysis. Correspondence Analysis is a descriptive technique designed to

analyze simple two-way and multi-way tables containing some measures of correspondence between the rows and columns. CCA method allows one to analyze two tables, say A and B, which have the same number of rows. It is a correspondence analysis of Table A with linear constraint from B: the row scores are linear combination of variables of B. CCA differs from CA in that rather than looking for implicit relationships between ordination of a species matrix and some environmental variables, explicit relationships are explored

Objectives of the Study

The primary concern of this paper is to apply CCA ordination method in statistical analysis of an ecological data specifically the Earthworm Data gathered from Mt. Malindang, Misamis Occidental by the Biodiversity Research Programme. Specifically, the researcher intends to apply the method to a set of ecological data and attempts at interpreting the statistical results.

Significance of the Study

This paper will be able to present the method appropriate in the analysis of ecological data. This would serve as a reference for researchers interested in the analysis of species-environment relations. The result of this study will become a good reference to researchers conducting further study on ordination methods.

Scope and Limitations of the Study

This paper is an expository study on Canonical Correspondence Analysis as an ordination method. A full explanation of the theory underlying the Canonical Correspondence Analysis is beyond the scope of this paper.

Review of Related Literature

In this chapter, the researcher attempts to present a brief description of CCA. It is hoped that the reader can gain a further insight into the actual goal of this study.

Multiple Linear Regression

In a linear regression, the fitted (predicted) value of the response variable Y is a linear combination of the values of one or more predictor (X) variables

$$\hat{Y} = b_0 + b_1 X_1 + b_2 X_2 + ... + b_k X_k + \varepsilon_{ij}$$

(1)

An X variable in the model equation could be a nonlinear function of an observed variable, as long as the fitted Y remains a sum of the terms that each an X variable is multiplied by a coefficient.

Correspondence Analysis

Correspondence Analysis (CA) is also known as reciprocal averaging, because one algorithm for finding the solution involves the repeated averaging of sample scores and species scores (citations). Instead of maximizing 'variance explained', CA maximizes the correspondence between species scores and sample scores. First Axis species scores and sample scores are assigned such that the weighted correlation between the two is maximized where the 'weight' is the abundance of the species. The eigenvalue of the CA axis is equivalent to the correlation coefficient between species scores and sample scores.

Canonical Correspondence Analysis

Simply put, Canonical Correspondence Analysis is the marriage between CA and multiple regressions. Like CCA, CA maximizes the correlation between species scores and sample scores. However, in CCA the sample scores are constrained to be linear combinations of explanatory variables. Because of the 'constraint', eigenvalues in CCA will be lower than in CA.

The maximization in CCA as finding the best dispersion of species scores can be described. This view of CCA makes its link to unimodal models clear. If a combination of environmental variables is strongly related to species composition, CCA will create an axis from these variables that make the species response curves most distinct. The second and higher axes will also maximize the dispersion (or inertia) of species, subject to the constraints that these higher axes are linear combinations of the explanatory variables, and that they are orthogonal to all previous axis.

There are as many constrained axes as there are explanatory variables. The total 'explained inertia' is the sum of the eigenvalues of the constrained axes. The remaining axes are unconstrained, and can be considered 'residual'. The total inertia in the species data is the sum of eigenvalues of the constrained and the unconstrained axes, and is equivalent to the sum of eigenvalues, or total inertia, of CA. Thus, explained inertia, compared to total inertia, can be used as a measure of how well species composition is explained by the variables.

3. Result s & Discussion

Table 1: Summary of the Ordination

**** Summary ****

Axes	1	2	3	4	Total inertia
Eigenvalues	: .583	.297	.265	.128	1.864

Species-environment correlations: .937 .940 .944 .871

Cumulative percentage variance of species data : 31.3 47.2 61.4 68.3 of species-environment relation: 42.1 63.5 82.6 91.8

Sum of all unconstrained eigenvalues 1.864

Sum of all canonical   eigenvalues 1.387

A summary of the ordination is the most important part of the analysis output. By default, the software produces result for the first four ordination axes (indicated by the **Axes** row). The eigenvalues measure the importance of each of the axis. The eigenvalue of the first axis is 0.583. The second axis has an eigenvalue of 0.279. The third and fourth axes have a relative importance also since their eigenvalues are not zero. Presenting the ordination space diagram with four ordination axes will yield the best result the software used will produce plots (biplot and triplot) of only two axes.

The species-environment correlation measures the strength of relation between species and environment for a particular axis. It is the correlation between the sample scores for an axis derived from the species data and the sample scores that are linear combinations of the environmental variables. For the first four axes, there is a high positive correlation between the species and environment (r value from 0.871 to 0.944), which means that species distribution can be attributed to the environmental factors.

The percentage of variance of the species data is given cumulatively as well as for the species-environment relation. For abundance data, these percentages are usually low when analyzed with CCA. An ordination diagram that explains only a lower percentage may be quite informative [1]. For the first two axes, the cumulative percentage variance of species data is 47.2%. This means 47.2% of the variation in species is explained by the environmental variables. Figure 1 below is the biplot produced by the software using the Earthworm Data.

Figure 1: Biplot of Earthworm Data

Figure 2. Triplot of Earthworm Data

Figure 2 is the triplot of samples, species, and environmental variables. It is called a triplot because it simultaneously displays three pieces of information: sample as points, species as points, and environmental variables as arrows. In Table 1, for the first two axes, the cumulative percentage variance of species-environment relation is 63.5%. It indicates that 63.5% of the variation of species data is accounted for by the environmental variables. If the two percentages variance explained by the biplot and triplot based on the first two axes differ much, it is an indication that other (not the used ones) explanatory variables are important. There is another important explanatory variable that was not used in the analysis or perhaps it was not measured [5].

The total inertia is the total variance in the species data as measured by the chi-square statistic of the sample-species table divided by the table's total. The inertia is equal to the sum of all

eigenvalues. The total variance in the species data as indicated in the result of the analysis is 1.86416.

In Figure 2, environmental variables are represented by lines. Lines pointing at the same direction indicate that corresponding explanatory variables are correlated with each other. The smaller the angle between two lines the higher is the degree of the correlation between the corresponding environmental variables. CEC is highly correlated with % OM than with Total N based on Figures 1 and 2 in as much as the result is also presented in Table 1. Perpendicular lines or lines of angle 90 degrees mean that the corresponding environmental variables are uncorrelated. In this case, Total N is uncorrelated with Avail P. A weak linear relation was detected between Avail P and Exch K, soil pH and Exch K, and between Total N and soil pH. Their angles are near 90 degrees. Lines of opposite direction means the environmental variables associated with the lines are negatively correlated. Exch K is negatively correlated with Total N. A negative correlation exists also between Avail P and soil pH.

In Figure 2, certain species such as Pheret1, Pheret3, Pheret6, and Pherer7, towards the right of the diagram, are found in conditions of high pH and calcium. Pheret11 are mostly found in SSDSIBSE due to the Total Nitrogen factor. Pheret1and Pheret6 are present in UndNSE due to the high Cation Exchange Capacity. P_scolex and Pheret20 are mostly found in SSDSIBNE due to the soil pH factor in the site. Agro coco GR1, and Dist Pen sites are characterized also with soil pH factor but no species are found in the three location sites. Phere10 is present in Logged-over due to the presence of high Exchangeable Potassium (Exch K). Pheret12, due to Available Phosphorus, is mostly found in SSDNE.

Table 2: Summary of Monte Carlo Test

**** Summary of Monte Carlo test ****

Test of significance of first canonical axis: eigenvalue =   .583

F-ratio   =   2.277

P-value   =   .1550

Test of significance of all canonical axes: Trace   =   1.387

F-ratio   =   2.074

P-value   =   .0400

(199 permutations under reduced model)

Table 2 summarized the results of the Global Permutation Tests to judge the significance of the relation between species and environmental variables using CCA. The test of significance based on the first canonical eigenvalue is reported first. The first canonical eigenvalue is 0.448 and the F-ratio is 2.277. The resulting p-value is 0.1550 indicating that the first canonical axis is statistically insignificant at 0.10 level. The test based on the sum of all canonical eigenvalues (the trace) follows. The trace is 1.387, leading to an F-ratio of 2.074 and p-value of 0.0400 demonstrating that the measured environmental variables significantly explain the species compositions at 0.05 level.

4. Summary, Conclusion and Recommendation

Summary and Conclusion

The statistical software produces a summary of the CCA ordination method, and the Monte Carlo Tests. It also produces summary of values for the first four axes. Summary of the ordination contains the eigenvalues for the first four axes. The percent variation represented by the first two axes in the biplot and triplot is also given. The Monte Carlo tests the significance of the first canonical eigenvalue and all the canonical axes.

The eigenvalues measure the importance of each of the canonical axis. The species-environment correlation measures the strength of relation between species and environment for a particular axis. The percentage of variance of the species data is given cumulatively as well as for the species-environment relation. The cumulative percentage variance of species data for the first two axes indicates the amount of variation (inertia) explained by the axes, as a percentage of the total variation. The species-environment relation cumulative percent represents the amount of variation explained by the axes, as a percentage of the variation that can be explained with the explanatory variables. If these two percentages differ much, it is an indication that other (not the used ones) explanatory variables are important.

No environmental variables were correlated with each other in the analysis result. There is a high correlation between species and environment for the first four axes. 47.2% of the total variation is presented in the biplot. The variation that can be explained with the explanatory variables for the first two axes is 63.5%, i.e. 63.5% of the variation is represented by the triplot. An ordination diagram that explains only a lower percentage may be quite informative.

Inspection of the analysis can be viewed using the biplot and triplot. The lines in the diagram represent environmental variables. The longer the lines the more important is the environmental factor. Opposite lines indicate that corresponding environmental variables are negatively correlated whereas lines of the same direction indicate positive correlation. Orthogonal lines indicate the environmental variables are uncorrelated. The smaller the angle between lines the greater is the correlation of the environmental variables.

The weighted means of the species are plotted in the biplot. These points are associated to the environmental variables that are linear combinations of the ordination axes. This may be interpreted that the presence of the species on a particular site is due to the effect of a particular environment. The triplot simultaneously plot the sample scores, species scores, and environmental variables.

Recommendation

The researcher would like to recommend an attempt at exploring the CanoDraw program inorder to create a more sophisticated ordination diagram A covariable data which can also be incorporated in the analysis.

List of References

Leps, J. and Smilauer, P. (2003). Multivariate Analysis of Ecological Data Using CANOCO. Cambridge, UK. Cambridge University Press.

ter Braak, C. J. F. (2002) *CANOCO Reference Manual and CanoDraw for Windows User's Guide: Software for Canonical Community Ordination (version 4.5)*. USA: Microcomputer Power, 2002.

ter Braak, Cajo J. F. (1985) *Correspondence Analysis of Incidence and Abundance Data: Properties in Terms of a Unimodal Response Model*. Washington, DC, Ecological Society of America

On *k-* distance Absorbing Sets and *k*-distance Absorbing Numbers Of Graphs with Specified Radius

Jovannie R. Castillo
Ernie O. Capuno
College of Arts and Sciences

Abstract

Let G be a graph and $S \subseteq V(G)$. A set S is said to have a k-distance absorbing property in G if for each $v \in V(G)$, there exist a vertex $s \in S$ such that $d(v,s) \leq k$. The k-distance absorbing number is defined as. $\Delta_k(G) = \min\{|S| : S \text{ has a } k - \text{distance absorbing property in } G\}$

In this paper some results on the k-distance absorbing numbers and *k*-distance absorbing sets of graphs specifically with a given radius are explored. A bound for the *k*-distance absorbing number of any arbitrary graphs is given as well.

1. Introduction

Background of the Study

The *k-* distance absorbing problem is a pioneering work in the theory of graphs. The problem arises due to a previous study done by the authors involving Eulerian graphs and digraphs for which accessibility problems are encountered. Varying the conditions a new perspective has been drawn which is known as the *k-* distance absorbing sets of a connected and undirected graphs.

In this paper, given any natural number k and a graph G, the authors wish to find out the existence of a non empty set S subset of the vertex set of G of the smallest cardinality possible such that for all vertex u in the vertex set of G there must exist at least one v in S such that the distance between u and v is at most k.

Statement of the Problem

This study deals on the k- distance absorbing sets and determines its k- distance absorbing number; in particular this study will attempt to produce the following results.

i) The k- distance absorbing number of a tree.
ii) The k- distance absorbing sets of graphs with specified radius or diameter.
iii) Characterizing those graphs whose k- distance absorbing number is equal to its order (if   there is any).
iv) Characterizing those graphs whose k-distance absorbing number is exactly equal to one.
v) Characterize those graphs for which $\Delta_k(G) = k$.

Significance of the Study

This study, will explore results involving k-distance routes. This is most especially useful to those who want to be involved in the study of shortest routes problem, but with the additional constraint of specifying the length of routes at the maximum. The authors also foresee some applications in business and optimization problems. It is hoped that the study will pave the way for further exploration in this concept.

Scope and Limitation

The graphs considered in this paper are connected, undirected, no loops and multiple edges.

2. Methodology

Results generated in this study employ different basic strategies. Basic concepts and preliminary notions accompanied with illustrations are given to facilitate the derivation of the results. Furthermore, illustrations are made to search for a pattern, which serves as a foundation in generating the results. The symbol *q.e.d. (qoud errat demonstratum)* signifies that the proof has been demonstrated.

Basic Concepts and Preliminary Notions

This Section gives the basic concept that is needed in this study. Most of the definitions in Section 2.1 are taken from the book "Graph Theory" by Frank Harary.[3]

Basic concepts and Definitions

Definition 2.1.1 A graph G is a pair $\langle V(G), E(G) \rangle$ where $V(G)$ is a finite non-empty set of elements called *vertices* and $E(G)$ is a set of 2-subsets of $V(G)$ called *edges*. The sets $V(G)$ and $E(G)$ are referred to as the *vertex set* and the *edge set* of *G*, respectively. If u and v are end vertices of an edge *e, we* denote the edge by symbol $e = uv$ and that u and v are adjacent while u and *e* are incident, as *v* and *e* are.

Definition 2.1.3 The *cardinality* $|V(G)|$ of $V(G)$ is called the *order* of G, while the cardinality $|E(G)|$ is called the size of G. A graph G with p vertices and q edges is called a (p,q) graph the $(p,0)$ graph is referred to as the empty graph of order p. In particular, a $(1,0)$ is called the *trivial graph*.

Definition 2.1.8 A *subgraph* of a graph G is a graph having all of its vertices and edges in G. It is a *spanning subgraph* of G if it contains all the vertices of G. If H is a subgraph of G, then G is said to be a *supergraph* of H. If S is a non empty subset of $V(G)$, the subgraph $\langle S \rangle$ of G *induced* by S is the maximal subgraph of G with vertex set S.

Definition 2.1.4 A graph G is said to be *connected* if every pair of its vertices are joined by a path. A maximal connected subgraph of G is called a *connected component* or simply a *component* of G.

Definition 2.1.5 The distance $d(u,v)$ between two vertices u and v in a connected graph G is the length of the shortest path joining them if any.

Definition 2.1.*6* The eccentricity $e(v)$ of a vertex v in a connected graph G is the $\max d(u,v)$ for all u in G. The radius $r(G)$ is the minimum eccentricity of the vertices while the diameter of G denoted by diam(G) is the maximum among all the eccentricities.

Definition 2.1.7 A vertex v is a central point if $e(v) = r(G)$, and the center of G is the set of all central point.

Definition 2.2.7 A graph is called *acyclic* if it contains no cyclic subgraph. A *tree* T_n is a connected acyclic graph. A *forest* is a disconnected acyclic graph.

Preliminaries

Definition 2.2.1 Let $k \in \square$. A graph G is said to be k-distance absorbing if there exist a non empty set $S \subseteq V(G)$ such that $d(u,v) \leq k$, $\exists u \in S$ and $\forall v \in V(G)$. Such a set S is said to have a k-distance absorbing properties in G. The k-distance absorbing number is defined as

$\quad \Delta_k(G) = \min \{ |S| : S$ has a k-distance absorbing property in $G. \}$

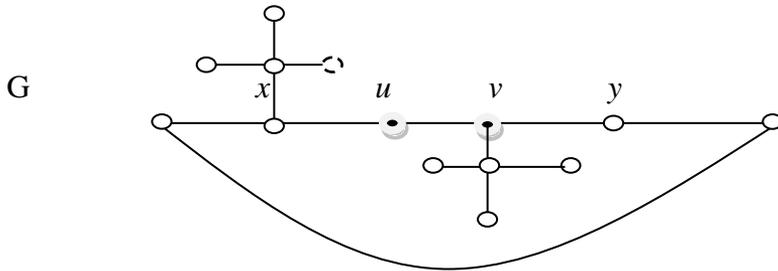**Example 2.2.2**. Consider the graph G below.

G

Figure 2.2.1

In figure 2.2.3 the graph G is a 3-access graph since the set $S_1 = \{x, u, v, y\}$ has a 3-access in G, however the set $S_2 = \{u\}$ has also 3-access on G and no other set of cardinality less than 1 has a 3-access on G. Thus, $\alpha_3(G) = 1$.

3. Results and Discussions

k- distance absorbing sets of graphs with specified radius

Theorem3.2.2. Let G be a graph and $k \in \Box$ where $k = \text{rad}(G)$ Then, $\Delta_k(G) = 1$ if and only if there exist a singleton subset S of $V(G)$ whose element is a center of G.

Proof: Suppose that $\Delta_k(G) = 1$ then this implies that there exist a set $S = \{v\}$ such that S has a k-distance absorbing properties in G. Now, suppose to the contrary that v is not a center in G, then this implies that $e(v) \neq \text{rad}(G)$ so either $e(v) > k$ or $e(v) < k$.

Case 1: If $e(v) < k$ then this is trivially contradictory since $k = \text{rad}(G)$, contradicting the minimal property of k.

Case2: Suppose $e(v) > k$ and let $v' \in V(G)$ such that v' is the vertex farthest from v, then $d(v, v') > k$ but by assumption $S = \{v\}$ has a k-distance absorbing properties in G thus $\forall v' \in V(G) \, d(v, v') < k$ a contradiction. In either case researchers arrived at a contradiction, so it cannot be assumed that v is not a central vertex.

Conversely, If $S = \{v\}$ where v is a center, then all other vertices in G is at most at k distance from v so the set $S = \{v\}$ has a k-distance absorbing properties in G and since $k \neq 0$ implies that $\Delta_k(G) = |S| = 1$.
Q.E.D

Theorem3.2.4. Let G be a graph, $k \in \square$ where $k = \mathrm{rad}(G)$ and $S \subseteq V\{G\}$ contains all the centers of G. then $\Delta_k(G) \leq |S|$.

Proof: Let $s \in S$. Since $k = rad(G)$ implies that $d(s,v) = k$ where v is the vertex which is farthest from s. Since S contains all the centers implies that for all $v \in V(G)$ and for all $s \in S$ $d(v,s) \leq k$ therefore $\Delta_k(G) \leq |S|$.

    Q.E.D

    Definition 3.2.3 Let G be a graph. A *major path* in G denoted by P_M is a path in G of Maximum length. A path is a *minor path* denoted by P_m if its initial and (or) its terminal vertex is on a major path and all other vertices of P_m is not in P_M.

Example 3.2.4 Consider the graph G below
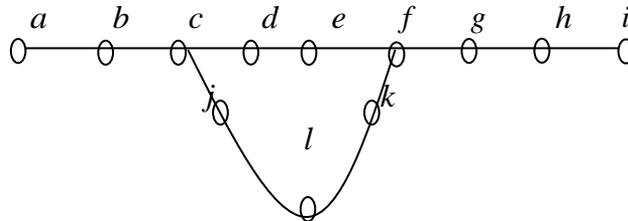
The path $P_M = [a,b,j,l,k,e,f,g,h,i]$ is a major path while $P_m = [b,c,d,e]$ is a minor path. The path $P = [a,b,j,l,k,e,f]$ is neither a minor or a major path since it contains vertices which are located along a major path in G.

    Theorem 3.2.5. Let G be a graph and $k \in \square$. A bound for $\Delta_k(G)$ is given by the inequality

$$\left\lceil \frac{M}{k} \right\rceil \le \Delta_k(G) \le \left\lceil \frac{M}{k} \right\rceil + \sum_i \left\lceil \frac{m_i}{k} \right\rceil$$

where $|P_M| = M$ and $|P_{m_i}| = m_i$. For all i where i is the number of minor path/s in G.

Proof: Let $P_M = [v_1, v_2, ..., v_i]$ be a major path in G. Partition the vertex set of P_M in the following manner: $P' = [v_1, v_2, ..., v_k], P'' = [v_{k+1}, v_{k+2}, ..., v_{2k}], ..., P^{(r^{th})}{}' = [v_{rk}, v_{rk+1}, ..., v_i]$ where $\left| P^{(r^{th})}{}' \right| \le k$. This implies that for all $v_j \in V(P_M)$, there exist a partition $P^r{}'$ such that if v_j is a vertex which belongs to that partition. There exist a $v_s \in V\left(P^{(r^{th})}{}' \right)$ and $d(v_s, v_j) \le k$, thus if G is isomorphic to P_M then $\frac{n}{k} \le \Delta_k(G)$ and since $\Delta_k(G)$ is a natural number it has $\left\lceil \frac{n}{k} \right\rceil \le \Delta_k(G)$. Now, if G is not P_M then it must contain minor paths say P_{m_t}, where t is the number of minor paths in G. By the same argument each of this minor path has $\Delta_k(P_{m_j}) \le \left\lceil \frac{m_j}{k} \right\rceil$ and since there are t minor paths the researchers $\Delta_k(G) \le \left\lceil \frac{M}{k} \right\rceil + \sum_j \left\lceil \frac{m_j}{k} \right\rceil$ combining the two inequalities they have the desired result.

4. Summary and Recommendations

This paper is a pioneering study in this area of graph theory. Henceforth the researchers would like to post the following recommendations:

1. That a further exploration should be conducted in this area.

2. That the bounds for $\Delta_k(G)$ be established as equalities.

List of References

Canoy S.Jr. and Buenavista R. (2004) *Moreon the Tree Chromatic index of a Graph.* Journal of Research in Science and Engineering (JRSE). Vol.1 No.2.

Chartrand G. and Lesniak, L. (1996) *Graphs and Digraphs*: 3rd Edition New York: Chapman and Hall.

Chartrand G. and Ortrud, O. (1993) *Applied and Algorithmic Graph Theory.* New York: McGraw-Hill, Inc.

Harary, F. (1969). *Graph Theory*. Reading MA: Addison-Wesley,

Awareness, attitudes and care-seeking practices of community people in Lam-an and Annex, Ozamiz City towards Tuberculosis: A Baseline Survey

Rezyl R. Mallorca
College of Arts and Sciences

Abstract

This paper is commissioned by Holistic Community Development Initiatives to assess the knowledge, attitudes and care-seeking practices of the residents of Lam-an and Annex, Ozamiz City regarding Tuberculosis. The study used descriptive research design that includes 610 residents of the identified barangays whose ages ranged from 12 to 65 years old. Findings revealed that almost all residents heard about tuberculosis, knew that it is serious and were aware that it is contagious. More so, there was still considerable number of respondents who did not know about how one could catch the disease. The findings further showed that respondents need to be educated regarding tuberculosis' prevention and treatment. Community residents' attitudes towards TB infected people are generally supportive, however, they tend not to get near those who are infected because of fear that they might be infected as well. Majority claimed that they will seek for immediate attention in case they display symptoms of TB.   Aggressive health education, enhanced programs for information dissemination regarding tuberculosis and a further assessment on effectiveness of TB DOTS program are among the ones recommended.

1. Introduction

Tuberculosis has been considered a major health problem worldwide that contributes to the considerable losses of resources. Substantial funds were spent in coming up with research based treatment and control of the tuberculosis, yet 1.77 million people died from TB in 2007 which is equal to about 4800 deaths a day (WHO, 2009). Further, it was reported that there are already about two billion people, equal to one third of the world's total population

are infected with TB. Despite the efforts made by the World Health Organization, case findings on TB positive patients had tremendously increased including patients with multi-drug resistant tuberculosis.

Directed by the World Health Organization, the Philippine government has launched several programs to fight against TB for decades, one of which is the National Tuberculosis Control Program (NTP). History shows how the government extends its efforts in trying to monitor and control TB cases in the country. The latest endeavor that the Department of Health took was the implementation of the new treatment regimen known as the Directly Observed Treatment, Short Course Strategy (DOTS) that follows the World Health Organization's guidelines. NTP's DOTS was implemented when an intensified national campaign to increase awareness about TB and to mobilize support for its prevention and control (DOH, 2005).

Notwithstanding, Philippines is still accounted to be one of the six Asian countries with the highest estimated TB incidence rates (WHO, 2009). This affirms the claim of medical practitioners that TB mostly affects the developing countries (MSF-USA Association, 2009). In 2007, figure shows that there were 255, 084 new TB cases found totaling to 440, 035 people living with TB in the Philippines. The rate is expected to have increased through the years since it was estimated by the World Health Organization (2009) that around 6,000 new TB cases are reported annually in the Philippines.   This prompted the researchers to probe on the awareness, attitudes and practices of the community people in Laman and Annex, Ozamiz City regarding tuberculosis. This would somehow create picture of whether the NTP's program has reached its vision to increase the awareness of the citizenry and mobilize support for its prevention and control.

Statement of the problem:

This study aims to find out the community peoples' awareness, attitudes and care-seeking practices regarding tuberculosis. Specifically, it aims to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
    a. Age
    b. Gender
    c. Education
    d. Type of work
    e. Proximity of house to the nearest health clinic

2. What is the awareness of the community towards tuberculosis in terms of:
    a. Its existence
    b. Its communicability
    c. Its modes of transmission
    d. Its symptoms
    e. Its Prevention
    f. Its cure
    g. Availability of health services
    h. Sources of information available about TB

3. What are the attitudes of community people towards tuberculosis?
4. What are the practices employed by the community people regarding tuberculosis?

Significance of the study

This study may give benefit to the community people through getting important information about TB, its existence, modes of transmission, symptoms, prevention and cure.

Health practitioners, Department of Health and Local Government Unit may also get information necessary to design programs as to dissemination regarding the disease, the prevention and monitoring programs.

2. Methodology

This present study uses descriptive research design. It merely describes the awareness, attitude and practices of the community people in Lam-an and Annex, Ozamiz City towards tuberculosis. Respondents are community people whose age ranged from 12 to 65 years old living in the identified areas in the City of Ozamiz. Conventional random sampling was used in determining the respondents who were taken. A researcher-made questionnaire was utilized as a primary instrument in gathering data.

The questionnaire consisted of four parts. First part measures respondents' demographic profile while the second part measures respondents' level of awareness about tuberculosis. On the other hand, the third part of the instrument assesses respondents' attitudes toward tuberculosis and lastly, the fourth part evaluates respondents' practices.

The researchers will follow the following procedures to reach the study's objectives. A courtesy call will be made for the approval of conducting the study from the local government unit involved at the same time conducting orientation of the research

assistants regarding the nature and importance of the study, how the questionnaire will be used to gather data and how to validate respondents' responses through interview. Data gathered will be analyzed through descriptive and some inferential statistics.

3. Results and discussion

Respondents' demographic profile

Majority of the respondents under the study are aged between 16-60 years old dominated mostly by men. Majority of the respondents are literate since almost all were able to go to school of which 5.2 percent are able to finish tertiary education.

When asked about having means of living, majority of the respondents said that they are employed. However, by looking at Table 3, one can tell that majority of those respondents who are employed are into blue collar workers for there are only few who are degree holders. As observed majority are working as laundry women, drivers, and the like. Respondents when asked about how close are their houses to the nearest hospital or clinic, 88.5 percent claimed they are near with approximately 0 to 10 km to the health facility. More so, as depicted in Table 6, it is a practice for community people to go to the public hospital to avail of medical services whenever someone in the family gets sick.

Awareness towards Tuberculosis

Almost all of the respondents are aware of the existence of tuberculosis as presented in Table 7. About 72.1% of these respondents claimed that they learned about the disease through people namely: health workers, family, friends, neighbors and colleagues while others learned it through television (50.7%), and

TB DOTS CHE program (52.6%). There were only few (7.3%) who claimed to have been taught about tuberculosis by religious leaders and been able to read from newspaper and/or magazines.

It was found out that majority of the respondents informed about the illness believed that it is serious (81.5%) and that it is also contagious (99.1%). However, it is worth noting that there were around 5.9% of the respondents in the study who do not know about tuberculosis, about 23.4% of the total respondents do not know that it is serious and that about 6.7% of the respondents did not know that it is contagious.

Respondents when asked regarding the modes of disease's communicability, majority believed that tuberculosis is airborne, that it can be caught when infected person coughs or sneezes. However there were only 64% of the respondents know that tuberculosis can also be caught through sharing of dishes/food with an actively infected person and about 16% considered getting TB by touching items in public places that could have been infected with the droplets deposited when someone who is infected sneezes or coughs covering mouth with hands and touching public facilities.

Table 12 presented the idea that not all of the respondents are aware of the symptoms of tuberculosis. Respondents thought that coughing up blood is the trademark symptom of tuberculosis as there were about 90% who checked it among the list seconded by cough that lasts longer than 3 weeks (78%). There were only about half of the respondents knew that weight loss, chest pain, shortness of breath, constant tiredness and night and afternoon sweats are signs of tuberculosis. It was found out that there were still considerable numbers of respondents who lacked the knowledge about the symptoms of TB.

Respondents' knowledge about tuberculosis in terms of its prevention is presented in Table 13 while Table 15 showed their knowledge regarding the illness' cure. As can be gleaned, there is still a need to educate the respondents regarding the prevention and treatment of tuberculosis since there were only about half of the respondents knew how to prevent it. Though almost all of the respondents knew that TB is curable (Table 14), there are still a number who did not know how it can be cured. Despite the fact that almost all respondents are aware that they can get free specific TB drugs and services from the health center that can be supplied for about six months, there were only 18% of the respondents knew about DOTS program specifically designed for TB patients.

Few respondents claimed that private doctors and/or clinic, non governmental organizations and/or church offer free TB treatment and services to patients while majority knew that they can be free from public doctors and clinic/hospital. This implies that there are still community people out there who have no idea that they can avail medical services and treatment from the government for free in case they get infected. Getting infected is a possibility as believed by the majority as shown in Table 19.

Respondents' attitude toward tuberculosis

The respondents would likely feel sad when they get infected with TB while others feel afraid about what could happen to them after the infection and some others may feel embarrassed for they could be a taboo to the community. Most of them knew of someone infected with TB in the community. About half of these respondents claimed that they feel compassionate enough to help those TB patients they knew while almost 30% claimed that they have the passion to help but more likely stay away because they might catch the illness.

Community's attitude towards people infected with TB is generally supportive as claimed by majority of the respondents. However, there were still a number of respondents who were able to observe that most people in their community are friendly but tend to avoid or even reject others who had TB. This might hold true to the respondents' attitude of avoiding because of fear that they might become victims of TB contamination if they get near or associate themselves with TB patients.

The revealed findings in terms of community's attitude towards tuberculosis can be attributed to the fact that not all people are fully aware on the basic facts about tuberculosis. They tend to feel fear because they thought that TB patients generally infect others by all means.

Care-Seeking practices

Majority of the respondents said that they can easily turn to their spouse for moral support in case they will be infected with TB. Respondents (86%) claimed that they would seek for immediate treatment as soon as they realize that they display symptoms of tuberculosis. To attend to their medical needs, 80% of the respondents know that going to the health center helps while others (55%) said they will go to a doctor for check up if they will be confronted with symptoms of the disease. When asked for reasons of a possibility of not able to go to any health facility with prevailing symptoms, some respondents (19%) said that it could be attributed to the cost of going which could mean cost of medicines and check up while 13% said failure to go can be attributed to the fact that they do not know where to go, cannot leave work (8%) and that they do not want to know that something is wrong with them (6%).

4. Conclusion and Recommendation

Conclusion

Some community people in Lam-an and Annex, Ozamiz do not know about tuberculosis, its symptoms, prevention and cure. More so, there were some community people who did not consider TB as serious and contagious disease.

Community people in the two identified barangays tend not to associate themselves though they feel the passion to help with the TB patients for fear of being infected.

Support of spouse and family in general are likely to be sought by people in the place in case they are confronted with TB infection. They are seen to be very eager to go the health center as soon as they know they have such infection. Possibility of community people's failure to avail for medical treatment and services is thought to be attributed to financial status of the family.

Recommendations

There is a need to aggressively push a health education program for the community people in Lam-an and Annex, Ozamiz City that will not only address teaching people the basics of tuberculosis but also to address issues on community's attitudes towards TB and patients in general.

Existing program/s designed for information dissemination regarding tuberculosis should be enhanced so that all people will be educated about the disease. It must be encouraged that those who are fully educated should share their knowledge in the community like their family members and friends.

A study could be done to assess the effectiveness of TB DOTS program and the efficiency of its implementation.

Appendix

Table 1: Respondents' distribution by Age

Age range	Frequency	Percentage
15 below	5	8
16-39	262	43
40-60	245	40.2
Above 60	89	14.6
No answer	9	1.5
Total	610	100

Table 2: Gender

Gender	Frequency	Percentage
Male	366	60
Female	232	38
No answer	12	2
Total	610	100

Table 3: Educational attainment

Level of Educational attainment	Frequency	Percentage
Elementary	91	14.9
High school	225	36.9
College level	248	40.7
College graduate	32	5.2
No answer	14	2.3
Total	610	100

Table 4: Status of employment

Status	Frequency	Percentage
Employed	418	68.5
Unemployed	131	21.5
No answer	61	10
Total	610	100

Table 5: House proximity to the nearest health facility

Distance (km)	Frequency	Percentage
0-10	540	88.5
11-20	39	6.4
21-30	9	1.5
31 above	4	.7
No answer	18	3
Total	610	100

Table 6: Medical services availed when sick

Medical services availed at	Frequency	Percentage
Private doctors	231	
Public hospital	423	
Nongovernmental hospital/clinic	28	
Quack doctor	63	

Table 7: Existence of tuberculosis

Categories	Frequency	Percentage
Aware	574	
Unaware	10	
No answer	26	

Table 8: Means of awareness regarding the existence of tuberculosis

Channels of communication	Frequency	Percentage
Newspapers/magazines	42	
Television	291	
Radio	215	
Teachers	82	
Brochures, posters & printed materials	214	
Health workers, Family, friends, neighbors & colleagues	414	
Religious leader	42	
TB DOTS CHE	302	
Health center workers	158	

Table 9: Awareness regarding TB as serious disease

Extent	Frequency	Percentage
Very serious	208	
Slightly serious	259	
Not serious	108	
No answer	35	

Table 10: Tuberculosis as contagious

Responses	Frequency	Percentage
Contagious	569	
Not contagious	2	
No answer	39	

Table 11: Modes of transmission

Modes	Frequency	Percentage
Handshake	92	
Sharing of dishes/food	390	
Air when TB infected person coughs or sneezes	546	
Eating from the same plate	215	
Touching items in public places	96	
Don't know how it is communicated	4	

Table12: Symptoms of tuberculosis

Symptoms	Frequency	Percentage
Skin rashes	7	
Cough	242	
Coughing up blood	550	
Sever headache	68	
Nausea	99	
Weight loss	373	
Fever	183	
Cough that lasts longer than 3 weeks	476	
Chest pain	305	
Shortness of breath	304	
Constant tiredness	306	
Prolonged fever	119	
Night and afternoon sweats	346	
Do not know	1	

Table 13: Awareness on the prevention of tuberculosis

Responses	Frequency	Percentage
Avoid shaking hands	70	
Avoid sharing of utensils	331	
Close windows at home	13	
Pray	92	
Eat nutritious foods	462	
Cover mouth and nose while coughing or sneezing	361	
Wash hands after touching items in public places	302	
Do not know	1	

Table 14: Awareness regarding TB as curable

Responses	Frequency	Percentage
Aware	561	
Unaware	11	
No answer	38	

Table 15: Awareness on how TB is cured

Perceived ways in curing TB	Frequency	Percentage
Taking herbal medicine	27	
Praying	94	
DOTS	111	
Home resting without medicines	31	
Taking specific drugs given by health center	562	
Do not know	1	

Table 16: Awareness on the prescriptive period of tuberculosis treatment

Prescriptive period	Frequency	Percentage
7 days	5	
2 months	2	
4 months	1	
6 months	527	
Do not know	46	
No answer	29	

Table 17: Awareness regarding free TB treatment and services

Responses	Frequency	Percentage
Aware	489	
Unaware	24	
No answer	97	

Table 18: Availability of free treatment and service

Places where TB treatment and services are available	Frequency	Percentage
Private doctors/clinic	219	
Public hospital/clinic	542	
Nongovernmental organization's or church's clinic/hospital	18	
Do not know	10	

Table 19: Perception regarding the possibility of being infected

Responses	Frequency	Percentage
Possible	555	
Impossible	7	
No answer	48	

Table 20: Possible reactions when infected with TB

Possible reactions	Frequency	Percentage
Fear	149	
Wonder/surprise	29	
Embarrassed	105	
Sad/hopelessness	441	
Ashamed	62	

Table 21: Knowledge of someone infected with TB

Responses	Frequency	Percentage
Yes	444	
No	124	
No answer	42	

Table 22: Feeling towards somebody infected with TB

Feelings	Frequency	Percentage
I feel compassion and desire to help	314	
I feel compassion but I tend to stay away from these people	180	
I fear them because they may infect me	178	
I have no particular feeling	33	
It is their problem and I cannot get TB	14	

Table 23: Community's treatment towards someone infected with TB

Observed practices	Frequency	Percentage
Most people reject him or her	90	
Most people are friendly, but they		

	Frequency	
generally try to avoid him or her	233	
The community mostly supports and helps him or her	313	

Table 24: Confidants in case one infected with TB

Confidants	Frequency	Percentage
Spouse	452	
Child	102	
Parents	135	
Other family members/relatives	13	
Friends	36	
Nobody	2	

Table 25: Things to do when confronted with symptoms of TB

Things to be done	Frequency	Percentage
Go to hospital	189	
Go to pharmacy	6	
Go to the doctor for check up	336	
Table 25, continued		
Go to health center	492	
Go to traditional healer	11	
Pursue other self-treatment options (herbs, etc)	8	

Table 26: Waiting time before getting oneself treated when infected with TB

Responses	Frequency	Percentage
When treatment on my own does not work	109	
When symptoms last for 3-4 weeks	88	
As soon as I realize that my symptoms might be related to TB	530	
Would never go to the doctor	3	

Table 27: Reasons in case one won't go a health facility when infected with tuberculosis

Reasons	Frequency	Percentage
Not sure where to go	79	
Cost	118	
Difficulties with transportation/distance to clinic	4	
Do not trust medical workers	2	
Do not like attitude of medical workers	5	
Cannot leave work (overlapping work hours with medical facility working hours)	53	
Do not want to find out that something is really wrong	35	

List of References

DOH. (2005). Manual Procedures for the National Tuberculosis Control Program, Department of Health, Manila, Philippines: Department of Health

WHO. (2008). Advocacy, Communication and Social Mobilization for TB Control: A Guide to Developing Knowledge, Attitude and Practice Surveys, Switzerland: WHO Press

Prepaid College Education Plan: An Alternative Leverage For HEI'S to Finance the Needed Infrastructure

Raymundo C. Dolor
Cynthia S. Tac-an
Rosalia E. Celestiano
College of Accountancy

Abstract

The study was on the possibility of issuing a prepaid college educational plan to the parents of students enrolled in the Integrated School of La Salle University and the financial viability of using the cash generated from it to finance the needed infrastructure of LSU. Results showed that the said plan is desired by 117 parents of LSU-IS and that it will generate cash of approximately P4.9M a year and approximately P23M in 5 years which is enough to finance the needed future infrastructure.

1. Introduction

People see the need to secure their children's education. This is evidenced by the sprouting of pre-need companies catering educational plan. Mr. Diomedes Goboleo, in his paper "Reforming the Pre-need Industry: A Review" which was used as basis of House of Representative's Policy Advisory 2008-07 stated that *the pre-need plans enjoyed unprecedented growth in the early years of its introduction in the market with industry sales growth of 127% between 1994 and 2001* in just a period of 7 years.

Unfortunately, pre-need companies started to collapse one by one leaving the investing public with disappointments and vain hopes. Among others cited as causes of the collapse in the Policy Advisory is the skyrocketing of tuition fees when tuition fees were

deregulated in 1992. For just a period of 6 years, the tuition fee rate per unit increased by 36% from 257.41 per unit in 2001 to 350.27 per unit in 2006 at an annual average increase rate ranging from 12.33% in 2001 to 9.53% in 2006 as shown in Table 1 below.

Table 1

Average Tuition and Tuition Fee Increase Rate

Year	Total # of PHEIs	# of schools increasing tuition	% of total	Average % increase in tuition	Average increase in peso equivalent/ unit	Tuition fee rate/ unit
2001-2002	1,175	422	35.91	12.33	33.81	257.41
2002-2003	1,271	383	30.13	11.74	34.49	308.50
2003-2004	1,280	358	28	11	32.48	323.64
2004-2005	1,321	381	28.84	11.37	33.15	334.89
2005-2006	1,347	305	22.64	11.58	36.38	350.55
2006-2007	1,428	390	27.31	9.53	31.04	350.27

Source: CHED as cited in the paper of D. Goboleo.

The Philippine Federation of Pre-Need Plan Companies, Inc. reported that the cost of 4-year College Education was 76.47% higher for just a period of 5 years from P408, 000 in the year 2000 to P720, 000 in the year 2004. In La Salle University for instance, the tuition was increased by 10% annually for 5 years since the year 2005 except in the year 2006 on which case the tuition fee increase was only 7.60%. At such rate, the tuition fee per unit increased by 43.21% from P279.40 in the year 2005 to P400.14 in 2009 with 2005 as the base year.

With the trend in tuition fee increases for the last 5 years, the pre-need companies must have to invest the money contributed

by pre-need education plan holders at a minimum rate of return of 10% annually to cope up with its currently maturing obligations.

On the other hand, Higher Educational Institutions (HEI) are currently financing its needed infrastructure through bank loan at an interest rate ranging from 18%-22% annually. La Salle University for instance, has been incurring millions of pesos of capital expenditures each year in support of its aim for an effective learning environment. Within the past five years, it finances the construction of its new building through bank loan. Sports facilities are still needed to be constructed in its campuses like swimming pool, tennis court, covered basketball courts and some other sports facilities and laboratories essential for the total development of its students. But sad to note, that the current college students might not be enjoying these planned facilities during their college years when in fact they shoulder part of the costs for the realization of this future infrastructure. It is in this regard that prepaid college education plan might become essential. It is by this way that by the time a student enters college he/she will be enjoying the facilities from what he/she was paying in advance.

The Problem

This research aims to determine the marketability and possibility of leveraging the capital expenditure of La Salle University through **"Prepaid College Education Plan"**. Specifically, it seeks to answer the following questions:

1. Are the lower level Integrated School (IS) students of La Salle University (LSU) covered by college educational plan?
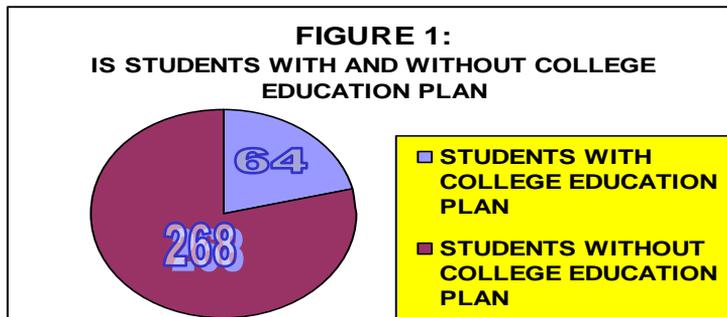
2. If the students are not covered by the college educational plan, do parents of lower level IS students of LSU intend to get a college educational plan?

3. If they intend not to get a college educational plan, what could be the ultimate reason for not getting one?

4. Will parents of these students prefer LSU to be one of the top three schools to where their children get college education?

5. If LSU is one of the top three choices in mind, what is these parents' level of interest of securing their child's college education in LSU under the "Prepaid College Education Plan"?

6. If LSU is not one of the top three choices in mind, what is the degree of possibility on parents' decision/mind if LSU introduced to them the prepaid College Education as an option?

7. What could be the projected 4-year and 5-year college education costs of these students using the present tuition fee increase rate?

8. How much periodic amortization premium that La Salle University could offer them?

9. Which could have higher cost of capital if capital expenditures will be financed from the proceeds of the "Prepaid College Education Plan" instead of a bank loan?

10. What could be the non-monetary advantages and disadvantages of introducing the said plan?

-- 109

2. Methodology

This is a descriptive, comparative and evaluative kind of research. The unit under study is the 454 lower level students of La Salle University Integrated School. The research used primary and secondary data. All the 454 lower level students were given the questionnaire and were collected through their respective advisers. Of the said number, only 302 returned the questionnaire distributed.

3. Results and Discussions

As shown in Figure 1 below, only 64 (27%) of the 302 lower level Integrated School students are covered by college educational plan and 268 (73%) are not.

FIGURE 1:
IS STUDENTS WITH AND WITHOUT COLLEGE EDUCATION PLAN

64

268

☐ STUDENTS WITH COLLEGE EDUCATION PLAN

■ STUDENTS WITHOUT COLLEGE EDUCATION PLAN

By grade level, there is a good number of students in each grade level that are not covered by college educational plan as shown in Figure 2 below. These ranges to as few as 21 in K1 to as many as 46 in Grade 1.

FIGURE 2:
**STUDENTS WITH AND WITHOUT COLLEGE EDUCATIONAL PLAN BY GRADE LEVEL**
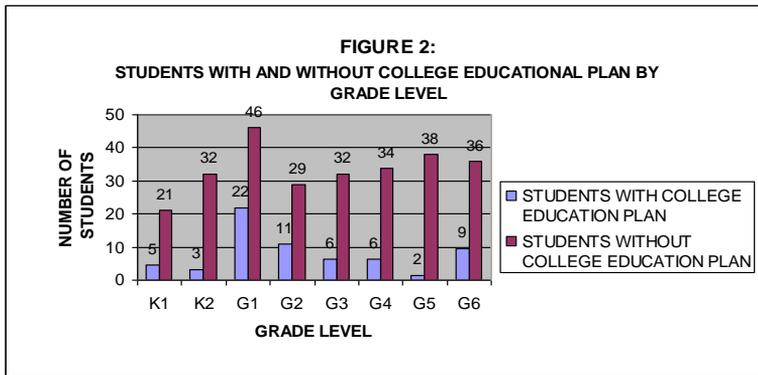
In aggregate, of the 268 students who are not covered by college educational plan, 9% of the parents plan to get a college educational plan, 51% have no plan to get a college educational plan and 40% are undecided.

FIGURE 3
**PARENTS PLAN AS TO GETTING COLLEGE EDUCATIONAL PLAN**
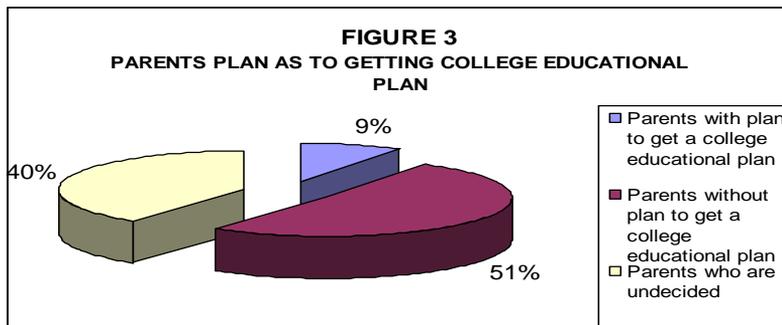
The primary reason of the 63% of the parents who do not plan to get an educational plan is the collapse of the pre-need companies. Only 37% of the said parents don't plan to get an educational plan because they don't have extra cash or they do not consider it as of primary importance.

As of this instance, LSU is the number 1 preferred school by 37% (113) of the Integrated School parents where they wanted their children to get their college education, number 2 by 5.9% (18) and

number 3 by 3.6% (11). On the other hand, 52.9% (160) of the parents are not considering LSU as one of the top 3 schools where they wanted their children to get their college education. The grade level dispersion of the parents' preference where they wanted their children to get their college education is shown in Figure 4 below.

FIGURE 4
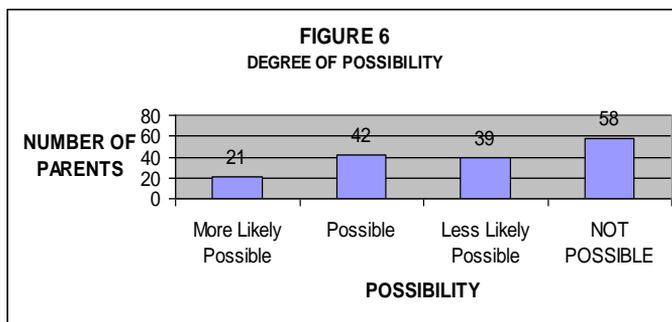**GRADE LEVEL DISPERSION OF PARENTS' PREFERENCE**
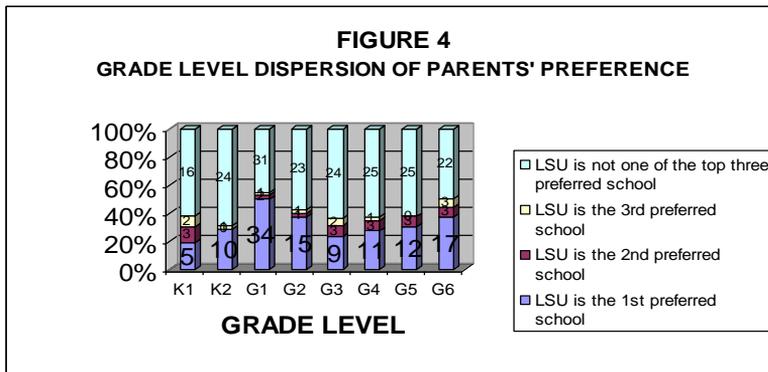
Of the 142 parents who choose LSU as one of the top 3 schools where they want their child to get a college education, 117 (82.39%) of them are interested of securing their child's college education under the "Prepaid College Education Plan" if offered by LSU. The degree of interest expressed by these parents is shown in Figure 5 that follows.

FIGURE 5
DEGREE OF INTEREST OF PARENTS ON THE PROPOSED PREPAID COLLEGE EDUCATION PLAN
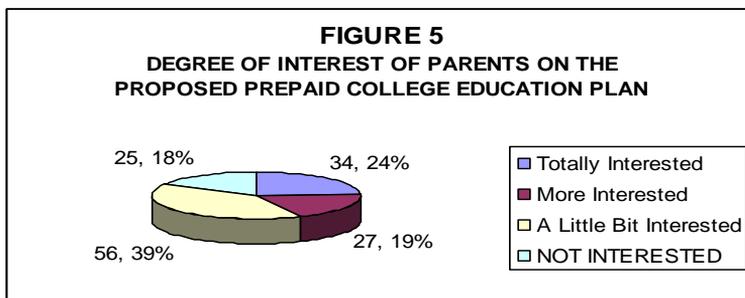
As shown in the above chart, 43% (61) of the 142 parents are likely to be the market of the said proposed prepaid education plan. Though 18% (25) of them are little bit interested, they might be a market of the said plan once the details of the plan will be set.

On the other hand, as shown in Figure 6 below, of the 160 parents who prefer their child to get their college education other than LSU, 21 (13%) will more likely change their mind and 42 (26%) will possibly change their mind and enroll their child in LSU for their college education if the "Pre-paid College Education Plan" will be introduced by La Salle. The 39 (24%) of the said parents will less likely change their mind and 58 (36%) of them will never change their mind even if the said plan will be introduced to them.

FIGURE 6
DEGREE OF POSSIBILITY

| NUMBER OF PARENTS	More Likely Possible	Possible	Less Likely Possible	NOT POSSIBLE
	21	42	39	58

POSSIBILITY

For the past 5 years, from 2004-2008, LSU has been increasing its tuition fee at a rate of 10% except in the year 2006 of which the increase rate was only 7.6%. For the year 2009, the tuition fee of LSU is P400.14. For this year, the average costs of enrolling in LSU in a semester for a 24-unit study load is P17,594.71 except Criminology and Nursing which are charged a tuition fee per unit P504.12 and higher laboratory fees. With the assumption that the increase rate will be the same, the projected average costs of college education 10 years after with 2009 as the base year will be approximately more than P39,000 per semester

and approximately almost P80,000 a year. The projected average semestral and annual cost of college education for next 15 years is shown in Figure 7 below.

FIGURE 7

15-YEAR PROJECTED AVERAGE COST OF COLLEGE EDUCATION
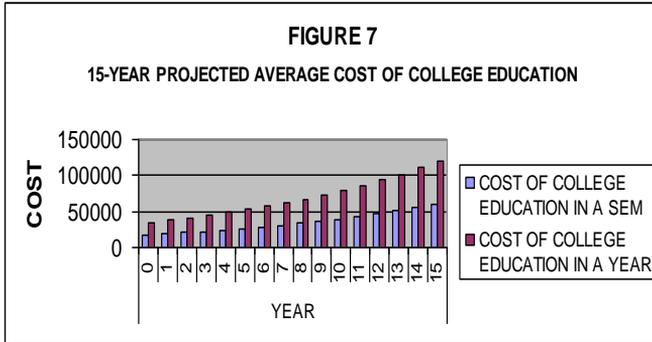
Using the above projection, the projected average total cost of a 4-year and 5-year college education in LSU when these IS Grade 6 students of S.Y. 2009-2010 will enter college will be approximately P238,000 and P311,000, respectively. While the K1 students of this S.Y. 2009-2010 is projected to have an average college education costs of approximately P430,000 and P550,000 for a 4-year and 5-year college course, respectively. The projected average cost of a 4-year and 5-year college education for the respective grade level is shown in Figure 8 following.

FIGURE 8
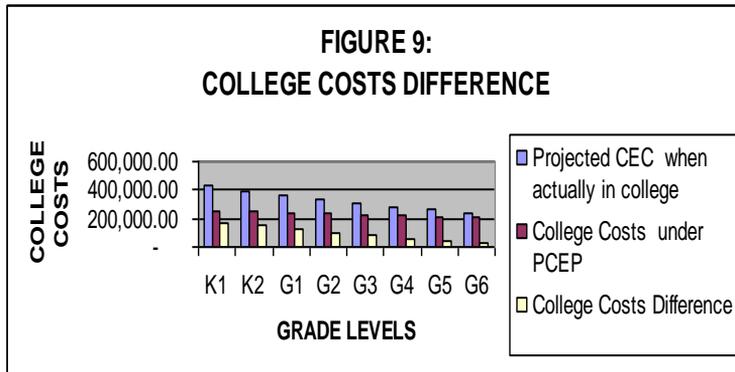**PROJECTED AVERAGE TOTAL COST OF COLLEGE EDUCATION**
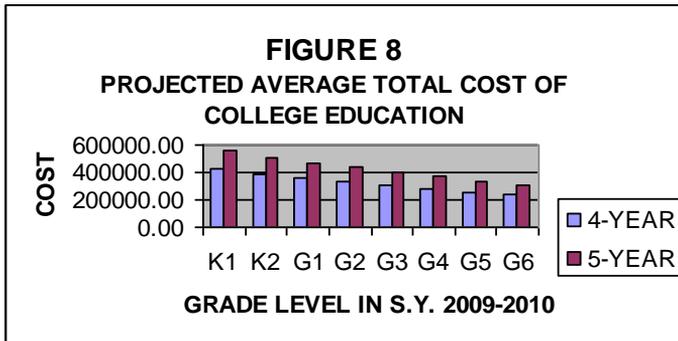
The following assumptions are used to come up with the financial projections of this study:

    1. The amortization period is the length of time before a child enters college.

    2. The future value is the projected college education costs when the child is actually in college.

    3. The future value factor is based on an interest rate of 10% which is based on the average tuition fee increase rate.

    4. The annual amortization is equal to the projected college education costs divided by the future value factor (FVF) of annuity of 1 at 10%.

    5. The college costs under the PCEP computed by multiplying the annual amortization by the number of years before the child enters college.

Using the above assumptions and basis of computation, the prepaid plan will have the following schedules of amortization annually and by grading period as shown in Table 1 below. Based on the schedules presented, when the child is in K1 the amortization is approximately P2, 875.37 every grading period and P23, 002.92 annually. Multiplying the annual amortization by the number of years of amortization, the College Education Costs under the PCEP of the K1 student will be approximately P253, 032.17 which is substantially lower than that of the Projected College Education Cost of a K1 of P426, 271.03. The detail of the difference in the college education costs under the PCEP and that which is projected when the child enters college is shown in Figure 9.

Grade Level in S.Y.09-10	Projected CEC when actually in college	PERIOD OF AMORTIZATION	FV Factor annuity of 1@ 10%	AMORTIZATION		College Costs under PCEP
				ANNUAL	GRADING PERIOD	
K1	426,271.03	11 years	18.531167	23,002.92	2,875.37	253,032.17
K2	391,963.82	10 years	15.973425	24,538.50	3,067.31	245,384.96
G1	360,531.84	9 years	13.579477	26,549.76	3,318.72	238,947.83
G2	331,727.67	8 years	11.435888	29,007.60	3,625.95	232,060.80
G3	305,325.55	7 years	9.487171	32,182.99	4,022.87	225,280.94
G4	281,119.45	6 years	7.71561	36,435.16	4,554.39	218,610.93
G5	258,921.33	5 years	6.1051	42,410.66	5,301.33	212,053.31
G6	238,559.57	4 years	4.641	51,402.62	6,425.33	205,610.49

TABLE 1
AMORTIZATION OF PREPAID COLLEG EDUCATION PLAN

FIGURE 9:
COLLEGE COSTS DIFFERENCE

Using the information in Table 1 above on amortization and multiplying it to the number of parents with LSU in the top of their mind where they wanted their children to get their college education and are interested to secure their children under the **"Prepaid College Education Plan (PCEP)",** and also, with the number of parents with LSU as not one of the top three choices in mind to send their children for a college education but will likely change their mind if the said Education Plan will be introduced by LSU, approximately P4.9M a year, as shown in Table 2, can be raised from the said "Educational Plan" or a total of about P23M for a period of 5 years .

Grade Level in S.Y.09 -10	AMORTI ZATION ANNUAL	PARE NTS		YEARS				
		X*	Y**	1	2	3	4	5
K1	23,002.92	8	5	299,038.02	**299,038.02**	299,038.02	299,038.02	299,038.02
K2	24,538.50	11	6	417,154.43	417,154.43	417,154.43	417,154.43	417,154.43
G1	26,549.76	18	9	716,843.48	716,843.48	716,843.48	716,843.48	716,843.48
G2	29,007.60	12	11	667,174.81	667,174.81	667,174.81	667,174.81	667,174.81
G3	32,182.99	11	13	772,391.81	772,391.81	772,391.81	772,391.81	772,391.81
G4	36,435.16	9	5	510,092.18	510,092.18	510,092.18	510,092.18	510,092.18
G5	42,410.66	5	2	296,874.64	296,874.64	296,874.64	296,874.64	296,874.64
G6	51,402.62	12	12	1,233,662.93	1,233,662.93	1,233,662.93	1,233,662.93	
		86	63	**4,913,232.28**	**4,913,232.28**	**4,913,232.28**	**4,913,232.28**	**3,679,569.35**

TABLE 2
5-YEARS CASH INFLOW FROM PCEP

X* = No. of parents with LSU as top of their mind where they wanted their child to get a college education and are interested to secure it under the PCEP.
Y** = No. of parents with LSU as not one of the top 3 choices in mind where they wanted their child to get a college education but will likely change their mind because of PCEP.

With the above information, the said "Prepaid Plan" can obviously finance the needed infrastructures of LSU and is a better alternative of leveraging the needed infrastructure rather than a bank loan obviously because the use of cash from the said plan is only at 10% compared to that of a bank loan which is at a rate of 18%-20% interest annually. In addition, it will secure the market of the LSU for the future years. If the children of all of these parents who are interested will enroll in different courses offered in the college, then, the future obligations of LSU under the said "Prepaid Plan" will have a relatively irrelevant impact to the entire financial position of the school in real sense. This is because whether or not a classroom has 20 students or 24 students, the school will still be paying and incurring the fixed costs for the salary of the faculty assigned the electricity and utilities used as well as the depreciation of its building and equipments related to the educational process. What is school's obligation then, in reality, is just to offer the educational services promised when these children reaches college. So, the obligation is converted into non-monetary sense because the obligation is not to pay in terms of money but to render the educational services promised though it can be measured in monetary terms. The only thing that will cause a great concern here is when parents will surrender the "Prepaid Plan" and will ask for a reimbursements of the money paid. In some way or another, it will shake the momentary liquidity of the school. However, this will also give rise to another opportunity of getting more revenues out of it. One way, is to provide a clause in the contract that if the parents will discontinue the plan, a cash surrender value will be equal to the amounts paid plus a 2% interest every year will be given which is the prevailing interest for a savings deposit in a bank. In this way, you will only be incurring a 2% interest for the use of the money rather than 18% or 20% for a bank loan. In addition, the said "surrendered prepaid plan" can still be reissued to interested parents at a price lower than the current tuition fee.

4. Conclusion and Recommendation

The prepaid plan is financially viable to leverage the cost of future infrastructure of La Salle University. However, since this research is focused mainly on the marketability of the said plan and financial implications as to its capability to raise revenue to leverage the future infrastructure, it is recommended that a more extensive feasibility study be conducted before this proposed plan will be put into execution. The researcher acknowledge that the more important aspect of the feasibility study – the TECHNICAL ASPECT, which is missing in this research, must be taken into consideration since there might be possible legal implications, restrictions and requirements regarding this matter. It is recommended that consultation to the university legal counsel be made and that legal advises be communicated to the team that will make the feasibility study on this matter before the plan is given due execution.

List of References

Agamat, F (2009). Management Advisory Services: A Comprehensive Guide. Manila: GIC Enterprises & Co.

Ballada, B (2006). Investment Mathematics. Manila: DomDane Publishers.

Diomedes, G (2007) "Reforming the Pre-need Industry: A Review" Retrieved July 20, 2009 from www.congress.gov.ph/download/cpbd/07

On the Existence and the Value of the Value of the Number

$$\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$$

Jaymar Talledo Balihon
College of Arts and Sciences

Abstract

This paper will answer the hanging question posted by Gopikrishna Srinivasan in response to a previous research entitled 'An Infinitely Recurring Square Root" whether this number exists or does not exist at all. If this number exists, then you can figure out what it has to be. It can be shown by algebraic computations that the expression $\sqrt{1+\sqrt{1+\sqrt{1+\cdots}}}$ has a value equal to $\dfrac{1+\sqrt{5}}{2}$. To prove that it does, you can use some concepts in calculus that every bounded; increasing sequence has a limit.

In general it can be shown by algebraic computations that the expression $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$, where $x \in N$ has a value equal to $\dfrac{1+\sqrt{1+4x}}{2}$ where $x \in N$.

It can be shown by algebraic computation that for any positive integer x the expression $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$ has value equal to $\dfrac{1+\sqrt{1+4x}}{2}$. In this note, you consider the infinite sequence $\langle a_n \rangle$ where $a_1 = \sqrt{x}$ and $a_n = \sqrt{x+a_{n-1}}$ for $n \geq 2$, and show that $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}} \in \left[\sqrt{x}, x \right]$.

1. Introduction

This chapter presents the background, objectives, significance, methodology of the study and some basic concepts in calculus.

Background of the Study

What is the value of the number $\sqrt{x + \sqrt{x + \sqrt{x + \cdots}}}$, where $x \in N$? To answer this question whether this number exists or does not exist at all must be considered. If this number exists, then what it has to be can be figured out. In fact the value of $\sqrt{x + \sqrt{x + \sqrt{x + \cdots}}}$, where $x \in N$ is equal to $\dfrac{1 + \sqrt{1 + 4x}}{2}$ where $x \in N$ by algebraic manipulations. To prove that it does, the concept in calculus that every bounded can be used, increasing sequence has a limit. Moreover, it is clear that the infinite sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, \cdots, a_n = \sqrt{x + a_{n-1}}, \text{where } x \in N$$

is increasing. The concern of this paper is to show that the infinite sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, \cdots, a_n = \sqrt{x + a_{n-1}}, \text{where } x \in N$$

is bounded and has a limit. If that will be proven then the number $\sqrt{x + \sqrt{x + \sqrt{x + \cdots}}} \in \left[\sqrt{x}, x\right] \subseteq R$, where $x \in N$ exists.

Objectives of the Study

This paper aims to show/find the following:

1. In general, what is the value of the number $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$ where $x \in N$?(**Theorem 3.1**)

2. What is the value of the number $\sqrt{1+\sqrt{1+\sqrt{1+\cdots}}}$? (**Example 3.2**)

3. What is the value of the number $\sqrt{2+\sqrt{2+\sqrt{2+\cdots}}}$? (**Example 3.2**)

4. What is the value of the number $\sqrt{3+\sqrt{3+\sqrt{3+\cdots}}}$? (**Example 3.4**)

5. The sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x+\sqrt{x}}, a_3 = \sqrt{x+\sqrt{x+\sqrt{x}}}, ..., a_{n-1} = \sqrt{x+a_{n-2}}, a_n = \sqrt{x+a_{n-1}}, ...$$

is bounded, increasing and has a limit. (**Theorem 3.5**)

Significance of the Study

If you can find the exact value and show the existence of the number $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$, where $x \in N$, then it will help you upon solving some arithmetic calculations. And it will erase the doubt with in you whether numbers of the form $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$, where $x \in N$ really exists. Thus, this paper which involves basic

concepts of calculus is of great importance to mathematics enthusiast.

2. Methodology

In this chapter, definitions, examples and preliminary concepts are being presented in order to provide detailed proof of the main results.

Preliminaries

This section contains definitions and preliminary concepts that are needed for further understanding of the study.

Basic Definitions and Known Results

Definition 2.1 [3]: A *function* $f : X \to Y$ is a relation between X and Y with the property that each $x \in X$ appears as the first member of exactly one ordered pair $(x, y) \in f$. Such a function is called a *map* or *mapping* of X into Y.

Definition 2.2 [2]: A *sequence* is a function whose domain is the set $\{1, 2, 3, ..., n, ...\}$ for all positive integers.

Definition 2.3 [2]: If a sequence $\{a_n\}$ has a limit, the sequence is said to be *convergent*, and a_n *converges* to that limit. If the sequence is not convergent, it is *divergent*.

Definition 2.4 [2]: A sequence $\{a_n\}$ is said to be

    i.   *increasing* if $a_n \leq a_{n+1}$ for all n ;

    ii.   *decreasing* if $a_n \geq a_{n+1}$ for all n .

Definition 2.5 [2]: The number C is called a *lower bound* of the sequence $\{a_n\}$ if $C \leq a_n$ for all positive integers n , and the number D is called a *upper bound* of the sequence $\{a_n\}$ if $a_n \leq D$ for all positive integers n .

Definition 2.6 [2]: A sequence $\{a_n\}$ is said to be *bounded* if and only if it has an upper bound and a lower bound.

Theorem 2.7 [2]: Let $\{a_n\}$ be an increasing sequence, and suppose that D is an upper bound of this sequence. Then $\{a_n\}$ is convergent, and $\lim_{n \to +\infty} a_n \geq D$.

Definition 2.8 [1]: The *order* of a group *G,* denoted by $|G|$, is the number of elements in *G.* A group with finite order is called a *finite group.* Otherwise, it is a *finite group.*

Definition 2.9 [2]: If $\{u_n\}$ is a sequence and

$s_n = u_1 + u_2 + u_3 + ... + u_n$ then the sequence $\{s_n\}$ is called an infinite series. This infinite series is denoted

by $\displaystyle\sum_{n=1}^{+\infty} u_n = u_1 + u_2 + u_3 + ... + u_n + ...$.

The numbers $u_1, u_2, u_3, ..., u_n, ...$ are called the *terms* of the infinite series. The numbers $s_1, s_2, s_3, ..., s_n, ...$ are called the *partial sums* of the infinite series.

Definition 2.10 [1] (*Principle of Mathematical Induction*): Let *P (n)* be a statement concerning the positive integer *n.* Suppose that

1. *P(1)* is true, and

2. If *P (k)* is true, then *P (k+1)* is true.

Then *P (n)* is true $\forall n \in Z^+$

3. Results and Discussions

This chapter will calculate the exact value of the number $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$ and to show that $\lim_{x\to+\infty}\langle a_n\rangle = x$.

Theorem 3.1. In general, what is the value of the

number $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$ where $x \in N$?

Proof:

Let $y = \sqrt{x+\sqrt{x+\sqrt{x+\cdots}}}$. Then $\qquad y = \sqrt{x+y}$

$$\Rightarrow y^2 - y - x = 0$$

$$\Rightarrow y = \frac{1\pm\sqrt{(-1)^2 - (4)(1)(-x)}}{2(1)}$$

$$\Rightarrow y = \frac{1+\sqrt{1+4x}}{2}$$

Observe that y must be positive. Therefore, $y = \frac{1+\sqrt{1+4x}}{2}$.

Example 3.2 What is the value of the number $\sqrt{1+\sqrt{1+\sqrt{1+\cdots}}}$?

Let $y = \sqrt{1+\sqrt{1+\sqrt{1+\cdots}}}$. Then,

$$y = \frac{1 \pm \sqrt{1+4(1)}}{2} \Rightarrow y = \frac{1 \pm \sqrt{5}}{2} \; .$$

But observe that y must be positive. Therefore, $y = \frac{1+\sqrt{5}}{2}$.

Example 3.3 What is the value of the number $\sqrt{2+\sqrt{2+\sqrt{2+\cdots}}}$?

Let $y = \sqrt{2+\sqrt{2+\sqrt{2+\cdots}}}$. Then, $y = \frac{1 \pm \sqrt{1+4(2)}}{2} \Rightarrow y = \frac{1 \pm \sqrt{9}}{2}$.

But observe that y must be positive. Therefore, $y = \frac{1+\sqrt{9}}{2}$.

Example 3.4 What is the value of the number $\sqrt{3+\sqrt{3+\sqrt{3+\cdots}}}$?

Let $y = \sqrt{3+\sqrt{3+\sqrt{3+\cdots}}}$.

Then, $y = \frac{1 \pm \sqrt{1+4(3)}}{2} \Rightarrow y = \frac{1 \pm \sqrt{13}}{2}$.

But observe that y must be positive. Therefore, $y = \frac{1+\sqrt{13}}{2}$.

In concept of calculus that every bounded, increasing sequence has a limit.

Theorem 3.5 The sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, ...$$

is bounded, increasing and has a limit.

Proof:

Claim 1:
$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x +}$$
is increasing.
Observe that

$$\sqrt{x} \le \sqrt{x + \sqrt{x}} \le \sqrt{x + \sqrt{x + \sqrt{x}}} \le ... \le \sqrt{x + a_{n-2}} \le \sqrt{x + a_{n-1}}$$

$$\Rightarrow a_1 \le a_2 \le a_3 \le ... \le a_{n-1} \le a_n.$$

Thus, $a_{n-1} \le a_n$ for all n.

Hence the sequence
$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x +}$$
is increasing.

Claim 2:

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, ...$$
is

bounded.

Cleary $\{a_n\}$ is bounded below by $\sqrt{x}$.

If $n = 1$, then $a_1 = \sqrt{x} \le x$. Now let $a_k = \sqrt{x + a_{k-1}} \le x$.

Then, $a_{k+1} = \sqrt{x + a_k} \langle \sqrt{x + x} = \sqrt{2x} \le x$, for any $x \in N$.

Therefore by Definition 2.10 (PMI), $a_{n+1} \le x$ for any $x \in N$.

It will follow that $\{a_n\}$ is bounded above by x. Since $\{a_n\}$ is

bounded below and bounded above, $\{a_n\}$ is a bounded sequence

by Definition 2.6.

Claim 3:

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, ...$$
has a limit

$$\text{and } \lim_{x \to +\infty} \langle a_n \rangle = x.$$

Since Claim 1 and Claim 2 state that $\{a_n\}$ is increasing and bounded

respectively, it will follow that $\{a_n\}$ has a limit by Theorem 2.7 and

Definition 2.3.

Therefore:

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, ..., a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, ...$$
has a limit and $\lim_{x \to +\infty} \langle a_n \rangle = x$.

$\square$

4. Summary, Recommendation and Conclusion

This chapter summarizes the results being studied in this paper and presents some recommendations for further inquiries.

Summary and Conclusion

This paper obtained the following results:

1. In general, the number $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}} = \dfrac{1+\sqrt{1+4x}}{2}$

   where $x \in N$. **(Theorem 3.1)**

2. The value of the number $\sqrt{1+\sqrt{1+\sqrt{1+\cdots}}} = \dfrac{1+\sqrt{5}}{2}$.

   (Example 3.2)

3. The value of the number $\sqrt{2+\sqrt{2+\sqrt{2+\cdots}}} = \dfrac{1+\sqrt{9}}{2}$.

(Example 3.2)

4. The value of the number $\sqrt{3+\sqrt{3+\sqrt{3+\cdots}}} = \dfrac{1+\sqrt{13}}{2}$.

(Example 3.4)

5. The sequence
$$a_1 = \sqrt{x}, a_2 = \sqrt{x+\sqrt{x}}, a_3 = \sqrt{x+\sqrt{x+\sqrt{x}}}, \dots, a_{n-1} = \sqrt{x+a_{n-2}}, a_n = \sqrt{x+a_{n-1}}, \dots$$

is bounded, increasing and has $\lim\limits_{x \to +\infty} \langle a_n \rangle = x$.

(Theorem 3.5)

Recommendation

The author recommends the following questions for further

investigation.

1. The sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, \dots, a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, \dots$$

is bounded, increasing and has a limit and

$$\sqrt{x + \sqrt{x + \sqrt{x + \cdots}}} \text{ where } x \in R \text{ exists..}$$

2. The sequence

$$a_1 = \sqrt{x}, a_2 = \sqrt{x + \sqrt{x}}, a_3 = \sqrt{x + \sqrt{x + \sqrt{x}}}, \dots, a_{n-1} = \sqrt{x + a_{n-2}}, a_n = \sqrt{x + a_{n-1}}, \dots$$

is bounded, increasing and has a limit and
$$\sqrt{x + \sqrt{x + \sqrt{x + \cdots}}} \text{ where } x \in C \text{ exists.}$$

List of Notations

$H \subseteq G$	is a subset of G
$H < G$	H is a proper subgroup of G
$\forall$	for all
$\exists$	there exists
$\in$	element
N	set of natural number
Z	group of integers
R	group of real numbers
C	group of complex numbers
$\leq$	less than
$\geq$	greater than
$\{a_n\}$	sequence
$\sqrt{}$	square root

List of References

Fraleigh, J.B. (1994). *A First Course in Abstract Algebra*. New York: Addison –Wesley Publishing Company Inc.

Hungerford, T. (1980). *Algebra*. New York: Springer-Verlag

Leithold L. (1986). *The Calculus with Analytic Geometry*, Fifth Edition. New York: Harper and Row, Publishers, Inc.

About the Researchers

Ms. July Estrada, RN earned her Master in Nursing at Misamis University in 2011. She is currently working as one of the school nurses assigned in LSU OPD and she is a faculty of the College of Nursing in La Salle University, Ozamiz City.

Ms. Arlene Apao, RN completed her Master of Arts in Nursing from Misamis University. She is presently working as a nurse of Integrated School-La Salle University, Ozamiz City.

Ms. Carol Chiong, RN obtained her Master of Arts in Nursing at Medina College in 2006. Currently, she is one of the school nurses assigned in the LSU college clinic.

Ms. Sheila Fajardo, RN finished her Master in Nursing (MN) major in Maternal and Child Care at Misamis University, Ozamiz City in March 2010. Presently she is one of the school nurses in La Salle University college clinic.

Ms. Tessally Villanea is a graduate of Bachelor of Science in Psychology at Mindanao State University (MSU-IIT) Iligan City in 2002. At

present, she is the guidance counselor of La Salle University-Integrated School.

Mr. Merven Pailden is a graduate of Bachelor of Science in Physics at Mindanao State University-Marawi City in 2002. He completed the academic requirements for Master in Science in Teaching Physical Science while he earned some units in Statistics. He was able to publish some articles in the journals of Samahang Pisika ng Pilipinas.

Ms. Omensalam Asi is a graduate of Bachelor of Science in Statistics at Mindanao State University, Iligan Institute of Technology (MSU-IIT), Iligan City. At present, she is A faculty of the College of Arts and Sciences and she is the Director of Planning and Evaluation at La Salle University, Ozamiz City.

Mr. Ernie Capuno is a graduate of Bachelor of Science in Mathematics at Mindanao State University, Marawi City. He teaches Mathematics in the College of Arts and Sciences at La Salle University (LSU). He is currently finishing his Master's degree.

Mr. Jovannie Castillo is a graduate of Bachelor of Science in Mathematics at MSU-IIT with the distinction of Cum Laude in 2005. He is also taking his Master of Mathematics at same school at present. He is a full time probationary Mathematics faculty of the College of Arts and Sciences.

Dr. Rezyl R. Mallorca is a graduate of Bachelor of Science in Psychology at MSU-IIT. She

finished her Master and Doctor in Philosophy at Immaculate Conception College-La Salle. At present, she is the director of Institutional Research Office, La Salle University, Ozamiz City.

Mr. Raymundo C. Dolor is a Certified Public Accountant by profession. He finished his Master in Business Administration at De La Salle University-Manila. Currently, he is the Dean of the College of Accountancy, LSU-Ozamiz City.

Ms. Rosalia Eguico-Celestiano is a graduate of BSC Major in Accounting at Immacute Conception College-La Salle University. She finished her Master in Business and Administration at Misamis University. At present, she is a faculty of the College of Business and Economics at La Salle University, Ozamiz City.

Ms. Cynthia Tac-an is a graduate of BSC Major in Accounting at University of San Carlos. She finished her Master in Business Administration at Misamis University. At present, she is a faculty of the College of Accountancy at La Salle University, Ozamiz City.

Mr. Jaymar Balihon is a graduate of Bachelor of Science in Mathematics at Mindanao State Univesity-Iligan Institute Technology (MSU-

IIT) in 2008. He is pursuing his Master of Education major in Mathematics at La Salle University, Ozamiz City. At present, he teaches Mathematics in the College of Arts and Sciences. He is also a member of CFC-Singles for Christ, Iligan City Chapter.