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Discouraging Ageism in Workplace: Key to Global Organizational Efficiency

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Abstract

According to Dictionary.com, it define human aging as "discrimination against persons of a certain age group."

Within the above contest, one can begin to ask a rhetorical question that who will not get old? Why older persons are discriminated or age restrictions to some of the vital things we do in the society? The science of gerontology is vast and could only be treated positively when its impact is well understood. The impact of age discrimination is retrogressively demeaning to the victims especially the baby boomers who were veterans and had sacrificed for the so called freedom we enjoyed today.

In establishing the impact of gerontology and ageism, I dedicated my study to carry out a research that on age discrimination and was able to establish some facts about ageism and its effect in our society. The purpose of this study is to identify the impact of age discrimination on the aged emotions and capability. In ascertain this study, we deployed questionnaires to the aged old in Lagos Nigeria (sample population) where we got feedback from veterans and other retired fellows staying in old people's home. About 95% of our sample population confirmed that they felt cheated and undignified after they were discriminated at in various aspects of their lives, even after retirement, while 3.8% disagreed not to have experienced age discrimination and 1% prefer not to comment on it. Details of the survey shall be given in the body of this article.

In this article, the first and second paragraph introduced the timing and age bracket that falls victims of ageism -especially the aged ones. When it is likely to start experiencing age discrimination which sometimes is not limited to aged but also the under-aged who are rated as incompetent to carry out or participate in an aged rated activities. The third paragraph underscored how ageism affect the baby boomers and Gen x irrespective of their fitness and how millennial also face age discrimination in recruitment and political eligibility.

Further to this, work of Robert Butler – the first researcher on ageism was mentioned with our team research at Regina Mundi Ages Home in Lagos and other field survey that were carried out in paragraph seven and eight. The article pointed out different countries acts that protect age discrimination in paragraph nine while the general effect of ageism in our society with our recommendation on how to stop ageism were cited in paragraph ten and eleven respectively.

Introduction

The prejudice of ageism has been in existence since time immemorial in our society. Some believe that if a man attains the age of 60 years and above, s/he is seen as weaker vessel than those younger in age. They even perceive their agility and sense of reasoning to have transformed back to that of a child again –thus they are treated as infants.

One of the key areas our society is experiencing this discrimination is at workplace. In our workplace today, this category of people lacks eligibility to apply for a job or not considered for equal opportunity as others. Ageism in recent times cut across both youngster and old persons. For example – persons below 16 years are seen as Child and are restricted from a paid job likewise those above 65 years of age are expected to proceed on retirement. For example, some Corporations and Banks have their entry level candidates not to be above 24 years while the average graduating age of University Graduates in Africa and Asia is beyond 25 years relative to unending strikes in our educational system. Another striking point is the case of a young

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brilliant chap called **Nancy Frank** (a close neighbour) who at the age of 9 had finished elementary school but was denied admission into high school due to age policy guiding high schools entry level from 10 years. Nancy had to forcefully repeat elementary school studying what she knew well in past years in boredom while her enthusiasm to know something new was denied by the standing entry rigid policy of high schools in Nigeria extra one year.

In modern day practice, discrimination against age is irrelevant and it is just a mere stereotype – a prejudice affected mostly by Baby-Boomers and Gen X. Some of Baby-Boomers had shown that they could still perform better on their jobs they were professional on after years of retirement. E.g. Lecturers and Professors in the Academic sector. In addendum, our past leaders in early 50s to 80s were below 35 years with excellent performance in their tract record, same is the case in the Biblical and Quranic history or the past rulers who some at very young age became mighty ruler in their empires. Regrettably! Today, most of our Millennial and Gen-Y could not even get near the corridor of power due to obnoxious policies that peg ceiling on age they can vie for any political position embedded in the Constitution. What a tragedy!

Study objective

The article on discouraging ageism in workplace has the following primary objectives.

1. To provide insight into the existence of age discrimination in our society and how it affects just like other prejudice like gender discrimination, racism etc.,
2. To give data on the affected persons using our sample as a mini yardstick.
3. To preview how other countries see ageism and what they are doing to either support or combat it.
4. To proffer solution to ageism other countries most especially in Asia and Africa on how to avert ageism in our society via positive orientation to the people.

Sample and survey method

Simple random sampling was introduced on our sample population of 80 aged persons in and aged home in Lagos Nigeria (researcher's base). This cut across male and female from different regions of the country and they are all old and retired from active work. Aside the sampling style, direct interview was also done to some of the respondents to get more feedback from them.

Questionnaires

Our questionnaire was concise and simple with only 5 key questions directed to get basic information about ageism. We decided to use an offline (hardcopy) questionnaire on our sample population due to inadequate internet facility the persons and some of them might not be well vast with modern technology even though they were educated or semi-educated.

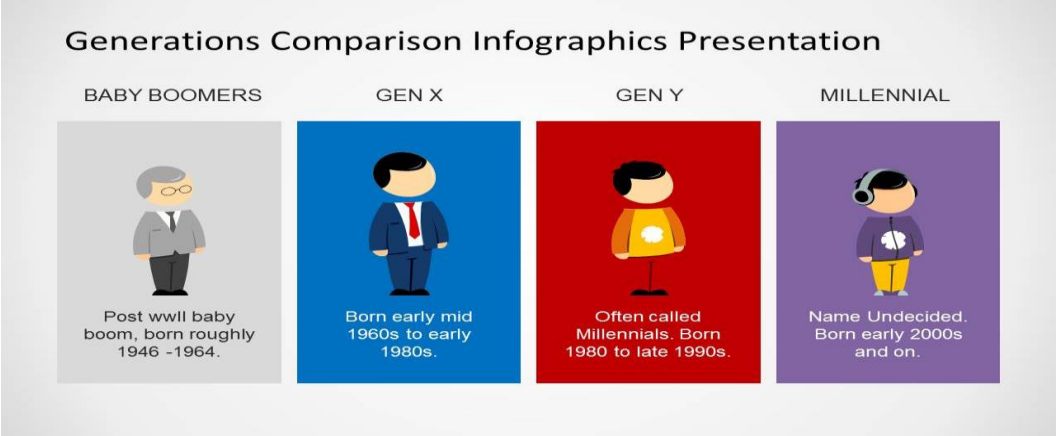
What is Ageism?

Ageism is a discrimination or stereotype against set of persons based on their age bracket they belong. It is a social discrimination against senior citizen in our society. This could also be classified under similar discrimination such as sexism, racism etc. In his quest to support the irrational bias against aged persons, Robert Butler 1969 linked ageism to these elements:

1. **Prejudice reaction to old persons**
2. **Ageing process and real discrimination against person's age group**
3. **Policies that institutionalized the stereotype against certain persons.**

Ageism in today's parlance cut across all phases of human lives. For example In political sector, Some Countries have age limit (*Universal Adult Suffrage*) to be able to contest for President, Senators, Congressmen etc.,

Ageism is not only restricted to the baby boomer, but also to Millennial



Source: https://slidemodel.com/templates/generations-comparison-powerpoint-template

The society prejudice which is discouraging the elderly others who feels discriminated because of age feel that they are being disrespected and unwelcomed by the society – a function of caste generalization to those class of persons.

Ageism in workplace

Age segregation in workplace has a lot of impact on productivity and Employee Engagement. Young people are more eulogized. They are perceived to have more strength to execute their jobs better than older persons- while sometimes, older persons suffer retrenchment and compulsory retirement mostly during economic recession or financial meltdown. One of the effect of this prejudice was mentioned in a research done by the ***Society for Human Resource Management*** that Ageism will lead to the tsunamic exit of the Baby Boomers and Gen X from our workplaces which in turn will lead to gigantic brain drain, lack of skill and experience replication, drop in quality etc., because all the Baby Boomers and Gen X would have taken away the experience they are endowed with.

Our field survey

During my field survey to Regina Mundi Aged Home in Lagos Nigeria, we discovered that some of the aged persons most especially the veterans still indulge in some sporting activities while few others are under intensive care. We found out that these persons feel cheated, undignified and abused from the quality of life they envisioned and should be entitled to equal opportunities as others.

In our field survey, 80 aged persons were given questionnaires to fill and give their opinion about age discrimination including their past experiences on it. Below is the result of the questionnaire result.

QUESTIONS	AGREED	DISAGREE	NO COMMENT
Have you ever experienced age discrimination in your life after retirement?	70	4	6
Do you feel cheated and undignified during the discrimination?	76	3	1
Do you believe you can still render the service you retired on for another 2-5 years if given the opportunity?	55	20	5
Do you indulge in body exercise, yoga, or aerobics?	72	1	7
Are you 70 years old and above?	50	28	2

Source: Field survey.

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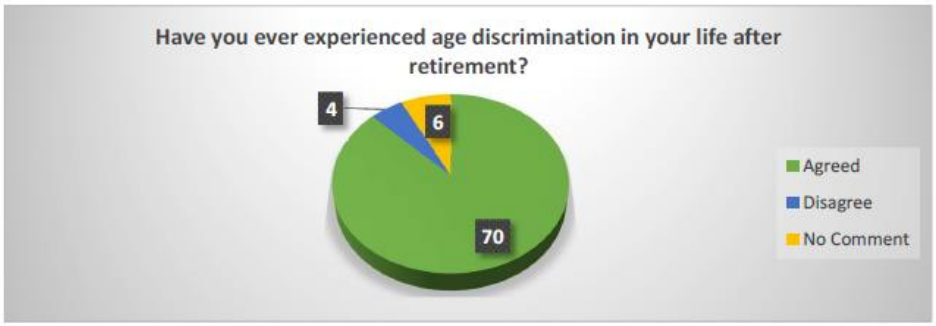
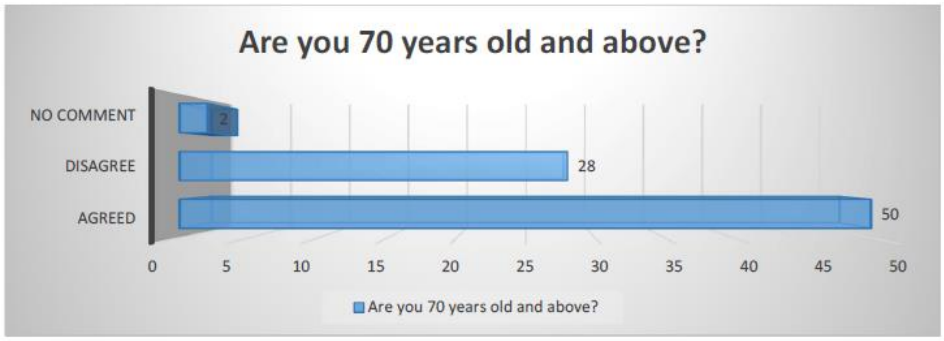
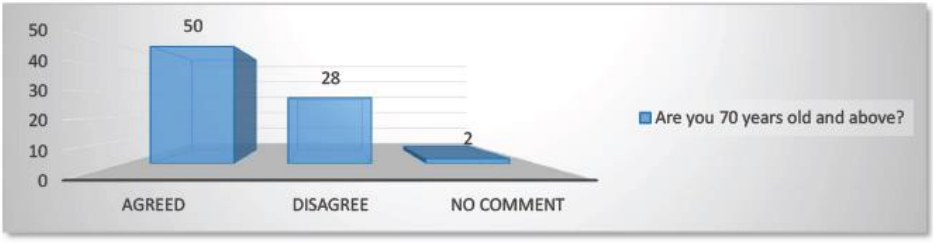
1. **Analyzing the above Q1. 70 aged persons to have experienced age discrimination after retirement. ($^{70}/_{80}$ x100 = 87.5% agreed, $^{4/}_{80}$ x 100 = 5% disagree and 6/80 x100 = 7.5% prefer not to comment).**



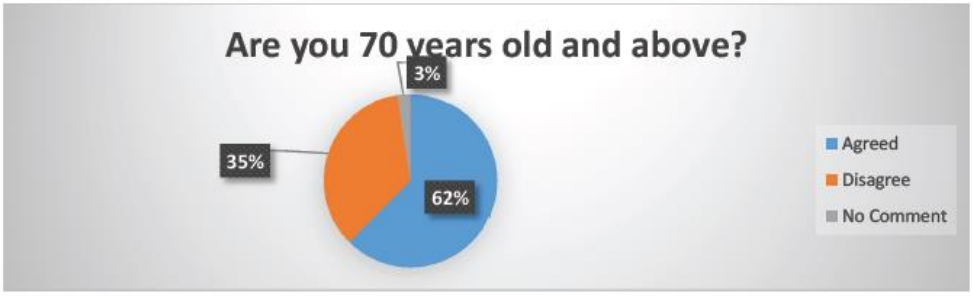
2. **Analyzing the above Q2. 76 aged persons felt cheated and undignified during the discrimination ($^{76}/_{80}$ x100 = 95% agreed, $^{3/}_{80}$ x 100 = 3.8% disagree and 1/80 x100 = 1.25% prefer not to comment).**



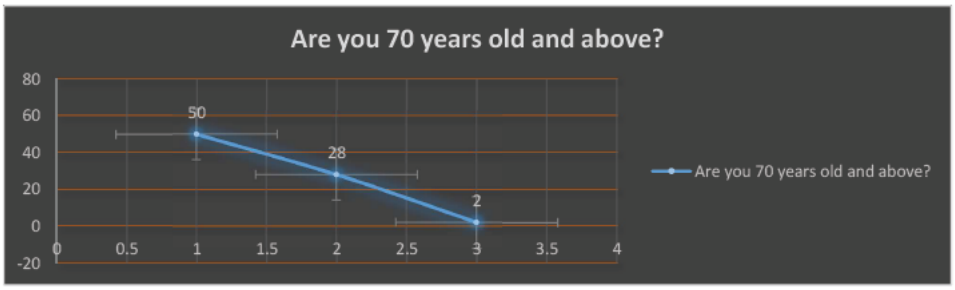
3. **Analyzing the above Q3. 55 aged persons agreed that could still work better 2-5 years more even after retirement ($^{55}/_{80}$ x00 = 69% agreed, $^{20/}_{80}$ x 100 = 25% disagree and $^{5}/_{80}$ x100 = 6% prefer not to comment).**



4. **Analyzing the above Q4. 72 aged persons agreed that could still work better 2-5 years more even after retirement ($^{72}/_{80}$ x00 = 90% agreed, $^{2/}_{80}$ x 100 = 1.25% disagree and $^{7}/_{80}$ x100 = 8.75% prefer not to comment).**

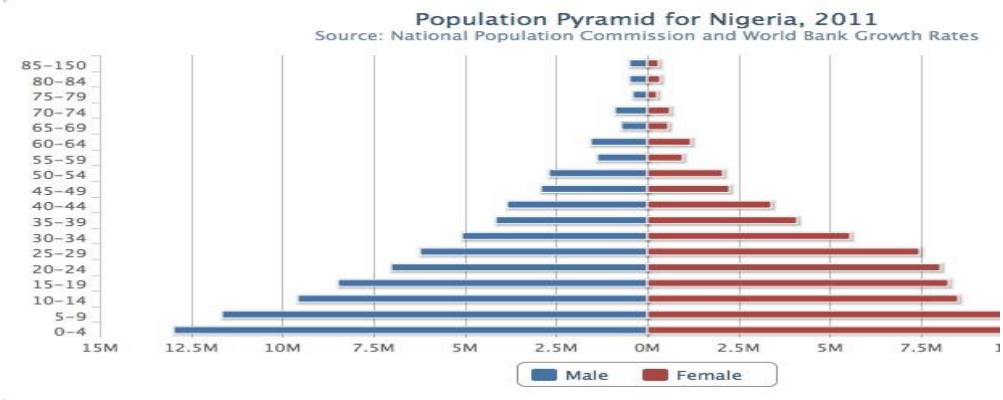


5. **Analyzing the above Q5. 72 aged persons agreed that could still work better 2-5 years more even after retirement ($^{50}/_{80}$ x00 = 62.5% agreed, $^{28}/_{80}$ x 100 = 35% disagree and $^{2}/_{80}$ x100 = 2.5% prefer not to comment).**



Further to this result, in Erdman Palmnre PhD of Duke University noted in his research that 58% of his sample population agreed to have heard jokes poked at old people, 30%said they were ignored, or not taken very seriously due to their age (Gerontologist Vol 41, no5).

In May 2012, President Jonathan having realized that Professors could still perform on their jobs after retirement at age 65, signed into law an amended bill (Miscellaneous Provision Act no11) that extended lecturers age from 65 year to 70 years of age. This is one of few steps in keeping the aged active in Employment and retain their wealth of experience within the sector of authority.



Most countries have started realizing this challenge and have promulgated laws to protecting this prejudice against these class of persons. Some of the laws include;

Age Discrimination in Employment Act 1967: The act forbids discrimination in Employment against the aged who is above 40 years old in the USA. The area that law forbids include, hiring, setting wages, promotion, career development and opportunities, and or termination of employment. The law forbids recruiter to set age limit to job advertised to public domain or denial or aged persons benefits.

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Equity Act (United Kingdom): This is another act that protects people from discrimination on basis of age, race, gender, disability, religion, sexual orientation, pregnancy, civil partnership or marriage etc. The act breakdown discrimination into four phase;

1. Direct Discrimination: e,g Access denial into a local pub because of age.
2. Indirect Discrimination: e.g. Disallowing aged person to participate in a marathon race.
3. Harassment: For example; making offensive jokes about age of somebody.
4. Victimization: e.g. punishing Employee for whistle blowing any discriminatory policy including ageism.

Equity act also protects against age discrimination in employment, this include recruitment, employment terms and conditions, promotion, transfer, training or dismissal.

While the first two discrimination is easy to defend by Employer, the last two (Harassment and victimization are not easy to defend in Court).



Effect of ageism

1. Ageism hurts emotionally: Victims of ageism are never same in terms of emotional balance. Psychologists confirm that discrimination against age is hurtful and brings about negative stereotype in our society.

2. Ageism shorten old people lives: From a research done by Becca Levy PhD from Yale University-660 person of 50 years above were surveyed. Those with positive ageism perception lived 7.5years more than the counterpart who had a negative perception-(Journal of personality &Social Psychology Vol 83, no2).

3. Ageism create rejection in the society: Most of the aged persons are portrayed as being weak, helpless, dependent and unproductive. This is a prejudice against the old person as some of them are with full of strength, self-sufficient, talented and more resourceful than the Youths.

How to fight agesim

Legal means: Like western Countries, America is one of the leading countries that has enough laws protecting her aged citizens from discrimination. The role of Equal Employment Opportunity Commission (EEOC) in ensuring all categories of Employees or applicants are treated equally cannot be over-emphasized. This kind of system enhance legal action against discriminators and protection for victims of Ageism including other forms of discrimination.

Society rejection/ ethical consciousness: Our society need to be re-educated about the senior persons' population and their value to our society, the impact will surely reduce ageism and other discrimination alongside.

Celebrating the aged persons: We should start celebrating the aged person. Employers must also celebrate long term serving staff and older ones by giving awards and other incentives to motivate and encourage the old generation while young ones will know the value of the aged, what it means and how they have contributed to our workplace and society at large.

Conclusion

Ageism just like any of the other discrimination e.g., Racism, Sexism, etc., has not established any good perception and positive result to our society, but iota of bitterness, caste and segregation. It is high time the global leaders advocated more awareness on how to kick this prejudice out of our global system.

Some Countries like USA and UK have regulations in place like Age Discrimination in Employment Act (ADEA) and Equity Act to protect their citizen from being discriminated. Howbeit, other world leaders and countries should not be left behind in the fight against this prejudice. We must all say No to Ageism in this 21st century!

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A Comparative Assessment of Near Point of Convergence between Goldsmiths and Normal Population

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Abstract

The process of jewelry making involves minute visual tasks at closer working distance for goldsmiths, which demands high visual ability that eventually might result with receded near point of convergence (NPC). Hence the aim of our study is to compare the near point of convergence between goldsmiths and normal population. One group of 72 male experienced goldsmiths and other group of 72 male normal populations were evaluated. Binocularly the near point of convergence was tested with sharpened tip of pencil. The patient age ranges between 30 to 60 years with best corrected visual acuity of 6/6, N6 monocularly without any ocular pathology were included in both the groups. The other near occupational work was excluded for normal population. The p-value for subjective comparison of NPC is 0.008 and for the objective comparison of NPC is 0.0005 which showed a highly statistical significant changes between goldsmiths and normal population for both subjective and objective comparison. Hence this test can be used as a clue to suspect whether the goldsmiths having convergence insufficiency and to decide on referring the patient for further binocular vision assessment and treatment accordingly.

Keywords: *Goldsmiths, near point of convergence, sharpened pencil tip.*

Introduction

Occupational vision is a branch of optometry and the intention of the occupational vision assessment which spots goldsmith ocular health, management, protection, vision training, and effective level of productivity to improve their performance. [17} "Clearly, the way we use our eyes can determine how well we learn, work and perform" (Anshel, 2006, p.20). [2] The occurrence of many diseases is influenced by occupation. [12]

A goldsmith is a person who makes jewels using gold or other precious metals such as silver, platinum and stones etc. Goldsmith usually specialize in cutting, filing, hammering, turning, spinning, bending, casting gold or other metals, engraving jewelry, repair or remodel jewelry which requires higher visual demands[7,18]. Visual information nourish the goldsmiths what to do, where to do, how to do. Visual skills for goldsmiths include visual abilities, depth and color perception, eye motility, eye-hand coordination, visualization and contrast sensitivity for edge detection. [11]

The jewelry manufacturing industry can be divided into two productions such as craftwork and mass production. This article is based on the craftwork that is individual articles that are hand-made by skilled craftsmen. In jeweler's workshops where the environment may involve some noise, dust and other impurities, hence goldsmiths needs to acquiring knowledge or awareness of the occupational health and safety act, handling designated substances, wearing, adjusting and maintaining protective equipment. [11, 5]

Convergence insufficiency (CI) is a non- strabismic binocular visual anomalies characterized by the eyes which is unable to converge correctly for a considerable period of time when a near task is performed.[15] The incidence of convergence insufficiency in the general population is 0.1% to 0.2% while exodeviation are present only 1% [1]. Convergence insufficiency is associated with a group of symptoms includes headache, blurred vision, visual fatigue, eye strain and double vision [3, 10].These symptoms occurs while doing near work such as reading, computer viewing, tailoring, jewelry making etc. Salve et al concluded that goldsmiths may experience subjective visual disturbance [13] especially convergence

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anomalies. Monroe J. Hirsch suggested that eye discomfort or eye fatigue accompanied when the individual is engaged for prolonged near work and concludes that the orthoptic training is useful to disappear ocular discomfort, fatigue and other subjective symptoms. [6]

The NPC is one of the diagnostic tests often performed to help to determine the convergence insufficiency [8] [10]. The normal range of NPC is TTN to 10cm when it exceeds above 10cm then it should said to be convergence insufficiency [3].

As a result, the vision standard could be used as minimum visual requirements for the entry level goldsmiths concluded by R. Monica and et al and their near point of convergence are receded when compare to normal population. Therefore near point of convergence between goldsmiths and normal population was compared.

Methods and materials

The study was approved by the ethics committee. Seventy two experienced male goldsmiths were recruited based on connivance sampling and seventy two male normal populations were recruited based on random sampling for the study. Patients visited for ophthalmology clinic, Sri Ramachandra University and Research Institute in porur for the first time without any ocular pathology. Participation was voluntary and proper permissions were taken. Demographic, medical, and visual information were received on day of the examination.

The near point of convergence is performed using the sharpened tip of pencil binocularly. All measurements were performed under same conditions on two groups for both subjective and objective procedure. All the tests were performed by the single examiner. It describes the holding ability of eye to converge in that the patient can maintain and hold the fusion, so that the patient can perceive as single target. The examiner moves a target gradually towards the patient and the target seems to be a sharpened tip of pencil. The procedure was performed in front of patient face and the patient will trace towards the target. The final point is measured and noted when the patient reports by seeing sustain double image then it is taken subjective observation and when the examiner notices one of the patient eye is deviating outwards then it is taken as objective observation. Using the pencil tip target measurements were taken for break response and recorded in centimeters. A measurement has been repeated thrice for consistency and average value has been taken.

The subject having 6/6, N6 monocular and binocular distance and near acuity respectively with habitual refractive correction with the age group between 30 to 60 years were satisfying inclusion criteria for both groups. The other near work related subjects such as tailor, computer user etc., were excluded for normal population.

The result of this study was assessed using IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. Hence to find the significant difference between the categorical variables in independent groups the Pearson's Chi-Square test was used. In the above statistical tools the probability value .05 is considered as significant level.

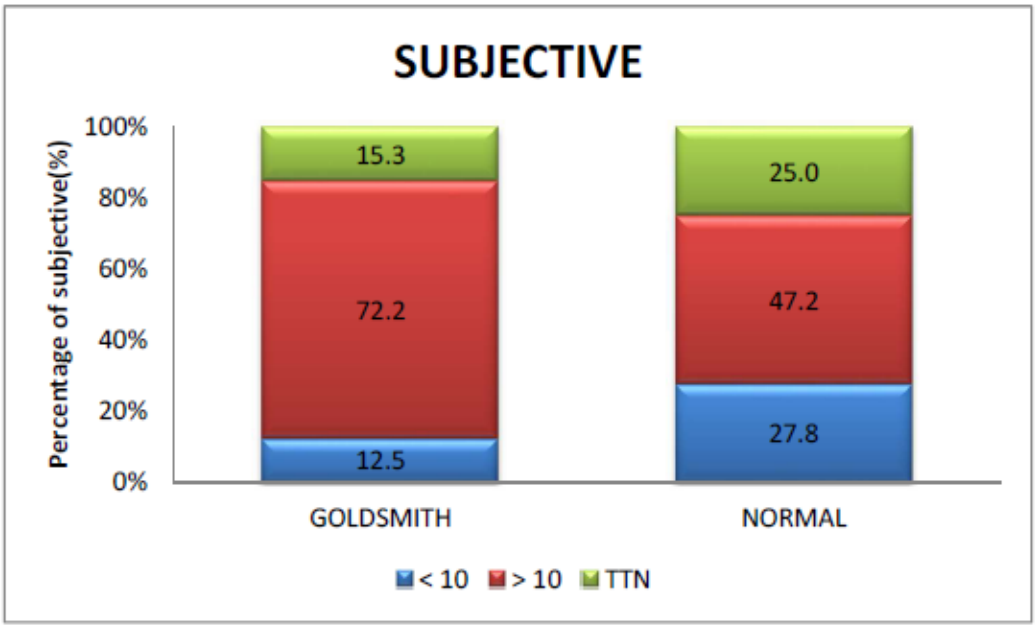
Results

One hundred and forty four males were included in this study. In this population seventy-two were experienced goldsmiths and seventy-two were normal population.

The subjective of goldsmith 9(12.5%) patients are <10 and 52(72.2%) patients are >10 and 11(15.3%) patients are TTN and for normal population 20(27.8%) patients are <10 and 34(47.2%) patients are >10 and 18(25.0%) patients are TTN. [Table 1, Graph1].

Table1. Subjective comparison between goldsmith and normal population

Subjective comparison						
		GOLDSMITH	NORMAL	Total	χ^2 Value	P-Value
< 10	Count	9	20	29	9.63	0.008 **
	%	12.5%	27.8%	20.1%		
> 10	Count	52	34	86		
	%	72.2%	47.2%	59.7%		
TTN	Count	11	18	29		
	%	15.3%	25.0%	20.1%		
Total	Count	72	72	144		
	%	100.0%	100.0%	100.0%		
** Highly statistical significance at P ≤ 0.01 level						



Graph 1. (Subjective comparison between goldsmith and normal population)

The objective for goldsmith 16(22.2%) patients are <10 and 49(68.1%) patients are >10 and 7(9.7%) patients are TTN and for normal 27(37.5%) patients are <10 and 20(27.8%) patients are >10 and 25(34.7%) patients are TTN. [Table 2, Graph 2].

Table2. Objective comparison between goldsmith and normal population

Objective comparison						
		GOLDSMITH	NORMAL	Total	χ^2 Value	P-Value
< 10	Count	16	27	43	25.127	0.0005 **
	%	22.2%	37.5%	29.9%		
> 10	Count	49	20	69		
	%	68.1%	27.8%	47.9%		
TTN	Count	7	25	32		
	%	9.7%	34.7%	22.2%		

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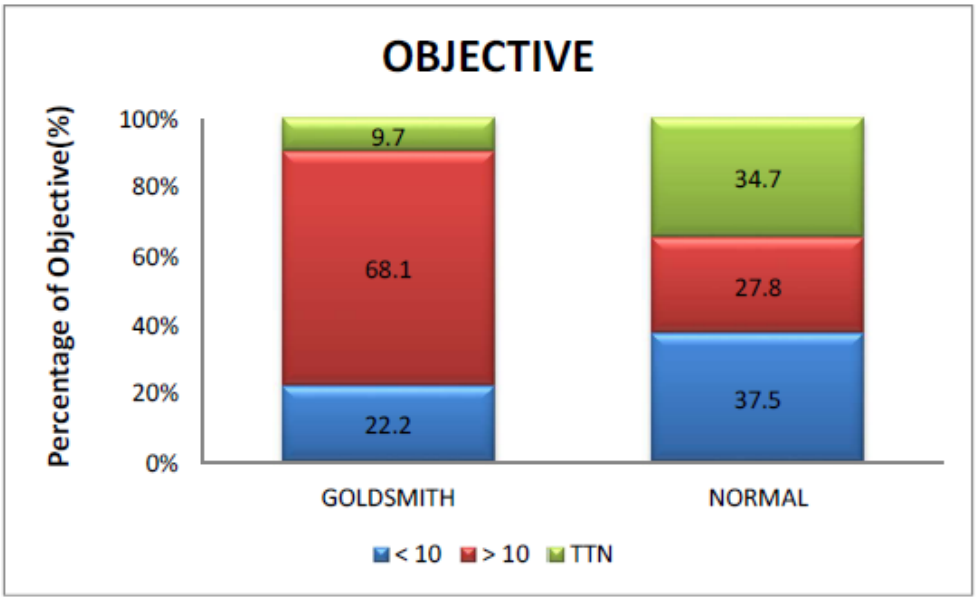
Total	Count	72	72	144		
	%	100.0%	100.0%	100.0%		
** Highly statistical significance at P ≤ 0.01 level						



Graph 2. (Objective comparison between goldsmith and normal population)

The p-value for subjective comparison is 0.008 and for the objective comparison is 0.0005 and the p≤0.01 level so there was a highly statistical significant change between goldsmiths and the normal population for both subjective and objective comparison. [Table 1, Table 2].

Discussion

As the results shows, there is a significant difference of near point of convergence between goldsmiths and normal population. Jewelry makers, watch repairers, and electronic manufacturers are classified as engaged in occupations having similar demands. U R Salve concluded that similar visual demands of the task like tired eye, convergence and accommodation problem carried out for both jewellery manufacturing and computer related work. [13] Similarly Untimanon et al concluded that electronic and goldsmiths have same visual problems. [18] In the study concluded by Monica R, Krishnakumar R, Santhanam P. P. has shown that the minimum distance visual acuity required for efficient working as 6/12 and expected near visual acuity for habitual working distance (23cm) to be N4, convergence at closer distance in certain areas of work but in this study have taken subjects has expected distance visual acuity as 6/6 and for near visual acuity N6 and they also shown that receded near point of convergence for goldsmiths. [11] Salve UR also shows that the goldsmiths have convergence problem. [13] The elements of working at a near task which make it visually demanding include frequent saccadic eye movements (ocular motility) and continuous eye focusing (accommodation) and alignment (vergence) demands.

In the stud Salve UR have concluded that Convergence occurs when the eyes turn "inward and downward" towards the nose when one views close objects [13] [10]. These need shrinkage of extra-ocular muscles in which the muscles involves are medial rectus and superior oblique of the eye [4]. These two muscles lead to eyestrain. The work of the jewelry manufacturing is precise [13]. The person who involved in goldsmith work like gold, stone and other minute work he have to focuses the object which is tiny in size and the patient will feel discomfort. These lead to higher discomfort in visual and mental attention [13]. The goldsmith who involved in jewelry making has to maintain their eyes in adduction and downward position [10]. Due to their long time of exposure and checking the quality of the gems, so the muscles of

eyes get fatigue. The above mentioned conditions may be the reason for higher visual discomfort. Headache is the one of "discomfort" symptom faced by goldsmith and it is most common symptom which seen during an eye examination [13]. The headache occurs to jewelry worker due to their improper workplace condition, poor lighting, and improper workstation [11]. The headache may also occur due to anxiety and depression for this they have separate investigation.

Binocular cues to depth are stereopsis and convergence. In this study, the population had receded near point of convergence (NPC greater than 10cm). Out of those, who had receded NPC, 72.2% were subjectively receded NPC and 68.1% were objectively receded NPC i.e. they had exophoria for near [10]. The previous studies have shown significant improvement in symptoms and clinical measures for near point of convergence by giving vision therapy for symptomatic convergence insufficiency [9]. Vision therapy is best therapy for eliminating asthenopia symptoms and convergence anomalies get improved in adult patients [11]. In-office therapy along with home therapy ends in best results than the home therapy alone [9] [14].

There was a high statistical change in near point of convergence between goldsmiths and normal population.

Conclusion

There was a highly statistical change in near point of convergence between goldsmiths and normal population for both subjective and objective comparison. This result can be used to detect for goldsmiths with receded near point of convergence and to decide on referring the patient for further binocular vision assessment and therapy given accordingly to their convergence. At the end, goldsmiths should be aware that vision is also a factor which affects goldsmith performance.

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Academic Self-Regulation of STEM of Senior High School Students of Divine Word Colleges in Region I, Philippines and Their Academic Performance

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Abstract

The study wanted to determine the level of academic self-regulation of the STEM students of Senior High School students of the Divine Word Colleges and its effect toward academic performance. There were four aspects of self-regulation investigated such as external regulation, introjected regulation, identified regulation and intrinsic motivation. Questionnaires were used to gather the data. The quantitative descriptive research design and explanation research was used in the study. The findings showed that the academic self-regulation of the STEM students of the senior high school of Divine Word Colleges is high which means that they have high external regulation, introjected regulation, identified regulation and moderate intrinsic motivation. However, the findings also showed that there is no correlation between academic self-regulation and their academic performance. Their academic performance can be caused by other factors that are not considered in this study.

Keywords: *Self-regulation, self-determination theory, academic performance, external regulation, introjected regulation, identified regulation, intrinsic motivation.*

Rationale

After two years of teaching at the Senior High School of Divine Word College of Vigan, the researcher has observed different behaviors of the students. Some are interested in the class and some are not interested. This can be seen through their participation in the class discussion. Some are enthusiastic to learn and express their ideas but some are not. Some are motivated but some are demotivated. They seem to be indifferent to the class discussion.

Observing those behaviors, it will be hard to jump to conclusion that the students are just lazy and stupid. The cause of those behaviors can be traced to motivation. The question to be raised, why are some motivated, while others are not motivated? When it comes to motivation, there are two kinds of motivations which are intrinsic and extrinsic motivation. Intrinsic motivation is coming from within the person himself/herself. He/she motivates himself/herself to do things because he/she finds enjoyment through accomplishing such activity. Extrinsic motivation refers to the motivation which is not coming from within the person himself/herself and in the activity itself but it is coming from outside such as from the family, group, society and culture. He/she performs such activity because of rewards or fear of punishment. Though the person does not find enjoyment with the activity, he/she has no choice but to do it or else he/she will not be rewarded or punished. In this case, the person has no control over his/her behavior but it is other people or external environment that controls the behavior. It is the environment that regulates his/her behavior. In this case, a human being who has free-will cannot regulate his/her behavior on his/her own free-will.

Self-regulation has become an important topic of interest related to children's learning and development with an emerging understanding of its contribution to children becoming positive learners as well as their long term mental health. It is important to children's development. It has been recognized as

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a key indicator of better health and education, significantly decreasing the possibility of both developmental and learning difficulties in the future (Casenhiser, Shanker, & Stieben, 2012). Inspired by self-regulation theory, the researcher is interested to find out if the students of Divine Word Colleges really regulate their own behavior and make their own choice when it comes to the reason why they study, do their homework, participate in classroom discussion or are they just following the wish of their teachers, afraid of their parents, doing it because they are supposed to do it? Those concerns motivates the researcher to conduct this study to find out the extent of the self-regulation of the students and if those self-regulation affect their academic performance.

The importance of the study

Using the concept of self-determination theory (SDT) developed by Ryan and Deci (2000), the purpose of this study is to investigate the impact of four motivational profiles (external, introjected, identified regulation, and intrinsic motivation) on the academic performance of Senior High School students of Divine Word Colleges in Region I, Philippines. The findings of the study will help discover ways on how to motivate students in order to perform well in their academic endeavor. Hopefully the findings of the study will also give an idea to the administrators, guidance and counselors to design a counseling program to help students to direct their own behaviors and be independent in deciding what they want to be in their lives. Self-independence may not happen later in life, if it is not done as early as possible. This can be done through gradual autonomy support, giving them chances to solve their own problems and inviting them to participate in making decisions.

Theoretical framework

Self-Regulated learning

This is one of one of the domains of the self-regulation. It refers to learning that is guided by metacognition or thinking about one's thinking, planning, monitoring, and evaluating personal progress against a standard and personal motivation to learn. Self-regulated learning describes a process of taking control of and evaluating one's own learning and behavior (Omrod, 2009). Students in this case are studying not because of external forces such as parents, teachers and society's demand. They decide to learn on their own because they find it important for themselves and find studying enjoyable. It is regulated by the students themselves and is intentional, deliberate, conscious, voluntary, and strategic without any fear of punishment or shame. It is the students themselves who take the control. They plan, set the goals, lay out the strategies, monitor and evaluate the progress of their own learning (Zimmerman, 2002).

Schraw, Crippen, & Hartley, (20060 defines self-regulated learning as one's ability to under-stand and control one's learning environment. Self-regulation abilities include goal setting, self-monitoring, self-instruction, and self-reinforcement. Self - regulated learning is not about academic performance but It is a self-directive process and set of behaviors whereby learners trans-form their mental abilities into skills (Zimmerman, Bonnor, & Kovach, 2002). Self-regulated learners are characterized by self-regulating, self-monitoring, self-evaluating, self-managing. Some signs of self-regulated learners are active – participation in the class because of their interest to know and provide the necessary resources and time for the success of their own learning.

Understanding self-regulation

Despite considerable research in the field, definition of self-regulation remains a difficult one. It is a multidimensional construct which is composed of motivational, cognitive, behavioral, and affective functions (Grolnick & Farkas, 2002). It also becomes complex because the conceptualizations of self-regulation differs according to the theoretical viewpoint of the researcher, leading to the assessment of different aspects of this important construct. Behavioral theories of self-regulation, for example, focus on learned self-control, where motivation by rewards, and children's development of strategies to manage

their reactions to gain such rewards, lead to self-regulated behavior (Bronson, 2000). In this case, self-regulation is the ability of the person to regulate his/her behavior based on his/her intrinsic motivation and external motivation. Happiness and unhappiness are often caused by one's ability to regulate his/her own life.

In line with the above concept, research consistently shows that self-regulation is considered a skill which is necessary for reliable emotional well- being. Emotional well-being is determined by how the person manages his/her life. It makes a different from one's well-being to another person's well-being. The emotional well-being of the person who controls his/her own life is different from the one whose life is controlled by others or external forces/regulators. A true happy person is the one who is free to act based on his own values and free will. Behaviorally, he/she acts based on his/her long-term best interest, consistent with his/her deepest values. (Violation of one's deepest values causes guilt, shame, and anxiety, which undermine well- being.) Emotionally, self-regulation is the ability to calm yourself down when you're upset and cheer yourself up when you're down (Stosny, 2011). Then there is a need to improve our self-regulation skill and a good place to start is an understanding of the biology and function of emotions in general and specifically feelings. Emotions *move* us. The ancients believed that emotions move behavior; in modern times we say they motivate behavior. They energize us to do things by sending chemical signals to the muscles and organs of the body; they prepare us for *action*.

By having self-regulation skill, one has the ability to monitor and control his/her own behavior, emotions, or thoughts, altering them in accordance with the demands of the situation. It can boost the capability of the person to inhibit responses, to resist interference from irrelevant stimulation, and to persist on relevant tasks even when one doesn't enjoy them (Cook & Cook, 2009). By continuing to improve self-regulation skill, one can reach the level of maturity in terms of self-regulation. According to Cook and Cook (2009), mature self-regulation requires several sophisticated cognitive skills. These include awareness of the demands of any given situation; consistent monitoring of one's own behavior, thoughts, and strategies; consideration of how successfully one is meeting the demands of the situation; and the ability to change aspects of his/her current functioning as needed to fit the situation or to accomplish a goal. This is further pointed out by Baumeister (2007) that there are four components of self-regulation theory and they are standards of desired behavior, motivation to meet the standards, monitoring of situations and thoughts that precede breaking said standards and will power. In order to achieve certain goal or objective, one has to apply the desired behavior to achieve such goal. Example is a student who wants to be in the dean's list has to study smartly or read a lot of books. Or a person who wants to have an excellent health condition has to take the right food, regular exercise and take vitamins. Those are the desired behavior to achieve a good health condition. In order to carry out those desired behaviors, one should have the motivation. Correct motivation is needed to sustain the behavior to achieve the goal. Beyond motivation, in order to achieve the goal, one should monitor the situation by which standards of desired behavior can be broken. Often times, even how much one wants to keep going and maintain the regular activity or behavior but there are situations in which those regular behaviors cannot be maintained because of unpredicted situations that occur along the way. One cannot continue doing exercise due to some situations that prevent the regular behaviors to continue. Lastly is the will power. One way wish to be always working hard but if there is no will power or inner strength to stick it out, then things can go in different directions. It is expected that by applying the four components of self-regulation one can stop doing things that she/he knows that she/he should not do.

Bandura (1991) in support of Baumeister's theory of self-regulation, argued that the major self-regulative mechanism operates through three principal sub-functions and these include monitoring one's own behavior, its determinants, and its effects, judgment of one's behavior in relation to personal standards and environmental circumstances, and affective self-reaction. In terms of self-monitoring, according to Bandura (1991), people cannot influence their own motivation and action very well if they do not pay adequate attention to their own performances, the conditions under which they occur, and the immediate and distal effects they produce. In this case, one needs to monitor the performance if it is still

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on the right tract as expected or not, then also monitor the situation that affects the performances and the final outcome. One can be motivated to apply the same behavior when the performance outcome is as expected and the conditions are still favorable to support the same kind of behavior. Thus, constant monitoring is necessary to regulate the behavior in order to consistently apply the correct behavior to achieve the final outcome. Success in self-regulation partly depends on the fidelity, consistency and temporal proximity of self-monitoring. Included in the self-monitoring are thought pattern, emotional reactions, behavior and condition under which these reactions occur and motivation. Self-observation/monitoring provides information needed for setting realistic goals and for evaluating one's progress toward them. Besides monitoring the behavior itself, one has to judge the behavior if the behavior is still within the prescribed standard behavior imposed by himself/herself and as prescribed by society. Consequently, such judgment results to self-reactive influences, in the sense that people will pursue course of action that produce positive self-reaction and refrain from behaving in ways that result in self-censure. One would be satisfied to maintain the behavior that meets the desired standard as accepted not only by the person but also by the society or influential persons in the society. Though Bandura does not include will power as part of the components of self-regulation behavior but both Bandura and Baumeister agree that self-regulation can be achieved by establishing desired standards of behaviors, monitoring of situation or environmental circumstances and self-motivation in order to attain the self-regulated behavior.

As Baumeister and Bandura focus on the individual effort of self-regulation, while Lundy (n.d) argued that self-regulation is also a collective effort. Self – regulation is a collective effort of systems and structure. She argues that self-regulation is influenced by the system and the structure, the culture and communities where we are living, or learning. Even if one has a self-regulation behavior but such self-regulation behavior cannot be sustained and enhanced when the system, structure, culture of the organization and practices or values of the community do not support. Example, there are many schools that are exploring ways on how classroom design enhances self-regulation. There's also a growing awareness that self-regulation gets a real boost when the whole school is involved. In this case, even though the students have self-regulation behavior but if the school does not support such behavior, consequently it will not continue. In this case self-regulation is not just class management problem and the student himself/herself but community or school as a whole. On the top of it, self-regulation capacities are also strengthened when the family is on board. In a sense that self-regulation is enhanced or strengthened when students experience consistent expectations and support at home and at school. And, as the self-regulation movement grows, we see how policies and programs in other sectors can foster self-regulation capacities in students.

The question that remains in our mind is the purpose of self-regulation. Why do we regulate our behavior? It is the way how the individuals choose to do and how they go about trying to accomplish their goals. Markus and Wurf (1997) distinguish three components of self-regulation process: goal selection, preparation for action and cybernetic cycle of behavior. According to them, the first stage in the self-regulation process is the goal selection stage. Before one can regulate his/her behavior, one must select the goal and decide what one intends to do. After one has set the goal, now one has to prepare a plan for action. In this stage, one has to design and prepare to implement the plan to achieve the goal. Lastly is cybernetic cycle of behavior. It is a way on how one uses information that he/she gathers in the process of executing the plan to regulate his/her behavior. Usually after one sets the goal, then he/she examines his/her behavior and compare if his/her behavior is leading toward the attainment of the goal. After obtaining the information, one has to adjust his/her behavior to reduce the discrepancy between the goal and the behavior; some adjustments have to be made.

According to Eisenberg, Smith, Sadovsky, & Spinrad, (2005), Shonkoff & Phillips (2000) beside achieving the goal, aspects of self-regulation correlate with various positive outcomes for children and adolescents—including better academic performance, problem-solving skills, and reading comprehension; more satisfying interactions with peers; higher levels of intrinsic motivation, self- worth, perceived

competence, self-efficacy, moral cognition, and moral conduct; fewer behavior problems; and lower levels of psychopathology, such as depression. However, though self-regulation is important in achieving the goal, the attainment of goal can also be affected by other factors such as self-efficacy, possible selves, and self-awareness (Bandura, 1986, 1989). It is about one's own belief toward his/her capability to succeed. People with high self-efficacy believe they have the ability to succeed at a task, to overcome obstacles, and to reach their goals. While, people with low self-efficacy doubt their ability to succeed and do not believe that they have what it takes to reach their goals. Self-efficacy may be important aspect in self-regulation; however, self-regulation is also affected by one's dream of what he wants to be in the future or a possible self that one wants to be in the future (Markus & Nurius, 1986; Markus & Ruvolo, 1989). Last factor that can also influence self-regulation is self-awareness. Knowing one's self is another factor that can influence self-regulation as Duval and Wicklund (1972) argued that when people focus their attention inward (i.e., when they become self-aware), they tend to compare their present state with a relevant standard. Encouragement arises when people believe they are meeting or exceeding a relevant standard; discouragement arises when people believe they are falling short of a relevant standard.

Latest theory on self-regulation is authored by Deci and Ryan (2000, 1999, and 1985). They pointed out the components of self-regulation and these are external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic regulation. The four components are parts of extrinsic motivation. These theories indicate that human behavior is either self-regulated or controlled. Intrinsic motivation indicates self-regulation, while extrinsic motivation is a form of controlled behavior. It has been argued that the ability to self-regulate has been viewed as a desirable quality throughout history because of its positive effects on behavior and the acquisition of skills (Reid, 1993). Self-regulated learners direct their own behaviors to study and achieve what they want to achieve in their studies. They monitor their progress; redirect their behavior toward the established goals. According to Zimmerman, (2001), In order for students to be self-regulated they need to be aware of their own thought process, and be motivated to actively participate in their own learning process.

External regulation

The main question here is why people do certain things and not the other things. The reasons why a certain person does one thing but not the other thing are related to different kind of motivation of different people (Deci, & Ryan, 2000). Deci and Ryan have investigated the reason behind why a person is so passionate in certain activity but not in other activity. Their investigation leads to different motivation as the reason why a person acts. Motivation refers to the drive or reason for doing something. Without it, one would have no inspiration, and one would not accomplish what he/she wants to accomplish (Deci, & Ryan, 1985). It makes the difference between the motivated and the demotivated person. The motivated person can accomplish his/her goal, while the demotivated person cannot accomplish. It is a key when it comes to getting people to take action.

Source of motivation is intrinsic and extrinsic. Intrinsic motivation is taking some action or accomplishing one thing because he/she finds that by doing such things he/she finds enjoyment or pleasure or make him happy. The motivation for acting is found in the action itself and the person himself/herself, and not in some external forces. The self-autonomy can be achieved when individuals feel they are engaging in activity because they choose to do so, not because they feel pressured by other people (parents, teachers) or other external factors. Extrinsic motivation is contrary to intrinsic motivation. The source of motivation is something external to the person. Though the decision to act is made by the person, but such decision is not originated from within the person but from something external to the person such as reward or punishment. When one acts based on intrinsic motivation, he/she is doing something because he/she likes it, it is fun, he/she enjoys it, or he/she finds it pleasurable. While extrinsic motivation, one does certain thing because of reward or fear for punishment, even though the act does not give him/her happiness or pleasure. One is not acting on his/her own free will. The one that regulates the behavior is not the person himself/herself but it is external forces or demands such as praise

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and punishment that come from parents, society or social group. The person is not in control of and cannot alter his/her actions, thoughts and feelings except to comply. In this case, there is no autonomy. Autonomous behavior comes from one's sense of self, unlike controlled behavior that comes from outside pressure. Self-determination may well be the most powerful factor in becoming a well-adjusted person (Mclean, 2006).

In line with the theory of motivation, self-regulation is a deliberate effort done by a person to alter its own states and responses, including behavior, thoughts, impulses or appetites, emotions, and task performance. However, such self-regulation can be motivated either by the person himself/herself or pressure from society or culture. Behaviorally, the person acts on certain thing, either because he/she likes it or because other people, external environment, society or culture requires it. The behavior is learned by the person through the society where he/she is living. The problem arises when comparing human to animal because animal learn certain pattern of behavior, not because it likes the act but because of fear of punishment.

Previous research on the animal concluded that animals learn behaviors based on past rewards and punishments. In that way, behavior patterns are molded by the external environment (Psychology, n.d). However, Bandura, a behaviorist, argued that shaping human behavior is more complex than animal. If animal is more on external regulation, human is external and internal at the same time. On the one hand, Bandura argued that the environment plays a greater role in shaping our behavior than genetics and at the other hand Bandura (1986, 1996) argued that there are several factors shaping our behavior and the *first is self-observation*. By observing the behavior of others and learn the consequence of those behaviors, one can learn certain pattern of behaviors. "Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action." We regulate our behavior by monitoring the behavior of others and consequence of those behaviors and adjusting our behavior accordingly. *Second is judgmental process*. It is a subjective evaluation of the consequences of our behavior. A person will always evaluate the consequence of his/her behavior without referring it to others or external rules (personal standards), and make some adjustment to his/her behavior. It is almost impossible to regulate a behavior effectively without monitoring its consequences. Poor monitoring is the main cause of self - regulation failure. He/she can also evaluate his/her behavior based on prescribed standards of behavior (standard of reference). In other words, the behavior of the person is directed by his/her own will.

Beyond self-observation and judgmental process, other psychologists confirm that self-regulation can be considered from both behavioral and neural systems levels, and from developmental traditions that have historically devoted greater attention to either (a) emotion-related processes of reactivity and regulation or (b) cognitive processes, including children's working memory and attention deployment (Blair & Razza, 2007). There is consensus across these diverse disciplinary perspectives that children's self-regulation includes their ability to manage or modulate positive and negative emotions, to inhibit or control their behavior, and to shift and focus their attention (Blair, 2002; Cole, Martin, & Dennis, 2004; Eisenberg et al., 1996; Kochanska, Murray, & Coy, 1997; Kopp, 1989; Mischel, Ebbesen, & Zeiss, 1976). Their ability to modulate their behavior can be externally and internally influenced.

Now we know where the behavior comes from. In short, in external regulation, the behavior of the person is not motivated by the person himself/herself but it is externally motivated. The person behaves to gain some rewards or to avoid some negative contingency. Example, someone does regular exercise to lose weight but the real purpose is to get a prize or to be recognized. A student who is doing well in academic may have excelled because his/her parents promised him/her a new car. Therefore, the behavior is controlled by external incentives such as praise, rewards, and punishment avoidance.

Introjected regulation

The reasons for acting are always different from one person to person because of different sources of motivation. Motivation for acting varies from one individual person to another; one has intrinsic

motivation, while others have extrinsic motivation. Contrary to the external regulation wherein a person acts out of fear of punishment or reward, and obedience, introjected regulation is behaving out of a sense of guilt or obligation or a need to prove something. One is behaving in a certain way because he/she has to do it, not because he/she wants to do it or one wants to be recognized. It involves the internalization of external controls, which are then applied through self-imposed pressures in order to avoid guilt or to maintain self-esteem (Deci & Ryan, 1999). It is a controlling motivational regulation in which people act due to internal pressures that are regulated by contingent self-esteem (Ryan & Deci, 2000). One is taking on external regulations to behavior but not fully accepting said regulations as his/her own. The motivation is still extrinsic motivation; however, such extrinsic motivation has been adopted but not yet incorporated by the person into the sense of self. The behavior rather than being externally controlled becomes internally controlled. However, at this stage the behavior is extrinsically motivated as it is used in order to achieve another goal rather than for the joy of participation (Cox. 2007).

Introjected regulation indicates that people go along with a task because they think they should and feel guilty if they don't. Such regulation might include studying for exams, doing homework, physical exercise or visiting a sick relative or elderly parent because he/she thinks that he/she should or ought to do it, not because he/she wants to do it (Positive Psychology Resources, 2006). Though the control is still with the person who committed the act, however, the act is not really the act of free-will and because he/she wants to do it but he/she does it because it is an obligation or a duty to do or else they would be ashamed. He acts because of pride, shame or guilt. Taking another example is losing weight because one feels that obesity is a character flaw. Obesity in the mind of many people is bad. Introjected regulation occurs when the external contingencies have been internalized and the individual acts to facilitate self-esteem (e.g. exhibit ability) or lessen guilt and avoid demonstration of failure.

Identified regulation

Identified regulation is behaving because of the importance one ascribes to the behavior. One is doing regular exercise because it is important for his/her health. At this level, the action begins to be integrated within the person's sense of self. Identification involves a conscious acceptance of the behavior as being important in order to achieve personally valued outcomes. It is a more autonomously driven form of extrinsic motivation. It involves consciously valuing a goal or regulation so that said action is accepted as personally important. It is no longer external pressure on the person to perform such act but he/she does it because he/she is aware of its importance and at the same time finds pleasure and enjoyment pursuing such behavior or activity. Another example is losing weight because a healthy weight is an important goal to accomplish. Or students who finish their assignments because they know that it is important for them to finish their assignments and they want to learn. In the identified regulation, it is no longer outside forces that motivate them to do certain thing but the person himself/herself and the value of the act itself. The act is good in itself.

The person acts on certain thing when he/she sees it as important for him/her. This happens when the behavior or act is explicitly recognized and valued by the individual (high perceived value and personal importance). At the identified regulation level, the person himself/herself motivates himself/herself to do certain things because of its value for the person himself/herself (Vlachopoulos & Karageorghis, 2005). The person must be able to make his/her decisions which values and rules to embrace, not depending on their parents or society where he/she lives.

Intrinsic motivation

Intrinsic motivation is the inner passion of an individual person to pursue certain activity that what he/she believes giving him/her pleasure. In other words, intrinsic motivation is an energizing of behavior that comes from within an individual, out of will and interest for the activity at hand. No external rewards are required to incite the intrinsically motivated person into action. The reward is the behavior itself. In the Self-determination theory, intrinsic motivation represents the most self-determined or autonomous

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behavior regulation by inherent interest, enjoyment and satisfaction. There are three types of intrinsic motivation according to Deci and Ryan, (2000):

1. Intrinsic motivation toward knowledge is observed if an activity is performed for the pleasure or satisfaction of learning or understanding something.
2. Intrinsic motivation toward accomplishment is defined as engaging in an activity for the pleasure of accomplishing or creating something.
3. Intrinsic motivation toward stimulation occurs when an activity is performed to obtain stimulating experiences.

In relation to academic performance, other authors argued that intrinsic motivation is associated with interest, excitement, confidence; enhance performance, persistence, creativity, self-esteem, and general well-being of students (Ryan & Deci, 2000). They explained that intrinsic motivation offers not only higher performance of students but it bring happiness and enjoyment for the student for pursuing their studies.

Related studies

This section looks into several studies conducted by other researchers related to similar topic on academic self-regulation and academic performance. Concern on the academic self-regulation and academic performance has started years back by many researchers. The theory of self-regulation is a broader theory of motivation. Motivation, extrinsic and intrinsic, affects how people regulate their behavior in order to achieve their goals. Students who want to be included in the dean's list will affect their studying behavior. Academic performance depends on the level of motivation of students. Koh, Tan, Tan, and Fang (2010) conducted a study to find out the effect of motivation of students and academic performance. The aim of this study was to investigate the effect of SBL on learners' motivation and their academic performance. In assessing students' motivation, the researchers adopted a framework based on the Self-determination Theory (SDT), chosen on account of its comprehensive treatment of the relationship between students' perceived needs satisfaction and their motivation. The study hypnotized that SBL, which provides learners with interactive learning experiences, will enhance students' motivation and performance. The findings suggest that the students perceived their psychological needs to be satisfied and had high levels of self-determined motivation. Students who undertook SBL had higher mean performance test scores, although SBL may have differential effects on learners depending on factors such as gender, educational backgrounds, and IT knowledge.

Pursuing the same interest on the relationship between motivation and academic performance, Ayub (2017) conducted a study on the effect of intrinsic and extrinsic motivation on academic performance. Samples of 200 students of selected university in Karachi were taken. The aim of the study was to explore the relationship between intrinsic and extrinsic motivation on academic performance. Results of the study suggest that intrinsic and extrinsic motivation and academic performance were positively correlated. Furthermore, the study concluded that motivation improves academic performance of the students and there is a gender difference in motivation type and academic performance. Kitsantas, Winsler and Huie (2008) in their study on self-regulation and academic success, supported the idea that self-regulation affects the academic performance of students. They argued that differences in low- and high-achieving students are closely linked to an individual's level of self-regulation. Self-regulation refers to the degree to which students are "metacognitively, motivationally, and behaviorally active participants of their own learning process" (Zimmerman, 1989).

Dent (2013) conducted a study on self-regulation and academic achievement across childhood and adolescence. The study found that self-regulatory capacities had direct effect on academic achievement as a whole. In similar effort, Agustiani, Chayad, and Musa (2018**)** undertook a study on self-efficacy and self-regulated learning as Predictors of Students' Academic Performance. The study revealed that there is a correlation between self-efficacy, self-regulation of learning and academic achievements of students. This is also found in the study of McClelland and Cameron (2011) who investigated self-regulation and

academic achievement in elementary education. Based on their investigation, they confirm the correlation between self-regulation and academic achievement of elementary children. Such correlation also found across discipline of studies such as medical schools that self-regulation affects academic performance in medical education (Lucier, Jonker, Rikers & Themmen, 2016).

Similar study was also carried out by Cobb (2003) on the relationship between self-regulated learning behaviors and academic performance in web-based courses in Virginia. His study is similar to the findings of Kitsantas, Winsler and Huie (2008) that self – regulated learning affect the academic performance of students who took the web-based course. Intrinsic goal orientation was used as predictors in the development of a mathematical formula used to predict academic success in a web-based course. In the same interest, Pintrich and De Groot (1990), prior to Cobb and others, had conducted the similar study on the effect of motivational and self-regulated learning components to classroom academic performance. His study found that elf-efficacy and intrinsic value were positively related to cognitive engagement and performance. Self-regulation, self-efficacy, and test anxiety emerged as the best predictors of performance. Intrinsic value did not have a direct influence on performance but was strongly related to self-regulation and cognitive strategy use, regardless of prior achievement level.

The reviews of those related studies support or strengthen the theories and the assumption of the current study that academic self – regulation can affect the academic performance of students. Building on those previous studies, the current study would like to investigate different aspect of self-regulation and find out what particular components of self-regulation affects the academic performance.

Statement of the problems

The statement of the problem of the study is drawn from the conceptual framework. This study is to determine the level of self-regulation of students and its influence on their academic performance, specifically to answer the following:

1. What is self-regulation of Senior High School students in terms of?
   a. External regulation
   b. Introjected regulation
   c. Identified regulation
   d. Intrinsic motivation
2. What is the academic performance of students in terms of their grade?
3. Is there any relationship between self-regulation and academic performance of STEM students?

Assumption of the study

The assumption of the study is that academic self-regulation of the students affect their academic performance and can be measured.

Hypothesis

Ayub (2017) on his study on the intrinsic and extrinsic motivation and academic performance found a correlation and the study of Kitsantas, Winsler, and Huie (2008) also found the existence of correlation, therefore the study hypothesizes that there is a relationship between self-regulation and the academic performance of STEM students.

Research methodology

In order to carry out the study, an appropriate research methodology is utilized. Therefore, this part will discuss research design, data gathering instruments, population, locale of the study, data gathering procedures and statistical treatment of data.

Research design

The study is a quantitative descriptive research design and explanation research to determine and explain the level of academic self-regulation of students. It describes and explains what is found in the

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data. It involves the description, recording, analysis and interpretation based on the data gathered through questionnaires which are statistically computed. It is a fact finding with adequate interpretation. It assesses, determines and reports the way things are. In other words, it describes the data that have been collected on research sample, describes "what is" about the data gathered.

In line with the current study, descriptive correlational method was deployed. The study assessed the academic self-regulation level of students and how it affects their academic performance. This was to identify what the dominant self-regulations among students were and what particular self-regulation does affect the academic performance.

Locale of the study

The locale of the study was Divine Word Colleges of Region I. The Divine Word Colleges are run by the Congregation of the Divine Word Missionaries or known as Society of the Divine Word or in Latin, Societas Verbi Divini (SVD).

Population

The population of the study was composed of 302 STEM (science, technology, engineering and mathematic) of Senior High School students of the three colleges. STEM students were chosen on the basis of their capability to understand and answer the questionnaires. Total enumeration sampling was used to meet the required data for the study.

Data gathering instruments

The study utilized questionnaires. The questionnaires were adopted from SRQ_A made by Kennon (n.d) from University of Columbia. The questionnaires were distributed to STEM students of the three private Catholic colleges in Region I. Questionnaires were composed of five parts and they external regulation, introjected regulation, identified regulation, intrinsic motivation, and academic performance.

Data gathering procedures

In the process of data gathering, the researcher sent letters to the Presidents of the three colleges in Region I, requesting the Presidents to allow the researcher to flow his questionnaires in his college. The researcher personally met the Presidents and students and requested them to answer the questionnaires.

The retrieval of questionnaires was arranged between the President's representative and the researcher with the help of employees and faculty of the three colleges.

Statistical treatment of data

In consistent with the study as descriptive research, therefore descriptive statistics is used to measure the weighted mean and the Pearson r will be used to measure their correlations.

The following ranges of values with their descriptive interpretation will be used:

Statistical range descriptive interpretation overall descriptive rating

4.21-5.00 Very true Very High
3.41-4.20 True High
2.61-3.40 Somewhat true Moderate
1.81-2.60 Not true Low
1.00-1.80 Not at all true Very Low

Findings

The finding of the study is presented according to the statements of the problem.

Problem 1a. What is the academic self-regulation of STEM of Senior High School students in terms of external regulation?

Table 1a. External regulation

	$\bar{X}$	DR
1. I do my homework because I will get in trouble if I don't	3.54	True/high
2 I do my homework because that is what I'm supposed to do	4.09	True/High
3. I do my classwork so that teacher won't yell at me	3.32	Somewhat true/moderate
4. I do my classwork because that's the rule	3.70	True/High
5. I try to answer hard questions in class because that's what I am supposed to do.	3.48	True/ High
6. I try to answer hard questions in class because I want the teacher to say nice things about me	2.95	Somewhat true/moderate
7. I try to do well in school because that's what I am supposed to do	3.94	True/High
8. I try to do well in school because I will get in trouble if I don't do well.	3.48	True/High
9. I try to do well in school because I might get reward if I do well	3.58	True/High
Overall	**3.56**	True/High

Legend

4.21-5.00 Very true Very High
3.41-4.20 True High
2.61-3.40 somewhat true Moderate
1.81-2.60 not true Low
1.00-1.80 Not at all true Very Low

Based on the computed mean presented on the table, it shows that most students have a high external self- regulation but there are some who have moderate self-regulation. However, overall, the students have a high or 3.56 mean rating which means that they have high external regulation. This means that they do their homework, classwork, try to answer hard questions in class and try to do well in the school because of external factor such as fear, pressure, punishment, rule, and reward.

Problem 1b. What is the academic self-regulation of STEM of Senior High School students in terms of introjected Regulation?

Table 1b. Introjected regulation

Items	$\bar{X}$	DR
1. I do my homework because I want the teacher to think I'm good student.	3.28	Somewhat true/Moderate
2. I do my homework because I feel bad about myself if I don't do it	3.97	True/High
3. I do my classwork because I want the teacher to think I'm good students.	3.28	Somewhat True/High
4. I do my classwork because I'll be ashamed of myself if I didn't get done.	3.74	True/High
5. I try to answer hard questions in class because I want other students to think I'm smart.	2.61	Somewhat true/Moderate
6. I try to answer hard questions in class because I	3.36	Somewhat

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feel ashamed of myself when I don't try		true/Moderate
7. I try to do well in school so that my teacher will think I'm good student.	3.11	Somewhat true/Moderate
8. I try to do well in school because I feel really bad about myself if I don't do well	3.79	True/High
9. I try to do well in school because I feel really proud of myself if I do well	3.99	True/High
Overall	**3.46**	True/High

Legend

4.21-5.00 Very true Very High
3.41-4.20 True High
2.61-3.40 somewhat true Moderate
1.81-2.60 not true Low
1.00-1.80 Not at all true Very Low

As indicated by the computed mean presented on the table, it reveals that most students have moderate introjected self-regulation but some have a high introjected self-regulation. However, as a whole, the STEM of the senior high school students of Divine Word Colleges have a high (3.46) introjected academic self-regulation which means that they are behaving out of a sense of guilt or obligation or a need to prove something. The students do their homework and classwork, answer hard questions and try to do well in school because they have to do it, because they feel guilty if they don't, because it is their obligation. Somehow they have internalized the external controls, which are then applied through self-imposed pressures in order to avoid guilt or to maintain self-esteem (Deci & Ryan, 1999).

Problem 1c. What is the academic self-regulation of STEM of Senior High School students in terms of identified regulation?

Table 1c. Identified regulation

Items	$\bar{X}$	DR
1. I do my homework because I want to understand the subject	4.02	True/High
2. I do my homework because it is important to me to do my homework.	4.2	True/High
3. I do my classwork because I want to learn new things.	4.16	True/High
4. I do my class work because it's important to me to work on my classwork.	3.98	True/High
5. I try to answer hard questions in class to find out if I'm right or wrong.	3.78	True/High
6. . I try to answer hard questions in class because it is important to me to try to answer hard questions in class	3.33	Somewhat True/Moderate
7. I try to do well in school because it's important to me to try to do well in the school.	3.93	True/High
Overall	**3.91**	True/High

Legend

4.21-5.00 Very true Very High
3.41-4.20 True High

2.61-3.40 somewhat true Moderate
1.81-2.60 not true Low
1.00-1.80 Not at all true Very Low

As it is gleaned from the table and as seen in the computed mean, it shows that most students have high identified self-regulation, though some have moderate identified self-regulation. However, overall the students have high identified self-regulation which is indicated by its computed mean rating of 3.91 which is interpreted as high. It means that students pursue certain activity such as doing homework, classwork, answering hard questions in class and try to do well in school because of their importance. They have somehow accepted consciously that doing homework, classwork, answering questions in class and trying to do well in school is important for them in order to achieve personally valued outcomes. They have consciously valued the goal of certain activity as personally important. They made their judgment based on the value of the activity for them.

Problem 1d. What is the academic self-regulation of Senior High School students in terms of intrinsic motivation?

Table 1d. Intrinsic motivation

Items	$\bar{X}$	DR
1. I do my homework because it's fun	3.03	Somewhat true/Moderate
2. I do my homework because I enjoy doing my homework.	3.36	Somewhat true/Moderate
3. I do my classwork because it is fun	3.32	Somewhat true/Moderate
4. I do my classwork because I enjoy doing my classwork	3.37	Somewhat true/Moderate
5. I try to answer hard questions in class because I enjoy answering hard questions	3.02	Somewhat true/Moderate
6. I try to answer hard questions in class because it is fun to answer hard questions.	3.09	Somewhat true/moderate
7. I try to do well in school because I enjoy doing school work well.	3.47	True/High
Overall	**3.24**	

Legend

4.21-5.00 Very true Very High
3.41-4.20 True High
2.61-3.40 somewhat true Moderate
1.81-2.60 not true Low
1.00-1.80 Not at all true Very Low

Based on the computed mean as presented on the table, it shows that most students have moderate intrinsic motivation. Only few students have rated themselves high. Overall mean rating points out that the STEM of the Senior High School Students of Divine Word Colleges have somewhat true or moderate level of intrinsic motivation as indicated by its overall mean ration of 3.24 which is moderate or somewhat true. It means that the students lack of autonomy and self-motivated interest in their behavior or in their studies. Their academic participation is still predominantly influenced by external motivation such as external self-regulation, introjected self-regulation and identified self-regulation. Their academic

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participations are not regulated by the inherent interest and enjoyment and satisfaction found in the activity they undertook. According to Deci and Ryan, (2000), intrinsic motivation does not require external rewards to do certain activity or behavior, because the reward is the behavior itself. They engage in activity just for the pleasure of accomplishing or creating something.

Table2 e. Summary on the level of academic self- regulation

	$\bar{X}$	DR
External Regulation	3.56	True/High
Introjected Regulation	3.46	True/High
Identified Regulation	3.91	True/High
Intrinsic Regulation	3.24	Somewhat true/Moderate
Overall	**3.54**	**True/High**

Legend

4.21-5.00 Very true Very High
3.41-4.20 True High
2.61-3.40 Somewhat true Moderate
1.81-2.60 Not true Low
1.00-1.80 Not at all true Very Low

As gleaned from the summary table, it reveals that Academic self-regulation of students are high but these academic self-regulation are mostly influenced by extrinsic motivation such as external regulation, introjected regulation and identified regulation. Their intrinsic motivation is found to be somewhat true or moderate.

Problem 2: Is there a relationship between academic self-regulation and academic performance?

Table 2. Relationship between academic self-regulation and academic performance

External Regulation	0.0817
Introjected Regulation	0.0983
Identified Regulation	0.1526
Intrinsic Motivation	-0.0064
As a Whole	**0.0816**

*Significant at .05 level

Based on the correlation coefficient computation, it is found that academic self-regulation such as external regulation, introjected regulation; identified regulation and intrinsic motivation have no correlation with the academic performance of the students. Therefore the hypothesis of the study that there is no relationship between academic self-regulation and academic performance is accepted. The finding of the study is contradictory to the result of the study of Ayub (2017), Kitsantas, Winsler and Huie (2008), Cobb (2003) on the effect of intrinsic and extrinsic motivation on academic performance. The results of those studies suggest that intrinsic and extrinsic motivation and academic performance are positively correlated. The result of the current study may point out different factors that cause academic performance.

Conclusion

Based on the findings of the study, the study concludes that academic self-regulation of the STEM students of the Divine Word Colleges is high; however, there is no relationship between academic self-regulation and academic performance and therefore the hypothesis is rejected. This further concludes that

the academic performance of students of Divine Word College of Vigan is not controlled by their academic self-regulation such as extrinsic and intrinsic motivation. Their academic performance can be affected other factor such as their self-efficacy, self-awareness, possible self (Bandura, 1986, 1989). Bandura argued that people with high self-efficacy believe they have the ability to succeed at a task, to overcome obstacles, and to reach their goals. While, people with low self-efficacy doubt their ability to succeed and do not believe that they have what it takes to reach their goals. Dreaming of possible self in the future can affect the outcome certain behavior (Markus & Nurius, 1986; Markus & Ruvolo, 1989). Last factor that can also influence the outcome is self-awareness. Knowing one's self is another factor that can influence the outcome as Duval and Wicklund (1972) argued that when people focus their attention inward (i.e., when they become self-aware), they tend to compare their present state with a relevant standard. Encouragement arises when people believe they are meeting or exceeding a relevant standard; discouragement arises when people believe they are falling short of a relevant standard.

The output of the study may point to the contradictory idea that that the ability to self-regulate has been viewed as a desirable quality throughout history because of its positive effects on behavior and the acquisition of skills (Reid, 1993), the attainment of goals and academic performance.

Recommendation

Ryan and Deci, (2000) explained that intrinsic motivation offers not only higher performance of students but it bring happiness and enjoyment for the student for pursuing their studies. Therefore based on that study and based on the findings of the current study which extrinsic motivation is higher than intrinsic motivation, recommends that there is a need to improve the intrinsic motivation of the students and reorient their extrinsic motivation.

Further study should be pursued related to the factors that affect the academic performance of the students beside intrinsic and extrinsic motivation such as self-efficacy, self-awareness and possible self (Bandura, 1986, 1989).

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Two Important Predictors of Quality Instruction: Teacher Ratings and Student Outcomes: Correspondence and Interpretation

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Abstract

This quantitative study determined the coefficient of correlation between teacher ratings and students' grades in the final exam of an elementary statistics course GSTA 140 and their reliabilities (overall consistency of a measure) at Effat University in Jeddah Saudi Arabia. The study was conducted with a cluster convenience sample of 558 students, registered in 22 GSTA 140 courses over a period of 3 years (fall 2014 to fall 2017). To avoid the effect of variability of different teaching styles on ratings, only those courses were collected, which are taught by the same instructor. The study, designed and inferences obtained, is based on Pearson product-moment Statistical correlation test, Normality test and Empirical rule. The results showed that there is a very weak positive correlation between teacher ratings and student achievement, however; their independent standard deviations (a measure of variation) are approximately equal. Normality tests showed that the data set for the students' grades is well modeled by a normal distribution as compared to the data set of teacher ratings. Results also indicated that the application of the empirical rule is the optimum approach to interpret the reliability of the data of teacher ratings surveys and students' final grades and hence prediction can be made on the bases of these values. The findings of this study could prove useful to university, regional, and kingdom, implementing similar formal teacher evaluation framework as Effat University.

Keywords: *Teacher Ratings, Student outcomes, Normal distribution, Coefficient of linear correlation, Standard deviation, Empirical rule.*

Background and purpose of the study

Public and private universities in Saudi Arabia are striving hard to modernize their educational system to compete with international standards, further they hope to meet Saudi Arabia's vision 2030 which states "[1]We will continue investing in education and training so that our young men and women are equipped for the jobs of the future. We want Saudi children, wherever they live, to enjoy high quality, multi-faceted education. We will invest particularly in developing early childhood education, refining our national curriculum and training our teachers and educational leaders".

Effat University is one of the best universities in Saudi region striving hard to provide high standard education to its students. This university accommodates four colleges, Engineering, Architecture, Business and Humanities, which further subdivided into many departments. All departments 'students must study 42 credit hours of the general education program. The general education program aims to help the students acquire introductory background information in a variety of disciplines ranging from scientific, cultural, reasoning, to humanity and health wellbeing. In addition, it targets at equipping the students with shared values and ethics.

One of these disciplines is "Introduction to Statistics" the purpose of teaching this course is to prepare the students for the further research works to find the solutions of their problems scientifically.

[1] http://vision2030.gov.sa/en/node/8

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To monitor, check and maintained the quality of curriculum and teaching process regularly, at the end of every semester, the students asked to complete a course evaluation survey for all the taught courses. These surveys consist of three parts. The first is concerned with the quality of the course, while the second part refers to the faculty performance. In this part, the students asked to assess the faculty's readiness, knowledge, delivery, methods of assessment and ways of treating the students. The rating is categorized by " strongly agree, agree, disagree, strongly disagree and no response", and third section of the survey concludes with an open-ended section where the students are requested to respond at their own will to questions on how to improve the course or what they like/dislike about it.

Al though these surveys are significant to both the instructors and the human resources department. As they are considered an important, measure of effective teaching and determines the sustainability of teacher job.

Unfortunately, there is no objective way to draw conclusions from these surveys with 100% certainty and hence, their interpretation has become a challenge. Often, the nature of student feedback is assumed relative to the instructor's teaching skills, the higher the positive rating, the better the teacher.

This research makes an effort to find the relationship between a teacher's evaluation rating and student achievement in terms of their final exam grades. Furthermore, it compares the stability and dependability of these two variables statistically.

Previous researches and their findings

Teacher ratings (also known as student evaluation of teaching or course evaluations) are one of the most studied topics in higher education, with several thousand research articles and books addressing various aspects of this topic over the past 100 years.

Despite of ambiguity, misperceptions about ratings and problematic use of their result, course evaluation surveys are the most commonly used methods for evaluating and getting feedback on teaching, in all over the world.

Several techniques have been applied to determine the extent to which ratings measure effective teaching. One set of studies has examined that relationship between ratings and student achievement in a course. The results of this approach have been mixed. In the 80s and 90s, some meta-analyses indicated a moderate positive correlation between teacher ratings and student outcomes as measured by exam grades. In general, these findings show that overall ratings of the course or instructor ('Overall this is an outstanding instructor' 'Overall this is an admirable course') show a consistent positive relationship to achievement (i.e., in classes where the achievement level is high, instructors tend to receive better ratings). However, a more recent meta-analysis showed a fluctuating positive relationship. Other studies have compared student ratings results with the ratings of peers and of experienced faculty, and, in general, these studies have shown positive correlations. Investigators have also instituted that rating of overall instructional excellence are best explained by ratings of certain approaches to teaching (e.g., arranging the class, appreciating involvement, and establishing rapport) rather than unnecessary factors. Finally, a recent research suggesting that an instructor's favorable rating in one course do not necessarily predict their performance in subsequent courses. This could mean that teachers with good ratings may simply be "teaching to the exam" but not approaching deep learning, or it could show a weakness of curricular alignment between the instructor's course and subsequent courses.

Some very recent research and google trend pictures are given as follows.

2 Ingrid Yvonne Williams Medlock. (December 2017). Teacher evaluation ratings and student achievement: what's the connection?

[3]Neelie B. Parker. (May 2017). Framework for teacher evaluation: examining the relationship between teacher performance and student achievement.

2 https://search.proquest.com/docview/1946167905?pq-origsite=gscholar.

3 https://search.proquest.com/docview/1952703543/fulltextPDF/366C986A3D454A58PQ/1?accountid=130572.

[4]Thomas P. Scanlan and Joliet, llinois. (2016). A Correlational Study of Teacher Ratings Established by the Charlotte Danielson Framework for Teachers and Student Achievement in Reading and Math.

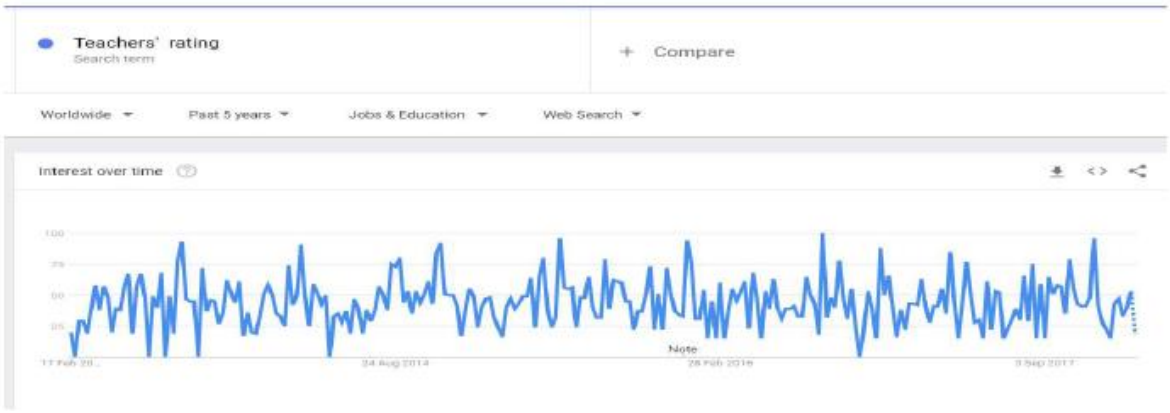

Figure 1. Google trends search: overall trends in 'teachers 'rating' over past 5- years.

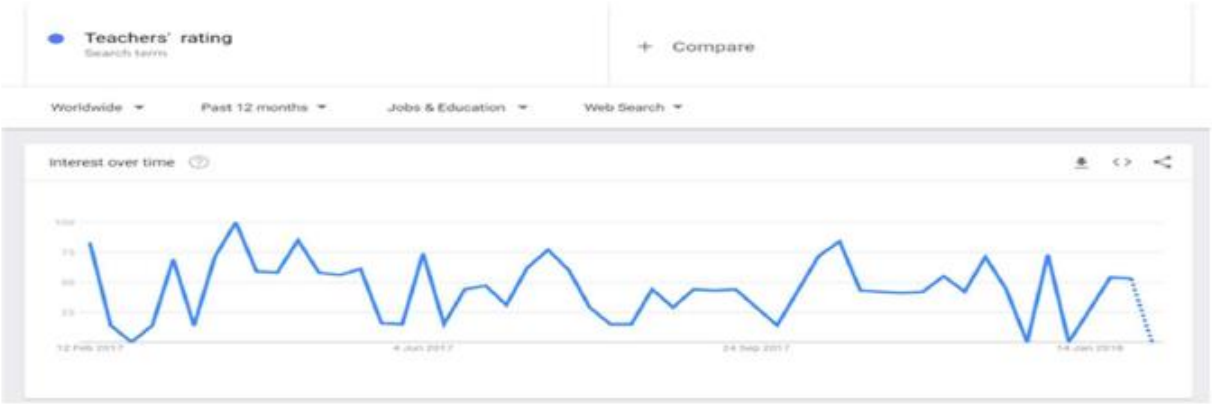

Figure. 2. Google trends search: overall trends in 'teachers 'rating' in 2017

Innovation

Teacher's evaluation rating and its interpretation is a very challenging and important educational topic and many researches have been done in this field but most of them are descriptive in nature. This research is a quantitative scientific research and the application of empirical rule and checking the strength of the data by normality test are innovations for this research, Also a big sample size of 558 students spanned over the period of three years is used which increases it reliability and validity.

Research questions

This study designed to answer the following three research questions.

Q1. What type of correlation is there, between students achieved average grade in their final exams and average course evaluation's satisfaction rating in the GSTA 140?

Q2. How to check the consistency of student's grades and teacher ratings by using measures of dispersion and empirical rule?

Q3. Which predictor is better to measure the level of educational instruction for a particular teacher, students' achievements or teacher ratings?

4 https://search.proquest.com/docview/1854892927?pq-origsite=gscholar

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Literature review

Thomas P. Scanlan and Joliet, Illinois write in their very recent research about the correlation of teacher rating and students' success in the exam that "5the purpose of faculty evaluation tools is to identify weaknesses and strengths, promote professional development and immediate or, some cases, terminate ineffective faculty members".

A brief history of teacher's evaluation

Robert J. Marzano, Tony Frontier, and David Livingston describe the history of teacher evaluation in their book named "Effective Supervision" that the early days of supervision and evaluation began in the 1700s and lasted until the mid-1800s. They characterized by a reliance on clergy to provide guidance to and supervision of teachers. As school systems became more complex, the need for more specialized guidance for teachers gave rise to the principal teacher as leader and a growing awareness of the importance of pedagogy. The era of scientific management, from the late 1800s until right before World War II, characterized by two competing views of education. One was the view that the purpose of education was the promotion of democratic ideals. The other was the view that schools function best when approached from the perspective of scientific management. Throughout this era, the scientific approach gained strength and acceptance. The period after World War II saw a swing away from the scientific approach to an emphasis on developing the teacher as an individual. This period also saw a proliferation of the responsibilities of the supervisor.

The next era, lasting from the late 1960s to the early 1970s, saw the phenomenon of clinical supervision—one of the most influential movements in supervision and evaluation. The Hunter model combined with clinical supervision to produce a widely used, but often time's prescriptive approach to supervision. Developmental/reflective models that were much less prescriptive followed this period. The RAND study provided a realistic look at the actual practice of supervision and evaluation in districts and schools and concluded that teachers preferred specific as opposed to general feedback.

The mid-1990s saw the introduction of the Danielson model to teacher supervision and evaluation. It was widely applied to K–12 education. Finally, the first decade of the 21st century witnessed heavy criticisms of current evaluation practices calling for major changes in tenure and compensation.

Value-added analysis and value-added assessment

6The most significant trend to link teacher evaluation with student achievement is to use the exam grade and value-added modeling (also known as value-added analysis and value-added assessment). This method of teacher evaluation measures the teacher's contribution in a given year by comparing the current exam grade of his students in the grade of students in previous school years and so on. In this manner, value-added modeling seeks to isolate the contribution, or value added, that each teacher provides in a given year, which can be compared to the performance measures of other teachers. VAMs (value added models) are considered to be fairer than simply comparing student achievement scores or gain scores without considering potentially confounding context variables like past performance (Newton, Darling Hammond, Hearten, & Thomas, 2010).

Research design

The study is scientific, quantitative in nature based on specific, narrow questions to obtain measurable and observable data on variables x and y.

This study involves statistical analyses; conducted on numerical continues data to make generalizations and predictions about the population. The statistical test used for the inferences is "Pearson Statistical correlation test", to find the strength of the association between two continuous variables x and y.

5 https://files.eric.ed.gov/fulltext/ED532775.pdf

6 https://faculty.smu.edu/millimet/classes/eco7321/papers/koedel%20et%20al%202015.pdf

"Empirical rule" (also known as the three- sigma rule or the 68-95- 99.7 rule) is applied to provide a quick estimate of the spread of data in a normal distribution with the help of measured mean and standard deviation.

Sampling technique

Cluster convenience-sampling techniques is used for the selection of the sample, of 22 elementary statistics (GSTA 140) course grades and their teaching ratings.

Data collection

Observational data collection method (surveys) is used to collect the teacher rating's evaluation by the students; this is the method where the researcher has no control on the change or modify environment to get the desired results.

For students' achievement, the software known as "Blackboard Learn" gathered records (grades).

Blackboard Learn (previously the Blackboard Learning Management System), is a virtual learning environment and course management system developed by Blackboard Inc. It is a Web-based server software, which features course management, customizable open architecture, and scalable design that allows integration with student information systems and authentication protocols.

Students were asked to respond the following questions in the formal surveys of teacher ratings at EFTA University.

Table 1. Survey questionnaire

SR.NO	Questions	Strongly Agree%	Agree%	Disagree%	Strongly Disagree %	Nonresponse
1	The instructor was prepared					
2	The instructor was available for help outside of class					
3	The instructor returned assignments/tests timely and with feedback					
4	The instructor was enthusiastic about the subject					
5	The instructor stimulated interest in the course subject					
6	The instructors explanation was clear					
7	The instructor treated students with respect					
8	I would like to take another course with the same instructor					
9	The course generally followed the syllabus					
10	The course materials were up to date and useful					

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11	The course resources I needed were available when I needed them					
12	The course materials were made available on Blackboard					
13	The course was intellectually challenging					
14	The assessment tasks and the assessment criteria were made clear to me					
15	The class activities, assignments, laboratories helped me in understanding the course					
16	The effort required for this course was appropriate					
17	Overall, I was satisfied with the quality of this course					
18	The lab sessions were organized and clear instructions were given to me					
19	The lab activities were well integrated with the lectures.					

Data analysis

Students' average grades considered as variable "x" and average teacher rating considered as "Y".

There are three measures have been calculated in this research, First is the coefficient of linear correlation between x and y, secondly value of standard deviation for both x and y and third is mean values of both above-mentioned variables.

A Pearson's coefficient of correlation "r" is used to analysis the data. The primary purpose of linear correlation analysis is to measure the strength of a linear relationship between two variables.

Some scatter diagrams given below that demonstrate different relationships between input, or independent variables, x, and output, or dependent variables, y.

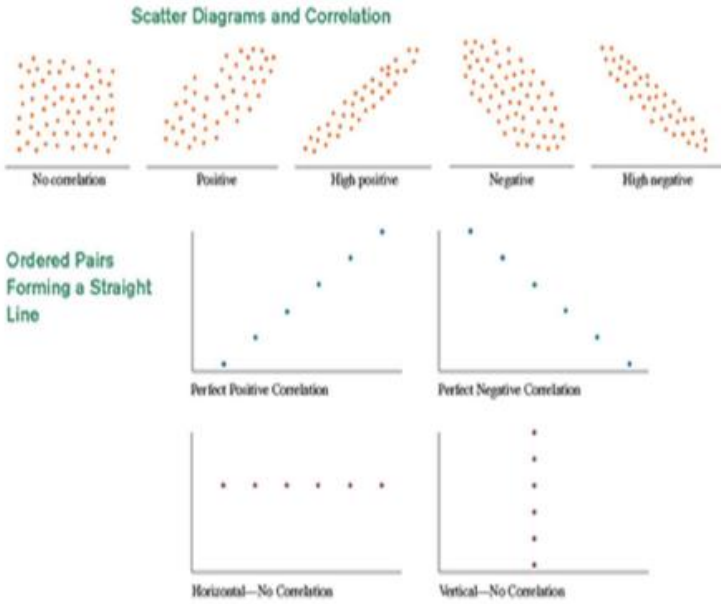

Figure 3. Patterns of correlation (Robert johnson and patricia kuby (2012)).

If as x increases, there is no definite shift in the values of y, we say there is no correlation or no relationship between x and y. If as x increases, there is a shift in the values of y, then there is a correlation. The correlation is positive when y tends to increase and negative when y tends to decrease. If the ordered pairs (x, y) tend to follow a straight-line path, there is a linear correlation. The preciseness of the shift in y as x increases determines the strength of the linear correlation.

Perfect linear correlation occurs when all the points fall exactly along a straight line. The correlation can be either positive or negative, depending on whether y increases or decreases as x increases. If the data form a straight horizontal or vertical line, there is no correlation, because one variable has no effect on the other. Students' average grade in the final exam considered variable "X" and average satisfaction rating of the course evaluation surveys considered as the second variable "Y".

The following diagram shows the computing formulae to find the coefficient of linear correlation with the help of variables x and y.

7The standard deviation (SD, also represented by the Greek letter sigma σ (the Latin letter) or s, is a measure that is used to quantify the amount of variation or dispersion of a set of data values. A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points spread out over a wider range of values.

The computing formula for standard deviation also uses the similar calculations with the help of variables x and y and the sample size n, as shown below.

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}} \; and \; S = \sqrt{\frac{\sum y^2 - \frac{(\sum y)^2}{n}}{n-1}}$$

[8]Empirical rule

If a variable is normally distributed, then (1) within 1 standard deviation of the mean, there will be approximately 68% of the data; (2) within 2 standard deviations of the mean, there will be approximately

7 https://en.wikipedia.org/wiki/Standard_deviation#cite_note-StatNotes-1

8 Robert Johnson and Patricia Kuby (2012)

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95% of the data; and (3) within 3 standard deviations of the mean, there will be approximately 99.7% of the data.

9 The Empirical Rule holds for normally distributed populations. In addition: The Empirical Rule also approximately holds for populations having single peaked; mound-shaped distributions that are not much skewed. In some situations, the skewness of a mound-shaped distribution can make it tricky to know whether to use the Empirical Rule. Hence, the class width is a decisional choice to have a realistic view of the distribution.

The empirical rule tells us that at least 95% of all sample means fall within about 2 standard deviations (SD) of the population mean, meaning that there is less than a 5% probability of obtaining a sample mean that is beyond 2 SD from the population mean.

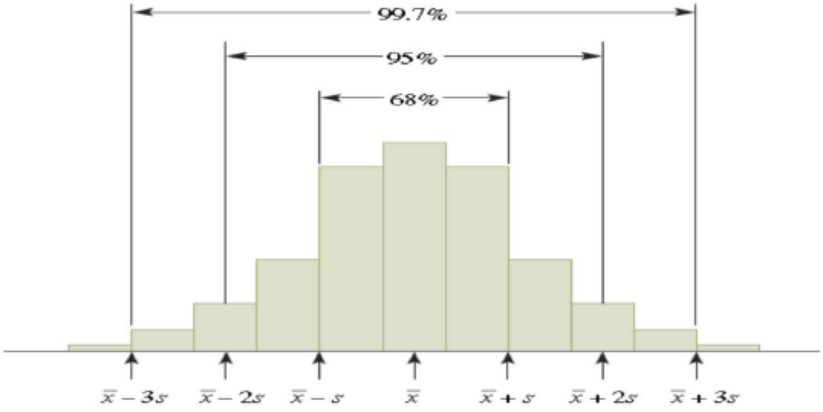


Figure 4. Empirical rule

Calculation

The following table is consisting five columns. The first column is showing the courses' sections and the times, when these courses taught, the second column is showing a number of students, third is showing grades out of 40. The teaching in Effat University is the type of continuous assessment system and weighted of the final exam is 40%, the fourth column is graded percentage and the last one is teacher rating out of 100.

Table. 2. Data collection

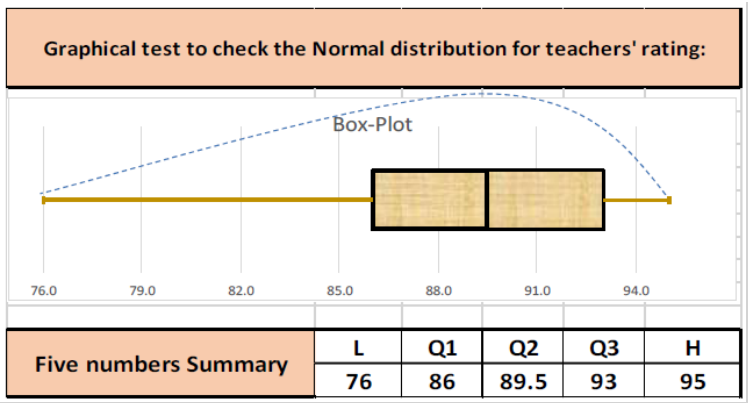
Courses	Number of students	Average grade out of 40	Percentage of grades (X)	Percentage of Positive rating (Y)
Fall 2017-GSTA 140 (1)	**26**	**27.85**	**69.625**	**89**
Fall 2017-GSTA 140 (2)	**26**	**29.41**	**73.525**	**95**
Fall 2017-GSTA 140 (6)	**20**	**27.88**	**69.7**	**94**
Spring 2017-GSTA 140 (2)	**33**	**29.02**	**72.55**	**93**
Spring 2017-GSTA 140 (4)	**33**	**28.79**	**71.975**	**92**
Spring 2017-GSTA 140 (5)	**29**	**26.9**	**67.25**	**95**

9http://www.academia.edu/18782753/Application_of_Empirical_Rule_on_Standard_Deviation_and_the_Chebyshev_s_Theorem_Quantitative_Aspects_of_Real_Estate_Market_Studies

Spring 2017-GSTA 140 (6)	**30**	**28.9**	**72.25**	**90**
Fall 2016-GSTA 140 (3)	**26**	**27.84**	**69.6**	**86**
Fall 2016-GSTA 140 (4)	**26**	**25.88**	**64.7**	**93**
Fall 2016-GSTA 140 (6)	**24**	**25.15**	**62.875**	**81**
Spring 2016-GSTA 140 (2)	**27**	**28.61**	**71.525**	**93**
Spring 2016-GSTA 140 (3)	**24**	**30.33**	**75.825**	**93**
Spring 2016-GSTA 140 (7)	**24**	**27.16**	**67.9**	**79**
Fall 2015-GSTA 140 (2)	**25**	**28.34**	**70.85**	**82**
Fall 2015-GSTA 140 (11)	**24**	**26.81**	**67.025**	**92**
Spring 2015-GSTA 140 (2)	**26**	**32.20**	**80.5**	**86**
Spring 2015-GSTA 140 (3)	**22**	**32.32**	**80.8**	**89**
Spring 2015-GSTA 140 (4)	**23**	**30.66**	**76.65**	**87**
Fall 2014-GSTA 140 (1)	**28**	**28.63**	**71.575**	**93**
Fall 2014-GSTA 140 (2)	**18**	**28.86**	**72.15**	**76**
Fall 2014-GSTA 140 (3)	**19**	**26.7**	**66.75**	**86**
Fall 2014-GSTA 140 (9)	**25**	**31.41**	**78.525**	**84**
Total Number of students	**558**			

Normality test

To compare the sample distribution with the normal distribution, a graphical method is used and box plots (a simple way of representing statistical data on a plot in which a rectangle drawn to represent the second and third quartiles, usually with a vertical line inside to indicate the median value. The lower and upper quartiles are shown as horizontal lines either side of the rectangle) are drawn for both the variable x and y.



Graph 1. Box plot for Y

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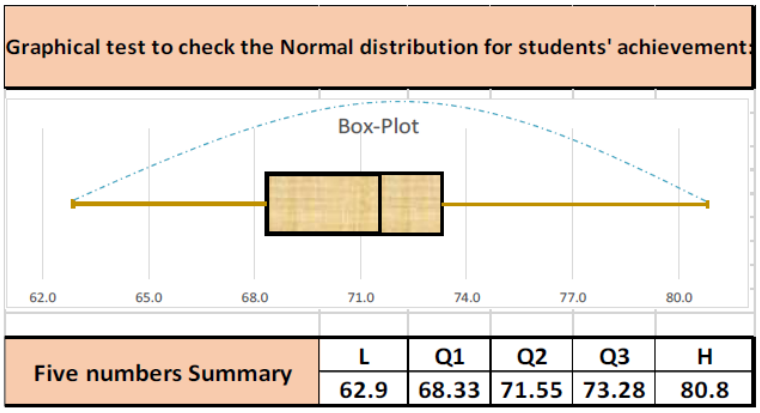
Quartiles Q1, Q2, and Q3 are the values, which represent 25%, 50% and 75% of the data set.
Least and highest values in the data sets are representing by L and H.



Five numbers Summary	L	Q1	Q2	Q3	H
	62.9	68.33	71.55	73.28	80.8

Graph 2. Box plot for X

Students' achievements' graph is showing better normal distribution the teacher ratings.

The normal distribution is important in statistics and used in the natural and social sciences to represent real-valued random variables with unknown distributions.

The values for product x and y and squares of x and y are given below.

Table 3. Sum of variables, x, y, x^2, y^2 and xy

	Average grades % (X)	**Average Positive rating % (Y)**	**XY**	x^2	y^2
1.	69.63	89	6196.63	4847.64	7921
2.	73.53	95	6984.88	5405.93	9025
3.	69.70	94	6551.80	4858.09	8836
4.	72.55	93	6747.15	5263.50	8649
5.	71.98	92	6621.70	5180.40	8464
6.	67.25	95	6388.75	4522.56	9025
7.	72.25	90	6502.50	5220.06	8100
8.	69.60	86	5985.60	4844.16	7396
9.	64.70	93	6017.10	4186.09	8649
10.	62.88	81	5092.88	3953.27	6561
11.	71.53	93	6651.83	5115.83	8649
12.	75.83	93	7051.73	5749.43	8649
13.	67.90	79	5364.10	4610.41	6241
14.	70.85	82	5809.70	5019.72	6724
15.	67.03	92	6166.30	4492.35	8464
16.	80.50	86	6923.00	6480.25	7396
17	80.80	89	7191.20	6528.64	7921
18.	76.65	87	6668.55	5875.22	7569
19.	71.58	93	6656.48	5122.98	8649
20.	72.15	76	5483.40	5205.62	5776

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21.	66.75	86	5740.50	4455.56	7396
22.	78.53	84	6596.10	6166.18	7056
	$\sum x = 1574.13$	$\sum y = 1948.00$	$\sum xy = 139391.85$	$\sum x^2 = 113103.89$	$\sum y^2 = 173116$

Sum other important calculations are given below.

Average of students' achievement

$\bar{x} = \frac{\sum x}{n} = \frac{1574.13}{22}$=77.55%

Average of teacher's rating

$$\bar{y} = \frac{\sum y}{n} = \frac{1948}{22} = 88.55\%$$

Correlation between students' achievement and teachers' rating:

$$ss(x) = \sum x^2 - \frac{(\sum x)^2}{n}$$

$=113103.89 - \frac{(1574.13)^2}{22}$=472.74

$$ss(y) = \sum y^2 - \frac{(\sum y)^2}{n}$$

$=173116 - \frac{(1948)^2}{22} = 629.45$

$$ss(xy) = \sum xy - \frac{\sum x \sum y}{n}$$

$$= 139391.85 - \frac{1574.13 \times 1948.00}{22}$$

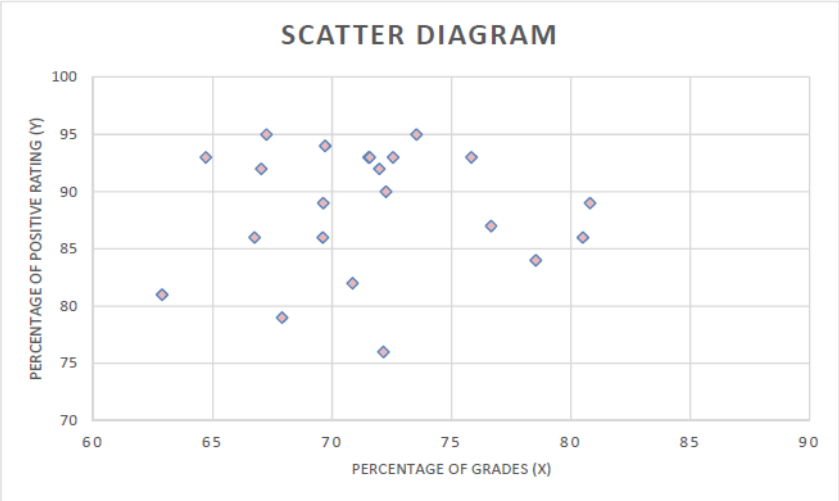
$$= 9.75$$

$$r = \frac{ss(xy)}{\sqrt{ss(x)ss(y)}}$$

$$= \frac{9.75}{\sqrt{472.74 \times 629.45}}$$

$$= \frac{9.75}{545.5}$$

$$r = 0.02$$



Graph 3. Scatter diagram

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The standard deviation of students' achievement

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$$

$$s = \sqrt{\frac{113103.89 - \frac{(1574.13)^2}{22}}{21}}$$

S=$\sqrt{22.51}$ =4.7≅ 5

The standard deviation of teachers' rating

$$s = \sqrt{\frac{\sum y^2 - \frac{(\sum y)^2}{n}}{n-1}}$$

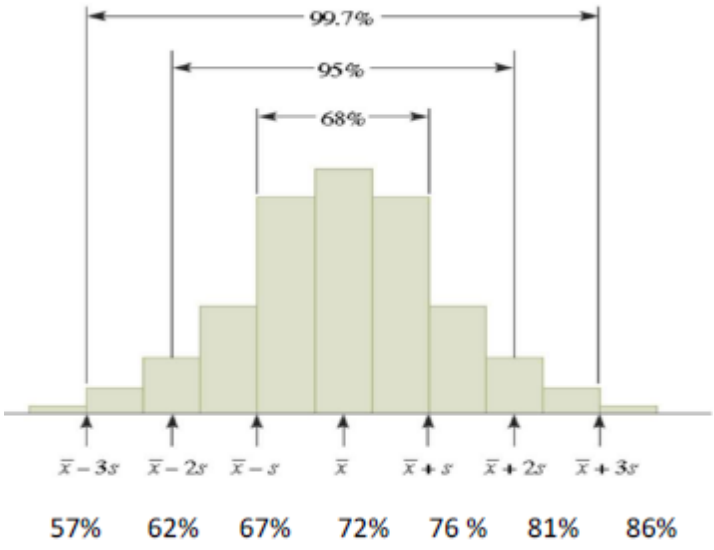
$$s = \sqrt{\frac{173116 - \frac{(1948)^2}{22}}{21}}$$

S=$\sqrt{29.97}$ =5.4≅ 5

Empirical Rule for students' achievement

Table 4. Three sigma values

$\bar{x} - s$	**67**
$\bar{x} - 2s$	**62**
$\bar{x} - 3s$	**57**
$\bar{x}$	**72**
$\bar{x} + s$	**76**
$\bar{x} + 2s$	**81**
$\bar{x} + 3s$	**86**



Graph 4. Empirical rule

Empirical rule for teachers' rating

Table 5. Three sigma values

$\bar{x}-s$	**83**
$\bar{x}-2s$	**78**
$\bar{x}-3s$	**72**
$\bar{x}$	**89**
$\bar{x}+s$	**94**
$\bar{x}+2s$	**99**
$\bar{x}+3s$	**105**

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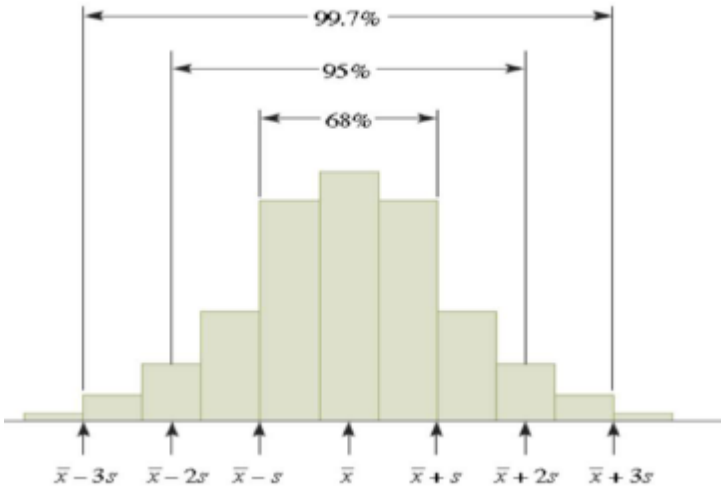


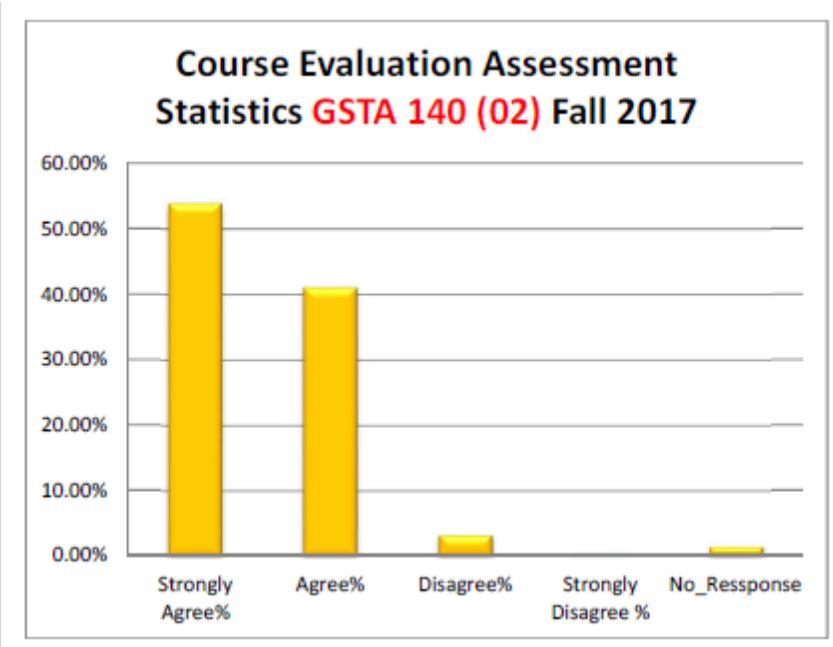
Graph 5. Empirical rule

Sample of formal teacher rating survey used in Effat University and its graphical interpretation

Table 6. Sample-teacher's evaluation survey

SR.NO	Questions	Strongly Agree%	Agree%	Disagree%	Strongly Disagree %	Nonresponse
1	The instructor was prepared	13	8	0	0	0
2	The instructor was available for help outside of class	12	7	2	0	0
3	The instructor returned assignments/tests timely and with feedback	12	8	1	0	0
4	The instructor was enthusiastic about the subject	12	8	1	0	0
5	The instructor stimulated interest in the course subject	11	9	1	0	0
6	The instructors explanation was clear	11	8	2	0	0
7	The instructor treated students with respect	14	7	0	0	0
8	I would like to take another course with the same instructor	11	8	1	1	0
1	The course generally followed the syllabus	11	10	0	0	0
2	The course materials were up to date and useful	12	9	0	0	0
3	The course resources I needed were available when I needed them	12	9	0	0	0
4	The course materials were made available on Blackboard	12	8	1	0	0
5	The course was intellectually challenging	9	11	1	0	0
6	The assessment tasks and the assessment criteria were made clear to me	12	8	1	0	0

7	The class activities, assignments, laboratories helped me in understanding the course	12	9	0	0	0
8	The effort required for this course was appropriate	11	10	0	0	0
9	Overall, I was satisfied with the quality of this course	12	9	0	0	0
10	The lab sessions were organized and clear instructions were given to me	8	9	1	0	3
11	The lab activities were well integrated with the lectures.	8	9	1	0	3
12	**Average**	53.88 %	41.10 %	3.26 %	0.25 %	1.50 %
13						
14	Student response	SR	95 %	Total Students		27
15	Response Rate	RR	78 %	N0. of Response		21



Graph 6. Sample-course evaluation assessment

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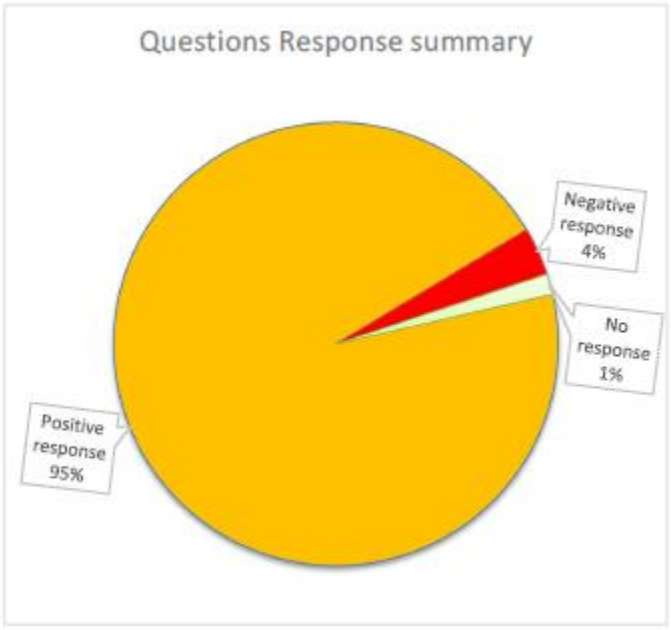

Graph 7. Sample-question response summary

Findings of the study

Q1. What type of correlation is there, between students achieved average grade in their final exams and average course evaluation's satisfaction rating in the GSTA 140?

Answer: There is a very weak positive correlation between students' achieved average final exam grade and course evaluation's satisfaction rating in the GSTA 140 final exam, the value of the coefficient of correlation is 0.02.

Q2. How to check the consistency of student's grades and teacher ratings by using measures of dispersion and empirical rule?

Answer: The standard deviation is approximately equal to 5 for both variables, which shows the same consistency.

The average Final grade of 558 students in 22 courses is 77.55%.

The average teacher's evaluation rating done by students in 22 courses is 88.55%.

By comparing above results, we conclude the ranges of reliability of these two variables by using empirical rule in 95% confidence interval, as follows:

$$73\% \leq x \leq 82\% \text{ and } 84\% \leq Y \leq 94\%$$

Q3. Which predictor is better to measure the level of educational instruction for a particular teacher?

Answer: Normality tests showed that the data set for the students' grades is well modeled by a normal distribution as compared to the data set of teacher ratings and hence the overall reliability of students' grades is better than teacher ratings and hence students' grades are the best indicator of educational instructions.

Conclusion

Teacher rating is not a true reflector of student outcomes as there is a very weak correlation between them. Less grades of the student does not mean that the teacher is not good. There are many factors effect on the grades; especially it is hard for the weak base students to get good grades. Similarly, teacher rating also badly effect if the course is a hard level or teacher is strict in grading or in maintaining discipline, etc., but again it does not reflect that the teacher is not qualified or not delivering the lessons properly.

The Empirical rule is the best way to find the real interpretation and reliability of these two predictors and their extreme limits.

Limitations

Apart from a good sample size of 22 similar courses taught by the same instructor, there are some limitations too, which can affect the findings of the research. For example,

- Difficulty level for different courses may affect the teacher' evaluation survey ratings.
- Instructors' teaching style can affect the consistency of the results.
- The sample distribution is not 100% normal distribution, which may affect the empirical rule's finding.
- Experience of the instructor also an important factor for the consistency of results.
- Feedback is gathered only by formal evaluation surveys.
- The participation rate of the students is less than 100% in all surveys.

Recommendations

Good teachers get large gains in student achievement (Hanushek, 2002) and there is strong agreement that good teaching may be the single most factor in student achievement (Haycock, 1998).

An effective teacher evaluation system can help all teachers improve as well as indicate areas where a teacher may need to grow (Wise et al., 1984). The most common method is for an evaluator to conduct frequent classroom visits (Peterson, 2009).

Teacher survey data showed that the majority of teachers used the evaluation information to improve teaching. The survey data also showed that the evaluation process led to improvements in student learning.

The most common and effective method of teacher evaluation is for the administrator to conduct classroom visits (Peterson, 2009).

There are some suggestions to improve the process of teachers' evaluation.

Administrators should not be considered the formal teacher's rating survey alone for judging the teaching skill for teachers. There are a number of approaches that can be used for this purpose, e.g., classroom observations (by managers, other teachers or external evaluators), value-added models that try to measure gains in student achievement, judgements made by the teacher's line manager or principal, teacher self-evaluation, teacher portfolios of work etc.

Results of surveys, should be discussed with the teacher and help her/him to overcome the weak areas by providing different types of professional development activities and workshops.

Value-added models or continuous assessments should be considered to appreciate/ awards /reward for the teacher.

Students should be given very clear and specific guidance about the feedback requested.

An environment of trust and support should be maintained for both students and teachers by the management.

Teacher's evaluation process or model should be followed.

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Figure 4. Teacher evaluation process

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Achieving Financial Inclusion in Ghana through Mobile Money

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Abstract

Financial inclusion refers to the act of ensuring that all the citizen sin a country are connected to a well – functioning financial or payment system, especially those citizens who live in rural areas and are mostly under privileged. This includes the provision of traditional banking products and services, credit facilities that are affordable and specially designed for low income earning individual, small and medium scale enterprises and other relevant financial products and services.

The aim of this study is to assess Ghana's ability to achieve financial inclusion through mobile money. Using MTN mobile money as case study, the researcher reviewed literature of other authors and researchers collected from secondary sources such as newspapers, research papers, online articles, books, journals, reports, dissertations etc.

Findings from the literature review showed that the introduction of mobile money in the country has contributed immensely and in various ways to achieving financial inclusion in the country.

Keywords: *Payment systems, Financial, products, financial inclusion, mobile money, country, services, mobile phone, transfers, remittance.*

Mobile money

Mobile money can be described as financial transactions that are conducted using a mobile phone, where money is kept in the form of virtual money in a SIM card oriented mobile account. Mobile money transactions are compatible with the most basic phones and do not require internet access. Mobile money has the potential to provide access to formal financial services to communities which do not have access to traditional banking services(USAID, 2013).Mobile Klutse (2015) defined mobile money as a fast, simple, convenient, secure and affordable way of transferring money using a mobile phone. Mobile Money is available for anyone, no bank account is required. However you will need a bank account to be able to link your Bank account to your Mobile Money wallet.

Lack of formal financial services limits access to credit, savings, remittances, insurance, and other instruments that play an important role in providing poor and vulnerable populations with financial protection from poverty, lack and health care costs. In Sub-Saharan Africa, 12% of the populationswho do not own a formal bank account patronize mobile service and in at least 28 countries around across the world, there are more mobile money agent outlets than formal bank branches **(**USAID, 2013).

Mobile financial services form part of the most promising technological applications which fast track a country's development. Mobile money seems to becoming that mobile application which transforms entire economies as it is used across several disciplines of business and the economy at large. At present, about 110 money mobile systems have been created around the world, with more than 40 million users (Donovan, 2012).

The commonest and most successful mobile money system in the world is known as M-PESA. It started in Kenya. As at, 2011, M-PESA operated in about six countries and had to its record, about 20 million users who were transferring up to $500 million in a month (Donovan, 2012).

Since its inception in 2007 by Vodafone's Safaricom mobile operator, M-PESA has had a strong impact on the economies of many East African counties and countries outside East Africa. Launched as a simple method of sending small payments between users, it has evolved into an internationally recognized

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mobile money transfer service having over 30 million users in 10 countries and providing a range of services including international transfers, loans, and health insurance. The M- PESA mobile money service processed about 6 billion transactions in 2016 at a frequency rate of about529 transactions per second (Monks, 2017).

Mobile money in ghana

Although mobile phones are integral in the use of mobile money, technology alone does not form the basis of mobile money as it requires a cash in and cash-out infrastructure, usually accomplished through a network of "cash merchants" (or "agents"), who receive commission for helping mobile money subscribers with perform their transactions(Donovan, 2012).

Mobile network operators have been a driver of the growth of mobile money in many countries including M-PESA and Ghana is not an exception. In Ghana currently, mobile money is operated by three network operators (RAW Africa, 2016).

MTN mobile money

MTN offers mobile moneys services in partnership with 10 banks in Ghana. The Mobile Money service is available to all MTN customers. Non-MTN users can also use the service to receive money transfers from registered Mobile Money customers (Klutse, 2015).

NCA (2017) showed that as March, 2017, MTN had over ten million voice subscribers. As at the same year, MTN 8.5 million out of MTN's over 10 Million voice subscribers were registered on the MTN on the mobile money platform with alongside 57,000 active agents and 16 partner banks. In 2016, MTN mobile money subscribers performed 56 billion transactions worth 23 billion Ghana Cedis (Ofori-Boateng, 2016).

MTN mobile money is useful for sending and receiving money, topping -up MTN airtime, paying utility bills, school fees, employee salaries and more, buying and paying for insurance, pay paying for airline tickets, for online shopping and general payment for other goods and services. To register to use MTN mobile money, a one needs a mobile phone. To register to use mobile money, one must acquire an MTN SIM card and a valid photo ID card **(**MTN Ghana, 2018).

Financial inclusion

Financial inclusion refers to the provision of affordable financial services to almost every sections of society including underprivileged and low income groups. Financial inclusion is very important in a nation's economy and it is often backed by political influence and bureaucracy. Financial inclusion has the ability to financially equip the underprivileged in society for economic growth and prosperity. The concept of financial inclusion has a special significance for growing economy (Shettar, 2016).

Globally about 2 billion adults lack access to formal financial services. And the case is not different in Ghana and most part of Sub-Saharan Africa. However, with the introduction of mobile money technology in the past decade, most countries across the continent have become aware of the need for financial inclusion for their citizens and the significant mobile money. Mobile money has is seen as the driver for financial inclusion in many developing countries. In Kenya and Tanzania; more adults have mobile money accounts than bank accounts. Though Ghana has also joined, t it is estimated the country is doingso at a slower pace compared to that of the success stories of Kenya and Tanzania. Currently, Kenya and Tanzania are the market leaders in mobile money accounts for countries in Sub-Saharan Africa. The prospects looks brighter as Ghana's mobile money subscribers doubled between 2014 and 2015 with transaction volumes tripling from 2013-2015(The World Bank, 2015).

Driving financial inclusion through mobile money

In the past decade, mobile money has chalked huge successes with subscribers registering with 277 services in 92 countries. Throughout the world, mobile money is available in about two-thirds of low to middle-income countries and is operated in about 85% international markets where less than 20% of the

population has access to a formal financial institution (Pasti, 2017). By enabling subscribers to keep and transact money stored in virtual form, millions of underprivileged people tend to feel safer, are more productive with their time and their money, and are able to take advantage of increased socio-economic opportunities. A Recent research shows that, in Kenya, 2% of households were able to escape extreme poverty (Pasti, 2017)

Financial inclusion in ghana

Poverty is more than just a lack of money. It involves a lack of access to the instruments and means through which the poor could improve their lives. Exclusion from the formal financial system has increasingly been identified as one of the barriers to a world without poverty. In many developing countries, more than half of households lack an account with a financial institution, while small firms frequently cite difficulty in accessing and affording financing as a key constraint on their growth. This exclusion does not necessarily mean that the poor lack active financial lives: in fact, the fragility of their situation has led to the development of sophisticated informal financial instruments. However, the use of only informal instruments means that the poor are limited in their ability to save, repay debts, and manage risk responsibly (Demirgüç-Kunt, Beck, and Honahan 2008).

Etim (2014) showed that the use of mobile phones have become very common in the Sub -Sahran West – African Region to the extent that it can result in significant changes, sustainable growth as well as economic opportunities for the large unbanked population with the introduction of mobile money. Ghana is no Exception.

Laary (2016) showed that Ghana's mobile subscriber base surged from 34,400,153 in November 2015 to 35,008,387, representing a mobile voice penetration rate of 127.63 per cent.

The advent of the mobile money in Ghana in essential in achieving financial inclusion for as many Ghanaians as possible, especially people living in rural areas (Swanzy-Essuman, n.d.).

A new World Bank study on financial inclusion has found out that the number of Ghanaian adults with active mobile money accounts has doubled in the past year, and now stands at 17 percent of the adult population. The study conducted by the World Bank's Consultative Group to Assist the Poor (CGAP) said Ghana's progress on mobile money is commendable, especially as the service was introduced barely half a decade ago. CGAP expects Ghana's positive progress to continue, especially since new Mobile Money regulations were passed in July 2015 which has awakened policymakers of the critical role that Mobile Money plays in driving financial inclusion (The Worldbank, 2015).

34% of adults now have an account, an increase from 24% in 2011. 12% of adults in the region have a mobile money account compared to just 2% globally. Kenya leads with mobile money account ownership at 58%, while Tanzania and Uganda have rates of about 35%. 13 countries in the region have mobile money account penetration of 10% or more. In Cote d'Ivoire, Somalia, Tanzania, Uganda, and Zimbabwe, more adults have a mobile money account than an account at a financial institution. In Kenya more than half of adults who pay utility bills use a mobile phone to do so. And in Tanzania, almost a quarter of those receiving payments for the sale of agricultural products do so into a mobile account. 48% of adults in Sub-Saharan Africa send or receive domestic remittances: Shifting domestic remittance payments from over-the-counter money transfer operators to accounts could double account ownership in Senegal, Cameroon, Democratic Republic of Congo, and Republic of Congo (The Worldbank, 2015)

According to the World bank, "*13% of adult Ghanaians report having access to a mobile account, as compared to the Sub -Saharan Africa average of 11.5% in 2014"*. Whist access to banking increased only marginally from 34% to 36% of Ghanaian adults, access to mobile money accounts increased from zero to 29% in the last five years (Boakye Yiadom, 2016).

How MTN mobile money contributes to achieving financial inclusion in ghana

In its quest to contribute to achieving financial inclusion in Ghana as much as possible, MTN Ghana through the MTN mobile money platform introduced the following innovative services:

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Qwik loan

Qwik loan is one of the mobile moneys services recently launched by MTN Ghana Limited, operators of MTN mobile money. It is a 30 – day loan facility in the company's attempt to contribute to promoting financial inclusion in country.

The facility enables just anyone to apply for a loan facility on the MTN mobile money platform without filling out complicated forms or having had to provide documentation which the applicant does not even have. This initiative is designed and provided to customers in collaboration with AFB Ghana, a consumer finance business. The loan facility is meant to meet customers at the point of their needs and to help them access capital for small businesses (Joy Business, 2017).

Yello save

In collaboration with Fidelity Bank Ghana, MTN Ghana has introduced a mobile money service which enables customers to transfer money from their mobile money wallet to a savings account right on the mobile money platform. This feature is to encourage the ordinary Ghanaian to save conveniently and regularly without going through cumbersome banking procedure to open a bank account and to avoid travelling all the way to the bank's premises just to deposit money into one's savings account (Aforkpah, 2017).

Easy access to treasury bills

Also, in collaboration with Ecobank Ghana, MTN enables subscribers to purchase government treasury bills on the MTN mobile money platform, thus enabling customers to invest right from the comfort of their location (Aforkpah, 2017).

Conclusion

People living in rural areas, illiterates and the underprivileged are often excluded from a country's financial and payment systems. One of the ways through which the lives of the afore mentioned calibre of people can be changed is to ensure that they have access to affordable financial services such as having access to a simple savings account and to low – interest credit facilities.

To migrate a huge fraction of society intofinancial inclusion, banks will have established as many branches as needed in the most remote parts of the country. This cannot be achieved within the shortest possible time. It may take years. However, MTN mobile money is said to have more agents nationwide compared with bank branches and can reach the most remote places where there are no banks yet.

Mobile money has and is still undoubtedly significantly contributing to achieving financial inclusion by all standards.

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Data Security and Privacy in Mobile Technology: A case of Whatsapp Web

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Abstract

Mobile computing technology is on the ever ascending trajectory, making it the technology to use in any thriving industry. Mobile computing technology is thriving due to its portability as such it is very easy to carry around and can be operated anywhere. However, due to the size of most mobile devices that run mobile apps being very small, which also makes it more portable, it sometimes impedes its usage on very large data inputs volumes. Most people find it more comfortable using their personal computers or laptops to prepare and store their documents and other files. This article reviews the benefits of using WhatsApp web, the potential privacy or security vulnerability as compared with other screen mirroring or casting technologies such as Vysor, Mobizen, AirDroid, etc. It is recommended that WhatsApp web connects to the mobile device through a WiFi or USB as implemented in AirDoid instead of connecting directly to the WhatsApp server once the QR code has been scanned using the WhatsApp on the mobile. Secondly, WhatsApp must implement automatic logout of older WhatsApp web sessions instead of just disconnecting the older session once a new session is connected and reconnects the older session once the new one is disconnected since this increases the vulnerability of the end-user.

Keywords: *WhatsApp Web, Data Security, Privacy, Screen mirroring, Screen casting, Mobile Technology.*

Introduction

Mobile computing technology is on the ever ascending trajectory, making it the technology to use in any thriving industry. Mobile computing technology is thriving due to its portability as such it is very easy to carry around and can be operated anywhere. However, due to the size of most mobile devices that run mobile apps being very small, which also makes it more portable, it sometimes impedes its usage on very large data inputs volumes. Most people find it more comfortable using their personal computers or laptops to prepare and store their documents and other files. However, the easiest and fastest medium for transferring document currently is mainly through social media especially WhatsApp. WhatsApp started mainly as an app for sending text messages at a very low cost compared to the SMS (Short Message Service) by the telecommunications companies on GSM (Global System for Mobile) enabled phones (Unuth, 2017). Transferring document from most laptops to mobile phones has its challenges, as such, the introduction of WhatsApp web made it easier and more convenient in working on document and transferring to others. WhatsApp web is a technology that mirrors the WhatsApp interface on a Mobile phone and synchronizes the messages to your PC or Laptop. This allows you to send and receive WhatsApp messages from your PC or Laptop.

Some screen mirroring technologies

Screenbeam

Screen mirroring is just what it sounds like, that is; putting what's on the screen of one device onto another screen for easy access. Screen mirroring can be very simple to use, especially with Miracast-enabled devices. To make use of screen mirroring, some basic hardware and software are needed. ScreenBeam is an excellent option solution for screen-mirroring. Companies such as Microsoft, Intel, and

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leading PC Original Equipment Manufacturers (OEM) and device manufacturers use ScreenBeam as their validation platform because of ScreenBeam's expertise in wireless screen mirroring (La, 2017).

Vysor

Vysor is a relatively new app to quickly mirror, cast or even control your Android device from the PC or Mac. Unlike the other apps, Vysor uses a Chrome app to cast your Android device to the computer. Some of the features of Vysor include but not limited to mirroring the Android screen to the computer, ability to take screenshots, ability to control your Android device with keyboard and mouse (Krishna, 2017). Vysor works by installing Vysor Chrome app on your computer and Vysor app on the android device to establish communication. Vysor casts or mirrors the android phone through a USB connector onto the computer.

Mobizen

Mobizen is one of the complete apps that does not only cast your Android device to a computer but also has the functionality to record the screen, control, take screenshots, and play media directly from your browser or a standalone software on your PC. This app is just like Vysor but better as it permits remotely controling of the android device by connecting it via the USB cable, over a WiFi network and even over the mobile data (Krishna, 2017). Mobizen works by linking or mirroring the webpage to the Mobizen app via Wifi or Mobile data with a six digit One-Time Password (OTP) generated on the webpage and captured into the Mobizen app.

Screen stream mirroring free

Screen Stream Mirroring Free is the best app that mirrors or casts mobile phones running android screen to Computer over WiFi. Screen stream mirroring free works only if both the computer and Android device is on the same WiFi network. It does not support mobile data or USB (Krishna, 2017). It connects through IP address on the same subnet mask of a WiFi connectivity. This makes it one of the secured mirroring or casting technologies.

Airdroid

Airdroid is one of the best ways to cast your Android device to any computer. Airdroid app generates an IP address which is entered as a URL on the browser on your computer (Krishna, 2017). This connects the Android device to the computer and gives the computer full control of the phone.

How whatsapp web works

WhatsApp is a cross-platform instant messaging service for smart phones that relies on internet connectivity for the transmission of messages. Based on a low-cost subscription model, WhatsApp is a cheap alternative to carrier-billed text messaging via SMS or even e-mail for less official communications, especially for international or group messaging. The mobile messaging app enables users to share text, image, sound or voice and video messages.

For you to be able to connect your WhatsApp web to your phone you need to update your WhatsApp to the current version with the WhatsApp web connector. Open any of the compatible browsers (Google Chrome, Mozilla Firefox, Opera, Microsoft Edge and Safari (for MacOS 10.8+)) on your computer and connect to the URL: https://web.whatsapp.com. The WhatsApp web page would load and display a quick response code (QR Code) as shown in fig 1. On your phone, open WhatsApp go to *Menu* on Android phones or *Settings* on iPhones, as shown in fig. 2. On the menu drop down select WhatsApp web (fig 3.), to activate the QR Code reader (fig. 4) on the phone via the camera. Point the QR code reader to the QR code on the computer (fig. 1) for the WhatsApp on the phone to be connected to the WhatsApp web. Once the connection is established, the WhatsApp web on the computer mirrors the WhatsApp contacts on the phone (fig. 5) with the corresponding messages. Click on any one of the contacts to load in the main window to use the WhatsApp web on the computer for chatting.



Figure 1. Whatsapp web qr code



Figure 2. Menu / settings icon on whatsapp



Figure 3. Whatsapp web on phone menu



Figure 4. Whatsapp web qr code scan

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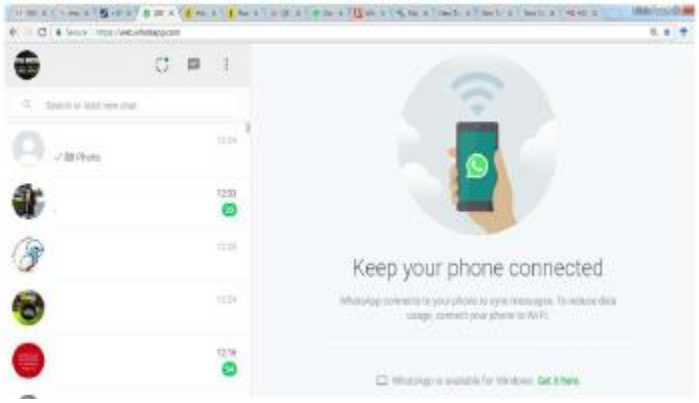

Figure 5. Whatsapp web on computer

WhatsApp has been really one of the few mobile apps that is truly multiplatform working on a wide variety of phones running varied operating systems including iPhone, Android, BlackBerry, Nokia, and Windows devices (Bailey, 2017). The number of WhatsApp users worldwide as of July 2017 stands at over 1.3 billion monthly active users an increase of over 3 million of the over 1 billion figure in February, 2016 (Statista, 2017).

Browsers supported

WhatsApp web started with only Google Chrome as the compactible browsers. Currently, WhatsApp web is supported by Google Chrome, Mozilla Firefox, Opera, Microsoft Edge and Safari for only MacOS 10.8+ (Kumar, 2017). However, it does not work on any browser on tablets or mobile phone device. WhatsApp must be installed and configured to an account on a mobile phone in order to use the WhatsApp web clients. The WhatsApp web application syncs directly with the WhatsApp mobile device as such the mobile device must be active or connected to the internet as well as the WhatsApp web for the communication to be established.

WhatsApp is very convenient to use while you're at your computer, and enable you to comfortably chat using your keyboard and wide screen of your monitor, there are some limitations. Several features available on WhatsApp mobile that are not available on the WhatsApp web on your PC or laptop. WhatsApp Web sessions can be initiated from multiple computers, but only one can be active at a time. The user is not granted the option to wrest control from another session. WhatsApp takes care of the security aspect by listing how many WhatsApp Web sessions are connected at any given time, and by letting the user log out of all in one click via the mobile app (Dua, 2015).

Privacy challenges of WhatsApp web

Due to its portability, reliability and timeliness as well as the current number of active users on WhatsApp, it has become one of the most reliable means by which files and documents are transferred. The messages sent via WhatsApp are end-to-end encrypted meaning that only the two communicating devices has the ability to decode them. This prevents messages being intercepted during transmission, but says nothing of their safety while on your device. On both iOS and Android it is possible to create a backup of your messages to either iCloud or Google Drive. The backups that WhatsApp create contain the decrypted messages on your device (Frew, 2017).

According to WhatsApp security by default information, (WhatsApp Inc, 2017), "WhatsApp's end-to-end encryption is available when you and the people you message use the latest versions of our app. Many messaging apps only encrypt messages between you and them, but WhatsApp's end-to-end encryption ensures only you and the person you're communicating with can read what is sent, and nobody in between, not even WhatsApp. This is because your messages are secured with a lock, and only the recipient and you have the special key needed to unlock and read them. For added protection, every

message you send has its own unique lock and key. All of this happens automatically: no need to turn on settings or set up special secret chats to secure your messages". However, unlike other screen mirroring applications which connects the mobile device directly to the computer or other device, WhatsApp web connects directly to the WhatsApp database via the unique QR code scanned by the mobile device. That is the mobile device and the computer need not be on the same network or even the same location. They can be miles apart, all that is needed it to first scan the QR code with the phone and after that, the two devices are separately connected directly to the WhatsApp server (fig 6). However, the WhatsApp web works only when the WhatsApp on the Mobile device is actively connected.

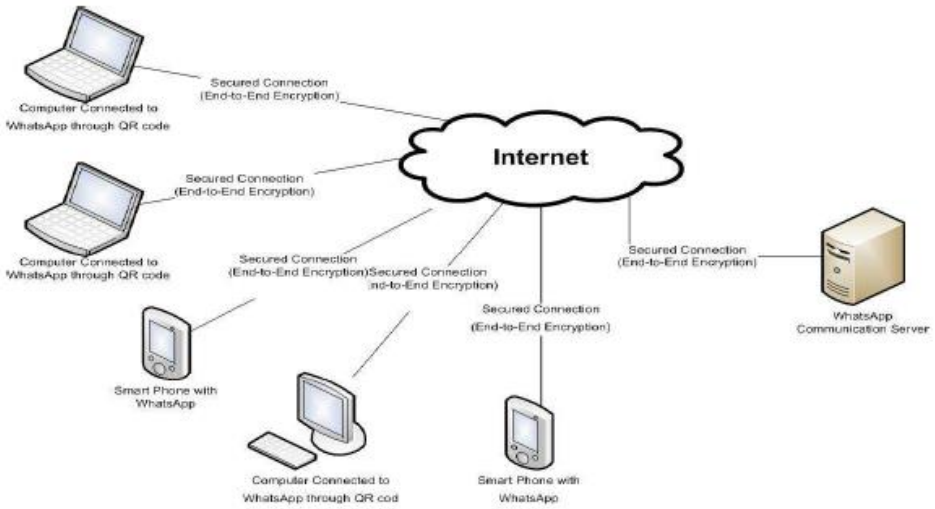

Figure 6. Simplified network architecture of whatsapp & whatsapp web connection

This architecture permits or creates room for an unauthorised person connecting your phone either with or without your knowledge to the WhatsApp web and once the phone is connected to the internet all the chats to that phone can be intercepted, viewed and downloaded. When a new session of the WhatsApp web is created by the same WhatsApp mobile app, WhatsApp logs out the older WhatsApp web and displays a pop up message "WhatsApp is opened on another computer or browser. Click "Use Here" to use WhatsApp in this window" (fig. 7). When the new computer or browser disconnects from the WhatsApp web connection, the older connection is re-established.

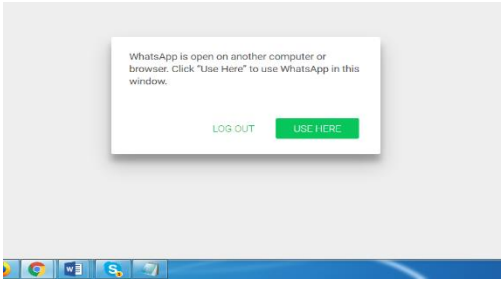

Figure 7. Whatsapp web session lost alert

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Figure 8. Whatsapp web on computer

Recommendation

WhatsApp web is an excellent application that increases accessibility and usability of one of the fastest growing social media application. However, it also increases the vulnerability of users to unauthorised access to personal communication. This article addressed some of the challenges of WhatsApp web. The recommendation has been sectioned into two. That is what individual users need to do, to prevent unauthorised persons to intentionally or unintentionally have access to their personal communications or document.

Recommendation to WhatsApp web developers

To make WhatsApp web more secured it is recommended that the developer should make it such that the QR code expires after some specified limited time or anytime the WhatsApp on the mobile device is closed. The QR code must then be rescanned to reconnect even to the same computer or browser. This even though would not completely solve the challenge of unauthorised person having access but would greatly reduce the possibility of reconnecting to the mobile device anytime it re-establishes connection.

Secondly, instead of having both the WhatsApp on the mobile device and the WhatsApp web on computer connecting to WhatsApp even from different networks, the architecture should be changed such that only the WhatsApp on the mobile device is connected to the WhatsApp server and the "WhatsApp web" connect to the mobile device via a USB or Wifi as show in the simplified architecture (fig 9). This would make the system more secured, since the mobile device must be in a close proximity for the connection to be established.

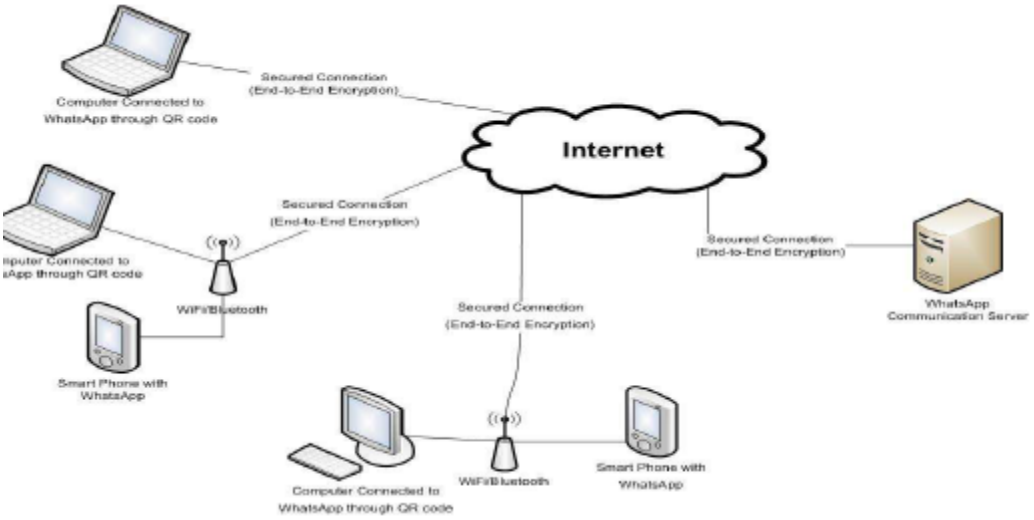

Figure 9. Proposed architecture for connecting whatsapp on mobile devices to whatsapp web

Recommendation for end users

No matter the security measures implemented by the developers of a system or an application, if the end users do not manage the security functionality provided by the system effectively, it increases the system's vulnerability. End users are essential part of privacy or security management. End users should always look out for ways that would make them less vulnerable. The current WhatsApp web, even though closes an existing session once a new session is connected, it does not have the functionality to automatically logout the old session. However, there is a functionality to know the last logged in browser as well as the time (fig. 8), even though it does not indicate any other information like the IP or Computer name of the connected browser or the location of the computer. This functionality also permits end users from logging out all connected browsers (WhatsApp web) or a particular connected browser from the mobile device. In this case to reconnect the WhatsApp web to the WhatsApp on the mobile device, the QR code must be scanned again to establish a connection.

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Perceptions of Nurses Regarding Information and Communication Technology at a Rural Hospital in Lesotho

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Abstract

Background *Accessing health facilities in rural Lesotho is a challenge due to the mountainous topography with a poor road network. As result Telemedicine has potential to improve access to health care in rural Lesotho.*

Aim *To describe the perceptions of nurses regarding information communication technology, in health care at a rural hospital in Lesotho.*

Methods *A quantitative descriptive research design was used. A total of 45 nurses working at a rural hospital was conveniently sampled from a population of 80. Data on demographics, knowledge and perceptions regarding CT was collected using a validated self-administered questionnaire. Microsoft Excel was used to analyze the data through descriptive statistics.*

Results *The majority of the participants were female 76% (n=34); of the age group 30 to 40 years 49% (n=22) and with nurse experience of 0-5 years 60% (n=27). Of the 45 participants, 82% (n=37) used smart phones; while 71% (n=32) used their phones for communication. The majority of the participants reported having used Microsoft Office (60%, n=27), not having ICT skills 69% (n=31), using internet on their phones 57% (n=26), willing to use ICT to communicate health information (100%, n=45), store patient information using ICT 96% (n=43) and willing to assist patients using ICT 98% (n=44).*

Conclusion *There are positive perceptions amongst nurses towards ICT at the rural hospital. This may reflect a level of perceived self-efficacy related to ICT in health creating a platform for possible implementation of telemedicine in the delivery of health information in rural hospitals in Lesotho.*

Keywords: *Sustainability, telemedicine, telecommunication, rural Africa, eHealth, perceptions.*

Introduction

According to United States Department of Health and Human Services, telemedicine is defined as the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health, and health administration (Watzlaf, Dealmeida, Zhou, & Hartman, 2015). Telemedicine connects patients with physicians or other healthcare providers outside of the traditional office visit through the use of electronic communications to improve a patient's clinical health status. These electronic communications include videoconferencing, store-and-forward imaging, streaming media, and terrestrial and wireless communications. (Ladino, et al., 2016, p. 650).

In Africa, the proliferation of mobile computing devices has driven a revolutionary change in both the computing and healthcare. Such information and communication technologies have been adopted and adapted for purposes of improving health care expertise with the world (Khan, 2006) in (Isabalija, Mbarika, & Kituyi, 2011). The application and use of such technologies has had direct impact in the quality of care of patients in high disease burned societies and in societies in remote settlements.

Electronic Management Record systems (EMR) are integrated health systems that consists of clinical record Management System and Doctors inference Management systems and Medical Record System. Continued emphasis is placed on quality medical record keeping. Quality record keeping influences national fiscal spending and appropriation of healthcare to communities. Attaining quality medical recording requires the integration of functional medical record software that allow and support healthcare. On one hand, proprietary medical record software packages continue to become introduced,

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and are known to be of stellar quality but may not necessarily be aligned to financially sensitive healthcare providers in low and middle income countries. On the other hand, there are a number of free medical record keeping package currently available such as Google Health, Microsoft Healthvault, Revolutionhealth Health Records, and WebMD Personal Health Record (Kalogriopoulos, Baran, & Nimunkar, 2009).

Paper-based record keeping is not aligned to the requirements of 21st health delivery system globally. Throughout time paper-based systems are proving to be more and more inefficient and continuously failing to meet the care provider's needs. With paper-based medical record keeping, communication between care providers is extremely difficult, especially in developing countries. In the United States, a paper-filed medical record may be scanned and sent to another care provider or sometimes faxed to wherever it needs to go. In the developing world, if a paper-filed medical record needed to be seen by a different care provider or someone at a different location, that paper file would have to be hand-delivered to this new location. (Kalogriopoulos, Baran, & Nimunkar, 2009)

EMRs would practically eradicate the manual labour of transferring papers or even scanning or faxing papers if that technology were available. As a result, this would save time and manpower and would decrease the time doctors and care providers take to communicate and easily manage patients information. This saved time could then be well spent for patient care, which would decrease waiting times for patients. The application of electronic medical record keeping would thus upsurge the overall quality of health care.

The Kingdom of Lesotho is a mountainous country found in Southern Africa, it has a high altitude, a ragged terrain and a horrible/undeveloped road network. It has a high burden of diseases like a high infant mortality rate, high number of people leaving with HIV/AIDS and high Tuberculosis (TB) rate.

The Ministry of Health in Lesotho through its partnership with Lesotho Millennium Development Agency (LMDA), pioneered Information and Communication (ICT) based systems that included Electronic Medical Record (EMR), Voice over IP (VOIP phones), and computers with internet and computing devices in health centers in all 10 districts. These will help support/improve communication between health care workers and patient record keeping within all levels of healthcare. Paray Mission Hospital is an example of the health centers that were supported with the above mentioned equipment. Paray Mission Hospitals (PMH) provides both primary care and high care. Paray Mission Hospital is located in the highlands of Lesotho with the mountainous topography and poor road network.

Problem of the study

The EMR system has been introduced to improve patient data capturing and communication among healthcare workers. Three years after the introduction of the EMR system in Lesotho, evidence reveals non-utilization of such a system in healthcare predominantly by all healthcare workers. At Paray Hospital, paper documentation of patient data dominates electronic information storage, with the nurses who are majority of healthcare workers in the forefront of technology-less access and retrieval of healthcare information. In as much as workshops and training have been done on the same professional nurses, the utilization and uptake of the EMR system is still non-existent. This study sought to describe the perceptions of nurses regarding ICT. Knowledge of these perceptions will allow for stakeholders to design appropriate strategies to improve utilization of the EMR systems, to further improve healthcare in Lesotho.

Aim of the study

The aim of the study is to describe the perceptions of nurses regarding information communication technology, at a rural hospital in Lesotho.

Objectives of the study

The objectives of the study were to

1. Determine the distribution of demographic characteristics among nurses at a rural hospital in Lesotho.
2. To determine the knowledge of nurses related ICT at a rural hospital in Lesotho.
3. Determine the readiness of nurses on ICT in health at a rural hospital.

Possible solutions to the problem

Nurses are a larger number of health care workers, and are the ones who interact with EMR system quite often than not. Therefore, there should be training on the health care workers. There should be a formal training on the health care workers and data clerks and there also should be a change management at the institution if it is to be taken by the hospital. IT should be included in the curriculum in nursing schools.

The best solution to the problem

The best solutions to the problem is to conduct trainings for nurses as they are a large number of health care workers as they interact with the systems more than any other workers. The inclusion of ICT skills in the curriculum for nursing schools will be the other solution.

Limitations

The limitations are that the study was a mini dissertation, the study involved only one hospital in Thaba-tseka. Time was a limited to do the study.

Achievements

The researcher managed to collect data and analyze data, secure ethical clearance at the hospital

Methodology

The following will describe the sampling and data collection procedure followed for this study.

Research design

In this study the author used a quantitative descriptive design. This design resonated with the overall purpose of this study which was to describe the perceptions of nurses regarding information communication technology, at a rural hospital in Lesotho

Description of the site

Population

Population is all possible respondents in a research project (Struwig & Stead, 2013). A number of 50 professional nurses working at PMH who registered with the Lesotho Nursing Council (LNC) was used in this study. Nurses are predominantly the main healthcare providers in Lesotho, and their knowledge and utilization of ERP systems are fundamental to healthcare of the country.

Sample size

Raosoft sample size calculator was used to calculate a sample size of 45 nurses from a population of 50 nurses at 95% confidence interval and 0.05% margin of error.

Sampling

Sampling is the process of selecting a portion of a population to represent the entire population (Polit et al, 2008). Convenience sampling was used because it saves time and by choosing conveniently available participants and a sample of 45 nurses was used.

Data collection

The researcher collected data by physically distributing structured questionnaires to conveniently sampled nurses between the 23rd and 24th July 2017. Informed consent was sought and those who consented filled and returned the questionnaires.

Data collection instrument

A self-administered questionnaire was used to collect data from those nurses who consented to the study. The questionnaire consisted of three sections, demographics, the knowledge of nurses on ICT and the perceptions of nurses on ICT in health. The questionnaire was generated on literature and was validated by a colleague with expertise in research.

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Ethical considerations

The study had no direct benefits for the participants, however they gained continuous professional development points for their participation. The study results are envisaged that they will benefit the health care profession later. Permission was requested and granted from Paray Mission Hospital management to carry out the study. Informed consent was then sought from individual participants. The questionnaire was peer reviewed by the Research Committee of Paray School of Nursing to check for accuracy and content validity. Consent forms were put separate from the questionnaires and was ensured that participants were anonymous.

Description of the statistical methods

Microsoft office excel was used to analyze data Descriptive analysis to summarize the demographic characteristics of nurses, knowledge of nurses on ICT and perceptions of nurses on ICT in health. Data was then entered, coded and cleaned. Data interpretation was based on modal responses and presented as frequency tables and charts.

Results

A response rate of 90 percent was achieved in the study.

Demographic characteristics of nurses

A total of 45 nurses were included in the analysis, figures 1 to 5 presents the demographic characteristics of nurses. The majority of the participants were females 76% (n=34), the age of nurses 49% (n=22) ranged from 30 to 40 years, Majority of nurses 56% (n=25) had a certificate in nursing assistance followed by 44% (n=20) had a diploma in midwifery. Concerning work experience of nurses at Paray Mission Hospital, 60% (n=27) and 31% (n=14) had worked for 0 to 5 and 6 to 11 years, respectively. Majority of nurses 13% (n=6) worked in pediatric ward followed by 9% (n=4) of nurses who worked in male ward.

Knowledge of nurses on ICT

Table 1 presents the knowledge of nurses on ICT. Majority of nurses 82% (n=37) own smart phones. Regarding the internet usage of nurses, 31% (n=14) reported that they always use internet on their phones followed by 27% (n=12) of nurses who often use internet on their phones. Concerning the usage of internet to get information on health, 36% (n=16) reported that they sometimes use internet to get information on health using their phones.

Perceptions of nurses on ICT

Table 2 presents the perceptions of nurses on ICT in health. Majority of nurses 69% (n=31) reported that they do not have any ICT skills. Regarding the usage of ICT as a source of health related information, all nurses reported that they would like to use ICT as a source of health related information. 91% (n=41), would like to communicate health messages with patients using ICT. Majority of nurses, 98% (n=44) would like to use ICT to communicate or attend patients.

Discussion

In the study, Majority of participants are female, according to Suresh (2011:18), in to a study on impact of information and Communication technologies on women empowerment in India, he found that women in general have good concentration power owing to their nature of work, and hence are easily trained to acquire any new skills. Therefore, should there be training on ICT for nurses at the hospital, it would not be a problem for nurses to learn. The study shows that 49% and 47% of the participants were in age groups 30 to 40 and 19 to 29 respectively. According to (Smith, 2014, p. 2), who did a study in older adults and technology use, found that older adults face several unique barriers and challenges when it comes to adopting new technologies. Therefore, it will be easy for nurses at the hospital to adopt to technology. 60% of the participants' work experience ranged from 0 to 5. Since the majority of participants are female and at a young age, it will be easy for them to acquire IT skills and adopt to changes regardless of work experience. This shows that most nurses are a young age and have

not served the hospital for a long time. The study shows that 13% and 11% of the participants were nurses working in pediatrics and maternity wards respectively. This shows that more nurses are a need to the two wards. 40% of the participants had never used any application of Microsoft office. This shows that they write reports on paper, and could therefore be difficult to present their findings.

In general, 69% of nurses did not have sufficient computer skills. This result corroborate with (Mugomeri, Chatanga, Maibvise, & Masitha, 2016, p. 532) whose study was Assessment of Computer Literacy of Nurses in Lesotho, stated that the implementation of the Hospital Management Information System (HMIS) and the general effectiveness of nurses in Lesotho face challenges due to inadequate computer skills of the nurses. As a result it will be difficult to implement EMR at the hospital as nurses do not have enough ICT skills. Without ICT skills, it will be difficult to implement Electronic Medical Record (EMR), since EMR requires a lot of interaction, therefore, without adequate computer skills, it will be difficult to the nurses without ICT skills to navigate the system. It will take them a longer time to register a patient into the system, resulting into long queues of patients. Since EMR is part of telemedicine, its implementation will be compromised by the lack ICT skills by nurse who are the key personnel to use it. Majority of participants indicated they would like to use ICT as source of health information, this indicates that nurses at Paray Mission Hospital appreciate the usefulness of ICT in telemedicine.

Conclusions

Nurses at Paray Mission Hospital lack ICT skills as evidenced by a high percentage self report. However they have a positive perception towards utilization of ICT. This might suggest a need for capacitation of nurses at paray mission Hospital on ICT. The capacitation may help support sustainability of telemedicine innovation at Paray Mission Hospital.

Figures and tables

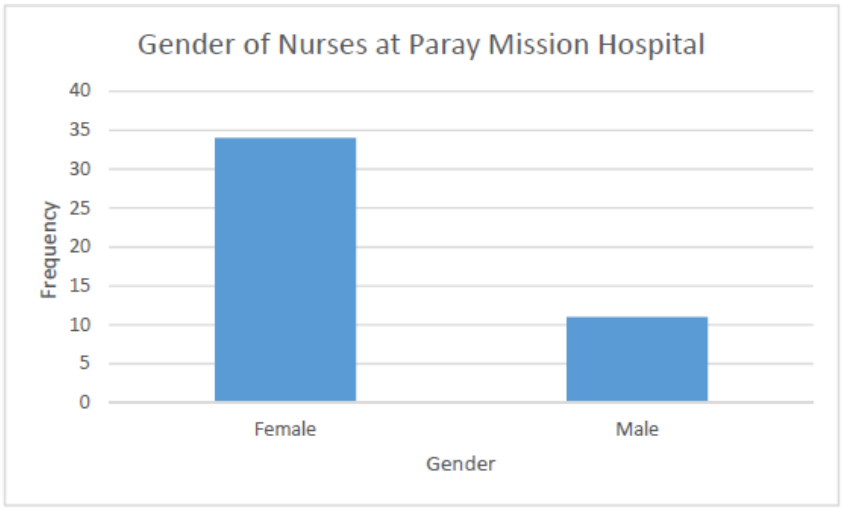

Figure 1. Gender of participants

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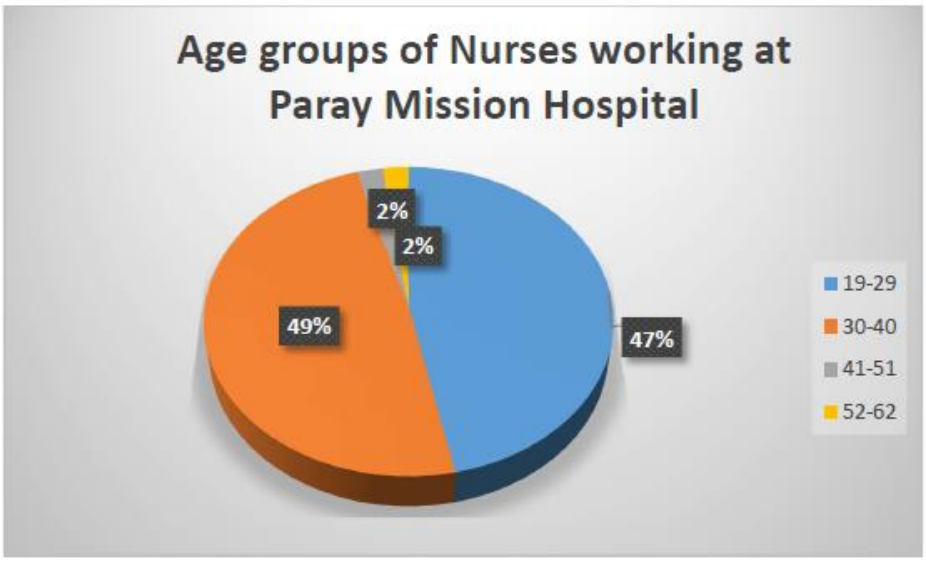

Figure 2 Age group of nurses at paray mission hospital

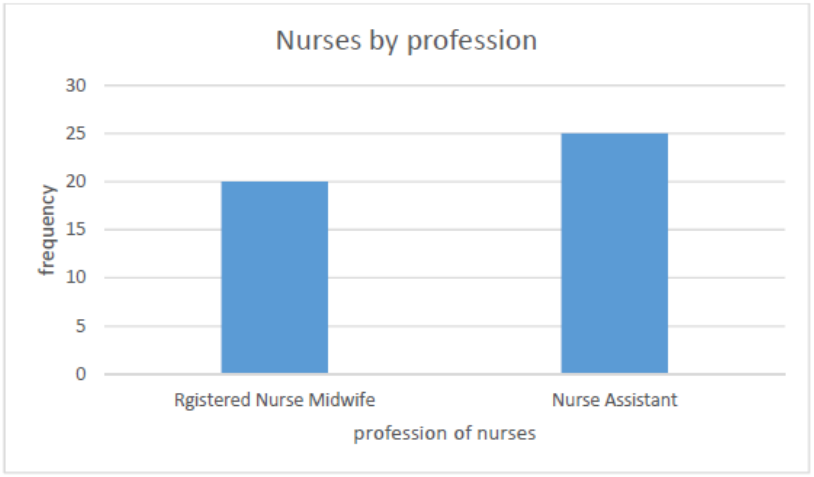

Figure 3. Profession of nurses at paray mission hospital

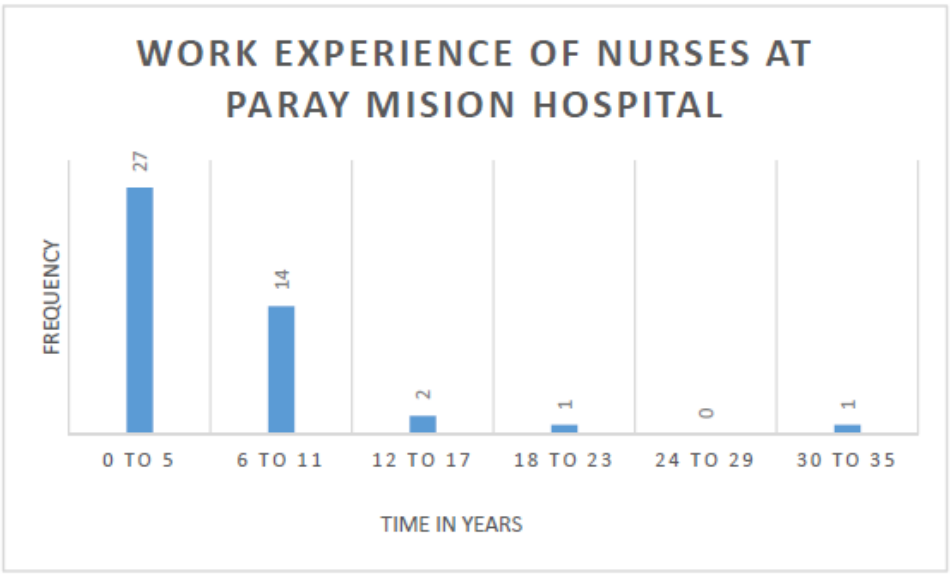

Figure 4. Work experience of participants

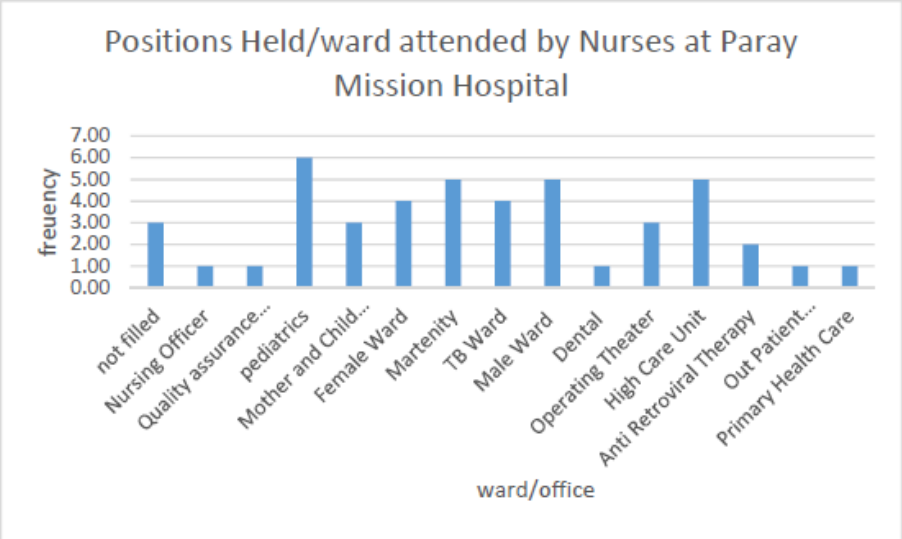

Figure 5. Position held/wards attended by participants

Table 1. Nurse's knowledge on ICT

VARIABLES	FREQUENCY(n)	PERCENTAGE (%)
Type of phone own/use		
Smart phone	37	82
Tablet	4	9
Calls & SMS only	4	9
Do not own	0	0
Ability to use internet		
Always	14	31
often	12	27
Sometimes	10	22
Rarely	5	11
Never	4	9
Use internet to get information on health		
Always	7	16
often	12	27
Sometimes	16	36
Rarely	4	9
Never	6	13
Make use of windows applications(Microsoft office)		
Always	5	11
often	3	7
Sometimes	9	20
Rarely	10	22
Never	18	40

Table 2. Perceptions of Nurses on ICT in health

VARIABLES	FREQUENCY(n)	PERCENTAGE (%)
ICT skills		
Yes	14	31
No	31	69
Use ICT as a source of health related information		
Yes	45	100

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No	0	0
Communicate health messages with patients using ICT		
Yes	41	91
No	4	9
Use ICT to store/keep information related to patients		
	44	98
	1	2
Use ICT to communicate/attend patients		
Yes	43	96
No	2	4

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Strengthening Social Service Systems for Vulnerable Children and Adolescents: A Conceptual Framework

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Abstract

There is emerging global consensus on the importance of strengthening social service systems for vulnerable children and adolescents in Africa, but no agreement on the conceptual definition and the scope of strengthening social service systems, whether strengthening social service systems is achievable or not, how to move towards it, common indicators for measuring its progress, and its long-term sustainability. This has resulted in various interpretations of the concept, emanating from different disciplinary perspectives. This paper discusses the various dimensions of strengthening social service systems emerging from these interpretations and argues for the need to pay attention to the complex interactions across the various components of social service systems in the pursuit for better social service delivery to vulnerable children and adolescents in Africa. The paper highlights major components of strengthening social service systems and proposes that these are utilized for measuring social service system strengthening.

Keywords*: social services, systems strengthening, child protection system, conceptual framework, Africa.*

Introduction

Strengthening social service systems has received increased attention in many African countries in order to improve social service delivery to better lives of vulnerable population, especially vulnerable children and adolescents. Davis, R et al. (2012) points out that "there is a growing interest in applying the system approach to strengthening child protection efforts". According to Davis, R et al.(2012) "the systems approach shifts attention to a larger systemic framework that includes legal and policy contexts, institutional capacity, community context, planning, budgeting and monitoring and evaluation of subsystems". Increasingly, governments and international organizations are utilizing a systems approach in the establishment and strengthening of child protection systems (Davis, R, 2009). However, investments in strengthening social service system have sometime taken place in many African countries in the absence of defining the actual systems at country level (Asare, N et al, 2011). As a result, understanding of what is meant by strengthening social service systems remains elusive. The lack of a conceptual framework on how to implement and measure strengthening of social service systems has undermined the efforts meant to improve the social service delivery mechanisms. There are various interpretations of the concept of strengthening social service systems, emanating from different disciplinary perspectives. This confusion in clarity and lack of a common agreed conceptual framework of strengthening social service systems at global and national levels dilutes the approach of strengthening social service systems.

Unfortunately, there is little or no research and scant literature on strengthening of social service systems compared to the health system strengthening, thereby, making it difficult for practitioners and policy makers to have a guide when supporting strengthening of social service systems. The lack of a conceptual framework makes it even more difficult for program planners to evaluate their efforts in strengthening social service systems, especially in Africa, where social service is fragile and fragmented across ministries. This dilemma justifies for urgent need to develop a conceptual framework that brings various dimensions of strengthening social service systems together, and pay attention to the complex interactions across the various components of strengthening social service systems in the pursuit for better social service delivery in Africa. As a contribution to emerging practice and debate in this area, this paper explores existing

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conceptual frameworks for strengthening social service systems and its eminent potential to guide as a framework for policy makers and program managers supporting strengthening social service systems for vulnerable children and adolescents in Africa. Therefore, this paper has two main objectives:

1. To examine existing conceptual frameworks for strengthening social service systems for vulnerable children and adolescents.
2. To assess and discuss the major components of strengthening social service systems and how these enhance child protection system for vulnerable children and adolescent.

Method

The paper used secondary data of existing literature on social service systems based on NGOs' reports and international development agencies. During the literature search the paper explored three interlocking questions 1) what are the existing conceptual frameworks on strengthening social service systems? What is the link between strengthening social service systems and child protection systems? What is the role of strengthening social service systems for vulnerable children and adolescents?

The paper used archival studies and utilized literature published by United States of America for International Development (USAID) and United States President's Emergency Plan for AIDS Relief (PEPFAR) on strengthening social service systems and unpublished reports on social service systems by NGOs and international development agencies. The paper also drew on the World Health Organisation (WHO) health system strengthening framework and electronically accessible journals that comment on child protection and social service system strengthening.

This paper notes that there is non-existence of peer reviewed published Journals on this topic. There is also limited research undertaken by academic institutions on the subject area other than official publication of USAID, Measure Evaluation and PERFAR together with official reports of some NGO's and international development agencies including numerous unpublished materials that comments on child protection systems. Therefore, the papers reviewed were obtained through an online search using a systematic review process. Overall, more of the literature reviewed has been conducted by policy- and practice-oriented organisations.

It should be noted that while the review aims to summarize the relevant literature on the topics outlined above, it does not provide an exhaustive representation of the literature on each topic. Rather, prominent, widely cited and insightful literature was selected to inform the wider research. The justification for the selection of NGO reports and literature for inclusion in this paper was based on those which intersected the issues on strengthening social service systems for vulnerable children and adolescents. Papers related to concepts and definitions were limited to those with multiple citations and regularly noted as prominent pieces within this field.

Defining social service system strengthening and its rationale

Globally, strengthening a social service system is recognized as a logical and effective step to improve the efficiency, quality, and sustainability of the services the system delivers (Measure Evaluation, 2017). A social service system is understood as one that addresses both the social welfare and the protection of vulnerable populations, and includes elements that are preventative, responsive, and promotive (PEPFAR, 2012). However, PEPFAR argues that "there is no universal definition of a social service system. This is, in part, because of the diverse range of social services that are provided across and within countries" (Measure Evaluation, 2017). According to PEPFAR, social service systems can be defined as the combination of interventions, programs, and benefits provided by government, civil society, and community actors to address social welfare and protect vulnerable populations (PEPFAR, 2012).

The Global Social Service Workforce Alliance point out that such a system's goal is to create a protective environment for healthy development and well-being, by alleviating poverty, reducing discrimination, facilitating access to needed services, promoting social justice, and preventing and responding to violence, abuse, exploitation, neglect, and family separation (Global Social Service Workforce Alliance, n.d.). PEPFAR (2012) argue that a well-functioning social service system should include strong linkages with

sectors such as health, justice, and education. This paper consider that a social service system strengthening should ensure that all components and key actors involved in child protection have the technical and operational capacity to carry out their functions in an integrated, holistic, coordinated manner that is geared towards long-term sustainability and accessibility (Davis, R et al., 2012).

Arguably, system strengthening approach is an evidence-driven process that identifies deficits, such as an underperforming workforce, insufficient financing, and inadequate child protection laws or policies (Global Social Service Workforce Alliance, 2015). Davis, R et al. (2012) asset that this approach builds on the existing capacity of individuals, organizations, and systems to strengthen those gaps. Measure Evaluation (2017) point out that a social service system strengthening is a sustainable way to help fortify the very networks on which vulnerable households rely to build good governance and help organizations define their core messages and develop well-functioning monitoring and evaluation systems; and link up with other systems. Wulczyn, F. et al. (2010) argue that the system strengthening approach ensures an evolving continuum of care and helps establish the necessary monitoring and resource strategies for delivering effective social services. This paper emphasis that, the system strengthening should be placed on the fact that the path that the system strengthening takes is country specific, country led and depends on a range of social, culture, economic and political factors.

The paper notes that system approach is more a theoretical framework that would inform the strategies to promote child protection systems. There are different perspectives on system strengthening that need clarifying such as;

1. **System building:** (where national systems are virtually non-existent, and/or the State is very fragile); where this situation exists, it offers the opportunity to design something that builds upon and integrates positive endogenous community practices and their principles and values. It begins with designing and building a system which creates a virtuous link between the state and citizens (recognized and understood by everyone).
2. **System reform:** (in contexts where the existing national system appears to be not fully relevant, appropriate, or where there is incongruence between the formal system and endogenous community practices).
3. **System strengthening** is basically a work of improving what is there, as long as there is some sort of national system, a foundation that is relevant and more or less realistic for the context, as well as some recognition of both formal and informal elements of the system. [1]

Wulczyn, F. et al. (2010) assert that strengthening national child protection systems as a whole helps to avoid the duplication that often occurs with purely vertical programmes developed in isolation for specific categories of children. PEPFAR (2012) point that responsive child protection systems should build on the strengths of issue-specific programming by ensuring that specific forms of vulnerability are addressed, including those related to gender, disability, HIV, and indigenous populations, and be able to measure outcomes for different groups.

Recognizing the meagre evidence base on system strengthening in Africa for vulnerable children and adolescents, and the nascent nature of strengthening social service system in general, this paper proposes major components of strengthening social service systems. PEPFAR (2012) defines six “system components” to guide interventions aimed at strengthening social service system as outlined in figure 1 below. These core components stress that an interrelated system of social service system strengthening is critical for the meaningful child protection system for vulnerable children and adolescents – a system that combines protection, prevention, promotion and transformation. It is crucially important to understand that each of these components of the social service system strengthening is equally important and must be supported as integral part of the social service system strengthening without which the social service system strengthening is incomplete.

[1] Davis, R et al (2012) Strengthening Child Protection Systems in Sub-Saharan Africa: A Working Paper

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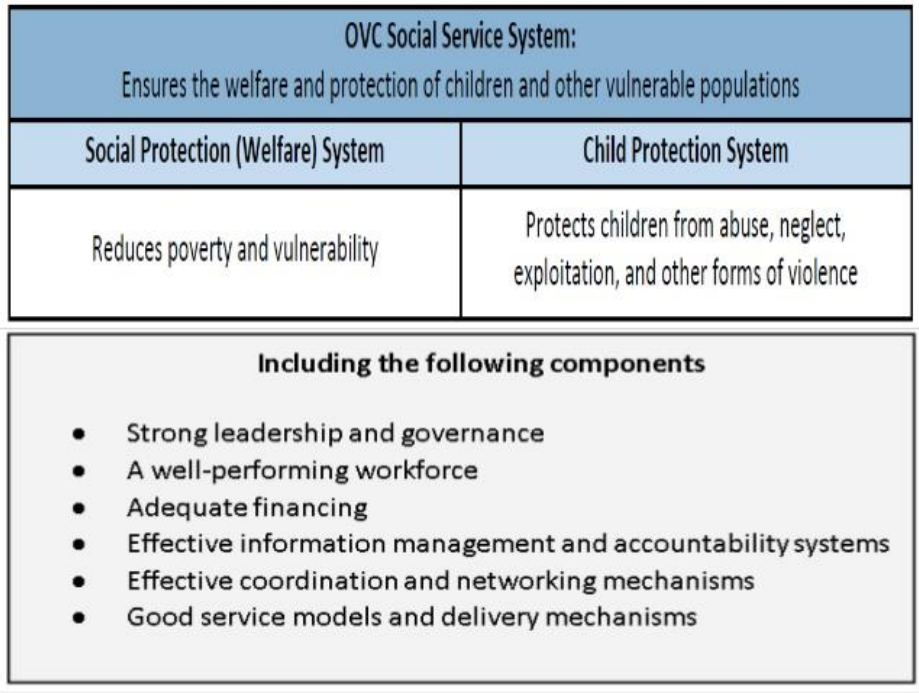

Figure 1. Social service systems strengthening for vulnerable children and adolescents: A conceptual framework

Sources: PEPFAR 2012

Social protection (Welfare) system and reduction of poverty and vulnerability

Reduction of poverty and vulnerability among vulnerable children and adolescent is essentially part of the aim of strengthening social service system (Casey Outcomes and Decision-Making Project, 1998). UNICEF point that it is widely recognized that the reduction of child poverty is crucial for sustainable economic and social development (UNICEF, 2014). Child poverty in this paper refers principally to economic deprivation and includes its multidimensional aspects such as lack of access to services, insecurity, powerlessness and lack of voice (Klasen, S, 2000). Children living in poverty experience deprivation of the material, spiritual and emotional resources needed to survive, develop and thrive, leaving them unable to enjoy their rights, achieve their full potential or participate as full and equal members of society (UNICEF, 2011). Brooks-Gunn and Duncan (1997) argue that living in hardship has long-term, adverse and irreversible consequences, turning poor children into poor adults and "can have serious ramifications throughout the rest of a person's life, including the chances of holding onto a job, the uncertainties associated with growing older and the transmission of vulnerability to the next generation" (UNDP 2014, 59). Investing in children has positive rates of return in terms of long-term developmental outcomes (Yaqub, 2002).

Arguably, a protective environment for children boosts development progress, and improves the health, education and well-being of children and their evolving capacities to be parents, citizens and productive members of society (Yaqub, 2002).. Harmful and abusive practices against children, on the other hand, exacerbate poverty, social exclusion and HIV, and increase the likelihood that successive generations will face similar risks (UNICEF. 2014). Measure Evaluation (2017) point out that the HIV epidemic's effects often place children in a position of vulnerability. For example, HIV can strain families economically, exacerbating the effects of poverty on a household's ability to provide for its basic food, nutrition, education and health needs (PERPAF, 2012).

Strengthening social service systems, therefore, reduces children's exposure to harm by accelerating actions that strengthen the protective environment for children in all settings (African Child Policy Forum., 2011). Preventing and responding to violence, exploitation and abuse is essential to ensuring children's

rights to survival, development and well-being (Ager, A et al, 2010). Rebecca, D. and Jim, M. (2012) argue that strengthening social service systems create a protective environment, where girls and boys are able to access services and are free from violence, exploitation, and unnecessary separation from family; and where laws, services, behaviors and practices minimize children's vulnerability, address known risk factors, and strengthen children's own resilience.

Figure 2. Below illustrates that strengthening social service system should contribute to poverty reduction and vulnerability and ensure a protective environment for all children in a strong family system. This framework assumes that this will lead towards preventing child vulnerability, mitigate vulnerability and overall promote transformation of children's lives achieved through policies and laws reforms i.e (strengthening and enforcing existing laws or review of both the laws and policies where gaps exist).

The framework argues that poverty reduction programmes should encourage scaling up social cash transfer programs either implemented as a single model (cash without care) or as a twin model (cash plus care), and also increase access to bursaries to enable vulnerable children access education and promote investments in public welfare assistance schemes. Further, the framework emphasize to ensure increase access to care services, access to basic services and integrated case management as critical part of the strengthening social service.

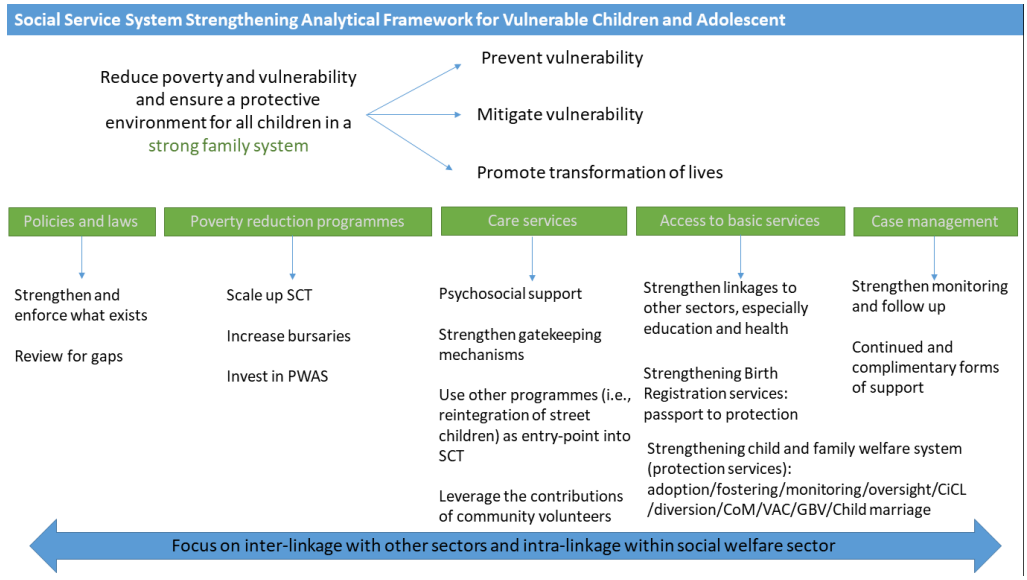

Figure 2. Social service systems strengthening analytical framework for vulnerable children and adolescents

Source: Adopted from UNICEF Zambia, presentation by Sylvi Hills during the Strategic Planning and Coordination Meeting - On Child Welfare and Juvenile Justice System in Lusaka, Zambia.

Components of the social service systems strengthening

This section gives an overview of the conceptual framework that underpins the components of strengthening social service systems. The conceptual framework is part of the definition provided by PEPFAR with its five core areas of strengthening social service system such as: (1) leadership and governance structures; (2) the social service workforce; (3) financing; (4) information management and accountability systems; and (5) coordination and networking mechanisms and additionally, 6) good service model delivery mechanism. This paper emphasis that interventions aimed at strengthening the system components should be understood as inputs that aim to improve the performance of the system itself. The paper argues that focusing attention on strengthening these system components should lead to improved coverage, access to, and quality of welfare and protection services, which are understood to be the desired outputs of a strong social service system. Furthermore, strengthening welfare and protection service models

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and delivery mechanisms can improve the welfare and protection of children and families—the desired impact of a strong social service system.

1. Leadership and governance

Leadership and governance are crucially important components of the social service system strengthening. Measure Evaluation (2017) define leadership and governance as having and implementing laws, policies, and strategies, as well as developing a ministry's organizational and leadership capacity. Accordingly to Bess, A et al. (2011) social service system strengthening need to focus on building strong senior leadership within the ministries that can communicate clear vision, goals and able to convene processes for agreeing on laws, policies, national plans of action, strategic plans, and regulations. Thus, a functional social services is one that have existence of legal and policy framework with operationalization of national laws, bills, guidelines, and strategies that guide a government's social protection and child protection assistance (Measure Evaluation, 2017).

2. Social service workforce

UNICEF argue that making sure that people working in the social service sector—especially those working with vulnerable children— have the proper skills, values, and motivation is critically important (UNICEF, 2012). Manly, a question arises on who the social service workforce is? Global Social Service Workforce Alliance argues that the social service workforce is an inclusive term that includes all categories of people who work on behalf of vulnerable children and families (Global Social Service Workforce Alliance, n.d). They point out that this includes a range of providers and actors, paid and unpaid, both informal and traditional such as family and kinship networks, community volunteers as well as formal, employed professional and paraprofessional workers (Global Social Service Workforce Alliance, n.d). . Examples of workforce strengthening include a wide range of approaches such as training and education of the formal and informal frontline workforce and capacity building of educational institutions such as curriculum development and teacher training (Wessells, M., 2009). Early studies show that having a larger and better distributed workforce lowers caseloads and enables workers to address child protection concerns more efficiently and effectively (National Association for Social Workers Foundation, 2010).

Global Social Service Workforce Alliance argues that social service ministries need skilled professionals to deliver policies and services with the best outcomes for children (Global Social Service Workforce Alliance, 2015). Bess, A et al. (2011) point out that strengthening social services system should pay attention to ensure that there is well-trained and effectively deployed governmental and nongovernmental staff who work individually or collectively to address the needs of vulnerable populations—especially children and families. It should be noted that for this to happen there is need to streamline social workers' caseload and role. Bess, A. et al. (2011) further, argue that social workers should engage with all members of beneficiary families, not just parents, so that they can identify children's needs and make appropriate referrals. To do this, they need additional training and a reduction in caseloads to a manageable level, with sufficient time allocated to each family for regular follow-up and with a [well-articulated integrated case management in place] (Global Social Service Workforce Alliance, 2015). According to the Global Social Service Workforce Alliance, social workers need to clearly understand that their role includes monitoring the physical and emotional well-being of children and young people in beneficiary households and referring them to the appropriate services if necessary (Global Social Service Workforce Alliance, n.d). Studies show that professional associations are important partners with the government in establishing and monitoring service quality licensure and standards, and serve as valuable resources for continuing education, thereby strengthening the capacity of social welfare workforce to provide evidence-based practice services to more vulnerable children and adolescents.

Financing

Financing include mobilizing, accumulating, and allocating money in sustainable ways to cover the child welfare and protection needs of vulnerable populations. Davis, R et al. (2012) points out that a systems approach has direct implications on the way resources (both human and financial) are considered within the new paradigm. Measure Evaluation (2017) argue that social service ministries must know the financial cost and the benefits of services and make a strong case to the ministry of finance and other donors to secure necessary funding. According to PEPFAR (2012) ministries should have comprehensive, well-performing financial management systems, financial control procedures, and processes for budgeting and spending resources, as well as accounting for and reporting on expenses if the social service system strengthening is to be effective.

3. Information management and accountability systems

This is a process for collecting, analyzing, disseminating, and using data on child welfare and protection policies and programs. Evidence-building, knowledge management and improving data collection, analysis and use for decision making underscores all areas of the social services system strengthening. Measure Evaluation (2017) argue that social service system strengthening work should therefore work to strengthen the evidence base on child protection and contribute to other areas of knowledge, and ensure that evidence is used effectively to improve policies, laws and their implementation. Experience shows that development of integrated multisectoral joint work plans with clear indicators supported with data dashboard that can be used to make decisions form an important part of these efforts. It is crucially important that there is a robust monitoring and evaluation that drive research and analysis of data including dissemination of information on child protection, both nationally and locally. Studies indicates that data generated from data dashboard can help track relevant trends; monitor and inform the development of laws, policies and interventions; and demonstrate the impact that social service programs are having on children. The overall perception of field leaders and practitioners is that M&E stands out as an area where great improvements are needed, and where increased sharing of information and larger investments are critical, especially, ensuring data quality and conducting routine assessments, surveys, ad hoc initiatives and tracking systems.

4. Coordination and networking mechanisms

Coordination is mechanisms for all actors working in child welfare and protection to develop and implement policy, share information, and coordinate services. Manly in Africa coordination across agencies remains limited and there is no strong referral mechanism to ensure that the needs of vulnerable children are identified and addressed more effectively (PEPFAR, 2012). Responsibilities are often spread across government agencies, with services delivered by local authorities, non-state providers, and community groups, making coordination between sectors and levels, including routine referral systems, a necessary component of effective child protection systems (Measure Evaluation, 2017).

Therefore, coordination acts as mechanisms for managing relationships and referrals between actors responsible for child welfare and protection services and ensuring that children receive comprehensive services. A cohesive, well-coordinated and participatory systems mapping and assessment that promotes joint planning, learning and consensus building from the beginning can lay the ground work for a functioning social service system strengthening. Effective coordination occur when children access social and health services delivered by partners through an effective coordinated system, referral system and that resource allocation and programs are implemented according to national policies.

Service model

Wulczyn, F et al. (2010) argue that for effective strengthening of social service systems to happen there is a need to develop a broader and better-tailored package of comprehensive child-sensitive social protection services. The World Bank (2017) point out that where a package of services already exists, additional complementary services should be considered to maximize its impact on the intersecting social

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and economic vulnerabilities that face children. Witter, S et al. (2004) argue that a service package should include the following; psychosocial counseling, community- and school-based interventions to create a more supportive environment for children and their families, awareness-raising about gender-based violence and related support services, child protection services, support for children with disabilities and those living with HIV and ensure access to treatment, low-cost recreational activities for girls and boys in the poorest households who are unable to access those that already exist, awareness-raising about longer-term effects/risks of child marriage, vocational counseling, awareness-raising about the risks of child labour and children's right to education, housing renovation support and strengthen the protective role of communities and parent skills including strengthening the family systems and access to cash plus care.

Discussion and conclusion

This paper recognizes that poverty exacerbates the risk of children and adolescents to abuse, neglect and other forms of violence. It has highlighted the role of strengthening social service system in poverty reduction and child protection. It has attempted to make a clear link between strengthening social service system and child protection system. The paper has drawn from existing literature on strengthening social service systems to conceptualize the conceptual framework for strengthening social service system in Africa. It has proposed major components of the conceptual framework for strengthening social service system includes (1) leadership and governance structures; (2) the social service workforce; (3) financing; (4) information management and accountability systems; and (5) coordination and networking mechanisms and (6) Good service model delivery mechanism. Most importantly, the paper has highlighted that social service system strengthening requires paying attention to policy reform, institutional capacity development, planning, budgeting, monitoring and evaluation and information systems.

The paper emphasized that there is need to support social welfare ministries in assuming an upstream role in the overall national child protection system. This includes support to strengthening capacity in strategic planning and costing of needed services. It also requires advocacy for appropriate budget allocation. There is need to create a culture of evidence-informed decision-making. The paper has argued that there is urgent need to strengthen coordination between sectors and increasing support through social protection and rule of law. The paper acknowledges that **w**ith the shift towards system strengthening, new evidence is required to support system-related policy formulation and programme design. It points out that this requires documenting and analyzing the effectiveness and efficiency of specific system components – linkages and relationships between protection interventions, actors and levels of government – and interactions between core and allied sectors.

This paper recommends that there is need to support systematic improvements in the quality and use of social work, including its professionalization and promote the development of appropriate regulations and guidelines to improve quality of service provision by non-state actors, as well as government service providers. The paper articulates that for strengthening social service systems to be effective, there is required to strengthen data analysis and information for decision making, budget and costing exercises. The paper further recommends that protecting children from harm and ensuring that they have access to social services is a multi-sectoral enterprise, requiring action by health services, social workers, the criminal justice system and community-level structures, among other actors. It argues that policy frameworks should reflect a country's real capacities and budgets, instead of promoting unrealistic, ambitious outcomes. Strategies, policy and legal development and reform are sensitive issues that should carefully be considered together with the actual "real" potential capacities of a country to implement required changes.

The paper concludes that strengthening social service system for child protection system is not an end. But should lead to strengthened family support services, referral mechanisms, alternative care, justice responses and victim support improve at local level, the proportion of children in residential care or detention should decrease, hazardous child labour should decrease or at minimum be addressed more quickly, and violence against children should decline, while access to services for children increase through an integrated case management and coordinated care.

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