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Editor-in-Chief
Dr. S.K. Bhatia

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Would like to appeal to the learned readers to send us their views, counter views, suggestions, comments, and observations etc. via "Letters to Editor" (which will be published in the next Issue) on the articles published in this Journal so that an academic discussion may start and our efforts may become more participative and thereby more meaningful and interesting.

Editor-in-Chief

The Themes for the next Issue July-2021

Section I.

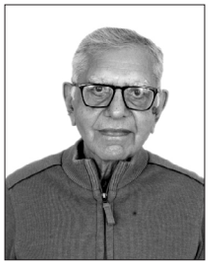
1. Valuing professionalism and training in Teacher Education courses.
2. Changes in perspectives on areas of research in Teacher Education.
3. Perspectives on how learning in Curriculum and Pedagogy are demonstrated in Teacher Certification Programs.
4. Perspectives on effective Evaluation Practices in Teacher Education Programs.
5. Innovations and Innovative practices in Teacher Education Programs.
6. Diversity and Inclusion: Different International perspectives.
7. Ensuring access and equity in high quality Teacher Education programs.
8. ICT-related Innovations and practices in Teacher Education Programs.
9. Policy perspectives in Teacher Education.
10. Reports on related conferences, seminars and workshops, including International offerings.

Section II. Sharing individual or group experiences of completing the curriculum transaction during the pandemic situations.

Section III. Involving teacher educators and school teachers in sharing their innovative experiments for optimizing students' all-round achievement.

Editor-in-Chief
Dr. S.K. Bhatia

Editorial



We are happy to bring out the second issue of International Journal of Teacher Education and Teaching in January 2021. Though it is the second issue, yet it has been labelled as the first issue on the main and inner cover page, as the first issue was without ISSN. We greet our subscribers and other stakeholders a very Happy New Year. May we keep on serving the intelligentsia engaged in teacher-education institutes and schools in the new year and always thereafter.

The year 2020 had been the year full of turmoil and struggles created by the pandemic-Covid-19. It adversely affected the entire world. Even the education sector was not spared. All the educational institutes had to be closed down for many days in the 1st and 2nd quarter of 2020 till they adopted the virtual mode of teaching-learning. This switch-over was simple for the institutes of the advanced countries, but challenging steps had to be taken for the schools and higher institutes of the other countries. Now online education is taking place all the world over with its technological advancements and limitations.

The process of initiating the steps for the second issue started when Covid-19 was at its full peak. The dilemma before the Editorial Board and the Advisory Board members was to decide the nature of thematical papers/articles to be invited for the January 2021 issue. Besides inviting papers on the 10 themes (as circulated in the call for papers) in the area of teacher education, two more dimensions have been added for this issue-these are 'Innovative Experiments in schools' and 'Designing and Implementing an Effective Curriculum Transaction through Online Mode during the Pandemic'.

Many authors extended an overwhelming support in contributing papers/articles in the area of teacher education. Based on the nature of these papers/articles, they were sent to the learned Referees for the peer-review. As per the opinion and comments of the Referees, some papers were accepted, a few were sent back to the authors for the necessary improvement and others were sent letters of regret.

A separate section has been ear-marked for 'Innovative Projects in Schools'. Since information regarding this was sent to some schools at a short notice, adequate number of quality papers could not be received. However, a few teachers contributed their papers and to appreciate and encourage them, their project-reports have been included in this section. As this section of 'Innovative School Experiments' is going to be a permanent feature of the journal, an attempt will be made to involve more and more schools in this realm.

The contributors were also briefed to share their experiences of completing curriculum transaction during the pandemic. A few educators and school teachers have developed good papers in this area and the recommended ones have been included in the journal.

There is much scope of more papers/articles in the domain of teacher and school education due to the pandemic related situations. Some teachers feel that Covid-19 has also been proved a blessing in disguise as many technological innovations in the process of teaching-learning might not have taken place in its absence. It is being opined that the online mode is going to stay even when the newly developed vaccines start showing their charismatic effects and normal functioning of the educational institutes gets resumed.

Besides the suggestions given in the foregoing paragraph, teacher educators, educational administrators and school teachers are requested to keep a track of relevant innovations they come across and pen down their

experiences in the shape of papers/articles; the Editorial Board will welcome the ones that meet the criteria stated in the 'Call for Papers'.

Though the authors are requested to focus on the themes suggested to them in the "Call for Papers", they may send papers/articles on other themes also as one never knows what innovation is going on in the mind of a thinker. May be his/her innovative ideas, coming out from his/her innermost, bring a revolutionary change and its publication may prove an eye-opener in the field of teacher and school education. An attempt will be made to suggest the relevant themes, based on the scenario going on in the world of education, but in exceptional cases, any paper/article of teacher and school education may find a place in our journal, if in the opinion of the Editorial Board, it is going to enrich the teacher or school education curricula and curriculum transaction in any form. With this note, I, once again, wish you a very prosperous and happy new year and as the people, the world over, have started rolling over their sleeves for the Covide-19 Vaccine, the year 2021 will uproot the deadly disease and all the sectors, including that of Education will flourish and the lively bustling will come back to all the schools and other educational institutes.

Dr. S.K. Bhatia
Editor-in-Chief

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RESEARCH ARTICLES

Article 1

Intuitive Analysis on the Prevalence and Correlates of Sexual Behaviors among Students of Pangasinan State University

Erwin O. Estrella
Shirley A. Layona

Abstract

Certain sexual behaviors are apparently acceptable for human beings but what sets apart the normal from the abnormal behavior is how an individual understands, accepts, thinks, and does all of these. Hence, this study entitled, "*Prevalence and Correlates of Sexual Behaviors among Students of Pangasinan State University*" aimed to determine the frequency of prevalence of sexual behaviors among students of Pangasinan State University. It also identified their profile in terms of their age, sex, civil status, monthly family income, religion, family type and time spent online as well as the correlation between their profile and the frequency of prevalence of their sexual behaviors. The study employed the descriptive correlational design of research study and a total of four hundred (400) students were considered as the respondents of the study. A questionnaire was used to gather the needed data and the gathered results were processed through the utilization of the SPSS.

Based on the findings of the study, the Researchers found out that majority of the students of PSU are 16-20 years of age, female, single, Roman Catholic believers, belong to a nuclear type of a family having an income of 9,999.00 and below and spending 2-4 hours online. Further, students exemplify low level of prevalence of their sexual behaviors. Spearman's results also revealed that age is correlated to their sexual behaviors. With these, the study strongly recommended that students should be consistently guided about their proper sexual behaviors. They should always have an open communication with their parents. The institution should maintain the course of the guidance and counselling program by strengthening more of their efforts as regards information dissemination on sex, sexuality, sexual harassment and other related matters. Since age is related to sexual behaviors, they must still be given utmost attention so as to lead them to correct path and be able to finish their studies. Lastly, the university should collaborate with the government agencies that also have the same thrusts and advocacies to help the school with the best practices as regards students' welfare and development.

Key Words: Sexual Behaviors, Frequency of Prevalence, Sexuality

Introduction

The Millennium Development Goals (MDGs) that were set at the 2000 Millennium Summit had an objective to fast-track global progress and development. Sexual and reproductive health is a pre-requisite of all goals especially sexual- health related. Progress is observed through the achievement of the two targets and their associated items for checking Millennium Development Goal No. 5 which strategically targeted to resolve adolescent birth rate, unmet need for family planning, sexual contraceptive prevalence rate and pregnancy care coverage. (Inter-Agency and Expert Group of WHO,2015) [1]

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The very first global analysis of sexual behavior explored the patterns and trends of sexual health and reviewed literature on preventive approaches to improve sexual health status. (London School of Hygiene & Tropical Medicine, 2006) [2]. The Researchers found out that there was no universal trend towards early sexual intercourse as well as underage sex and promiscuity.

Secondly, developed countries have comparatively high rates of multiple partnerships and tend to have higher rates of sexual-related diseases. For them, social factors such as poverty, mobility and gender equality are reasons for sexual ill-health which needs public health interventions. Rates of condom use at sexual intercourse were increasing and are generally higher in industrialized than in non-industrialized countries.

Kothari, et.al. (2012) [3] found out in their study that there were a number of demographic shifts which may have affected adolescent lives and the context in which adolescent sexual and reproductive behavior occurs. The proportion of adolescents' age 15-19, living in rural areas, has declined in more than half of the countries surveyed, suggesting increasing urbanization among adolescent populations. The proportion of adolescent women who report having sexual intercourse in the past 12 months has increased in more than half of the countries surveyed. The proportion of adolescent men reporting recent sexual intercourse has decreased by small margins in most of the countries. A similar trend is observed for the proportion of adolescent women who have had a live child. The proportion of adolescent women who received antenatal care from a skilled provider seems to show improvement over time, and a similar increasing trend is observed for adolescents who are attended by a skilled provider for delivery. Efforts to improve levels of contraceptive use and antenatal/delivery care among adolescent women are necessary, as they appear to face various levels of unmet reproductive need. Beyond the descriptive information provided in this report, additional research would be helpful to examine the relationships between related adolescent behaviors, risks, and health outcomes. Youth's engagement in sex-related undertakings has become so drastic. As regards past studies, parent-child closeness and sturdy familial bond can lessen the likelihood of the child to be involved in sexual activities. Further, the effect of becoming open and closer to discussing sexual topics among family members can lead to a more comfortable and happy living. Gumban, et.al (2016) [4] stressed that considering and realizing the sexual behavior of youth has been highly significant in attaining health development in the country. Young people with low level of parental communication in terms of sexual health issues resorted to risky sexual behaviors.

In Philippines, Lee (2012) [5] stressed that there are certain sexual behaviors that are acceptable as human beings but what sets apart the normal from the abnormal behavior is how we think of sex, and whether it is harmful to oneself and others. In like manner, Holmes (2012) [6] shared her thoughts that it is normal to have sex even seven times in a day (or for a couple to have sex only once a month) as long as it does not disrupt a person's daily activities, and it does not affect other people. Sexual behaviors are articulated in a multitude manner which include not only the thoughts but also the sexual practices and carnal fantasies. These are all manifested not only along socio-cultural means like human society and sexuality culture but also on biological, physical, and emotional habits. Others believed that sexual behavior is genetically grounded but others claimed it is largely through the influence of the environment. Human sexual behaviors are impacted by various aspects like cultural, political, theological, spiritual and ethical. (Carey, 2012) [7]

De Irala, et.al. (2019) [8] noted that students' primordial source of information about sexuality and love are acquired from friends. However, what is interesting to note is they value more their parents' advice than their friends', though little talk about this occurs in their respective homes. Annoyingly, more than half of these respondents were not mindful that condom use was not highly effective in hampering pregnancies. Lastly,

more girls over boys opposed sexism and concluded that parents should be open in discussing about sexuality and condoms are safe but should be used accordingly. In like manner, high percentages of adolescents still value virginity and strongly asserted pre-marital sex, multiple sex, casual sex, pornography, cohabitation, same-sex relationship, petting and female masturbation are still given such second-thought. Yet, male masturbation, holding hands and kissing as well as necking were found acceptable. Results indicated an increase in adolescents who engaged in premarital sex over time, although generally low (27.7%) compared to other studies. (De Jose, 2103) [9]

Pinoy Youth Today (2013) [10] by University of the Philippines shared that there is a heightened, bolder and wider range of sexual behavior including those that use new ICT which include notable differentials in all sexual activities, higher levels among males, older youth (age 20-24) and residents of NCR and contiguous regions Central Luzon and Calabarzon compared to their counterparts. Most of the sexual activities are unprotected against the risk of pregnancy and increase in teenage fertility in the past decade. The new technologies have given rise to new forms of sexual activity and new means of meeting sexual partners that could increase the risk of adverse consequences like under a context of low prevalence of the use of protection. As well, the increased prevalence of sexual activity in various forms may indicate new normative standards regarding sex. Norms around marriage may also be changing as indicated by a higher proportion of the living-in than the formally married status.

It is within these prevailing notes and concepts that the Researchers intended to focus on the sexual behaviors of the students of Pangasinan State University.

Methods and Procedure

This study used the descriptive-correlational method of research. Correlation research is looking for variables that seem to interact with each other, so that when one can see one changing, a Researcher has an idea of how the other will change (Kowalczyk, 2013) [11] Through this concept, this design was deemed appropriate for the present study. Four hundred students of PSU-Urdaneta were considered as respondents of the study.

Table 1 Respondents of the Study

Degree Courses	No of Respondents
AB English Language	13
B Elementary Education	14
B Secondary Education	22
BS Mathematics	11
BS Information Technology	58
BS Architecture	32
BS Civil Engineering	119
BS Computer Engineering	41
BS Electrical Engineering	49
BS Mechanical Engineering	41
Total	**400**

A Researcher-made questionnaire was used in this study which was designed, crafted and patterned from the various related studies. The questionnaire was prepared in accordance to the main purpose of the present study. The questionnaire utilized consisted of the following parts: **Part I** of the instrument focused on the profile of the respondents. **Part II** of the instrument elicited the information on the sexual behaviors of the students of Pangasinan State University.

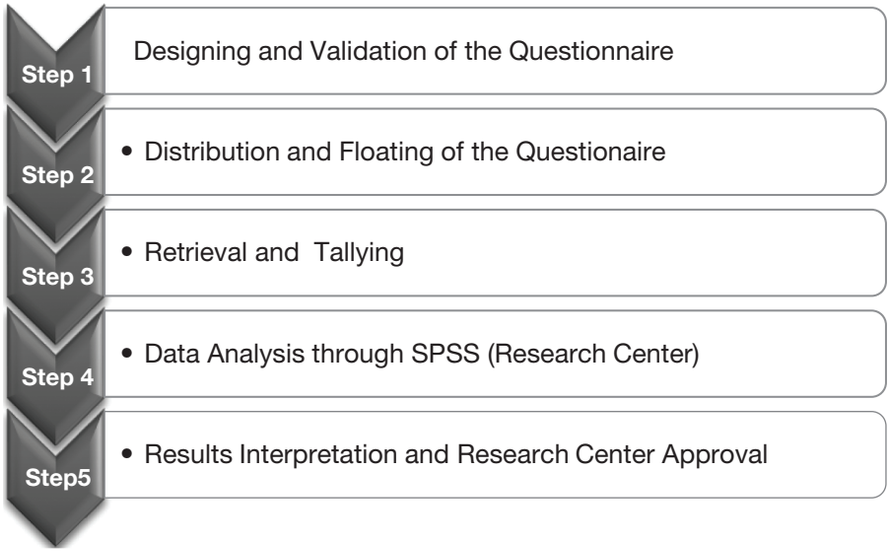


Figure 1. Research Process

The descriptive survey, through the use of the questionnaire-checklist, was employed to answer the problems of the present study. The questionnaire-checklist that was used for data gathering revealed the profile of the students in terms of their age, sex, civil status, monthly family income, religion, family type and time spent online. The Researchers obtained permission from the Campus Executive Director. The established questionnaire-checklist was meticulously evaluated. After the questionnaire was simplified, improved and refined, the questionnaire was subjected to content validation by five experts in the field of guidance and social sciences. The experts ascertained the content validity of the instrument with the average of 4.93. In describing the validity, the average weighted mean was adopted.

The following mean scale range and descriptive rating below were used to interpret the validity of the questionnaire.

Numerical Values	Mean Scale Range	Descriptive Rating
5	4.51 – 5.00	Very Highly Valid
4	3.51 – 4.50	Highly Valid
3	2.51 – 3.50	Moderately Valid
2	1.51– 2.50	Not Valid
1	1.00 – 1.50	Not Valid at All

The questionnaire was distributed, explained and clarified to the respondents regarding the main purpose of the study. Likewise, the retrieval of the questionnaire was done just after accomplishing the details of the questionnaire. Likewise, tabulation and tallying started right after the retrieval then submitted to the Campus Research Coordinator and endorsed to the Statistics Center for further analysis. All the needed and relevant data that were gathered was consolidated and analyzed. In determining the profile of respondents, frequency counts and percentages were used as the main statistical tool.

Likewise, to determine the frequency of prevalence of the sexual behaviors of the students, average weighted and frequency were utilized.

Scale	Range	Descriptive Equivalent
4	3.26 – 4.00	Always
3	2.51 – 3.25	Sometimes
2	1.76 – 2.50	Often
1	1.00 – 1.75	Never

To determine the significant relationship between the profile variables and the frequency of prevalence of the sexual behaviors of the students, chi-square was utilized.

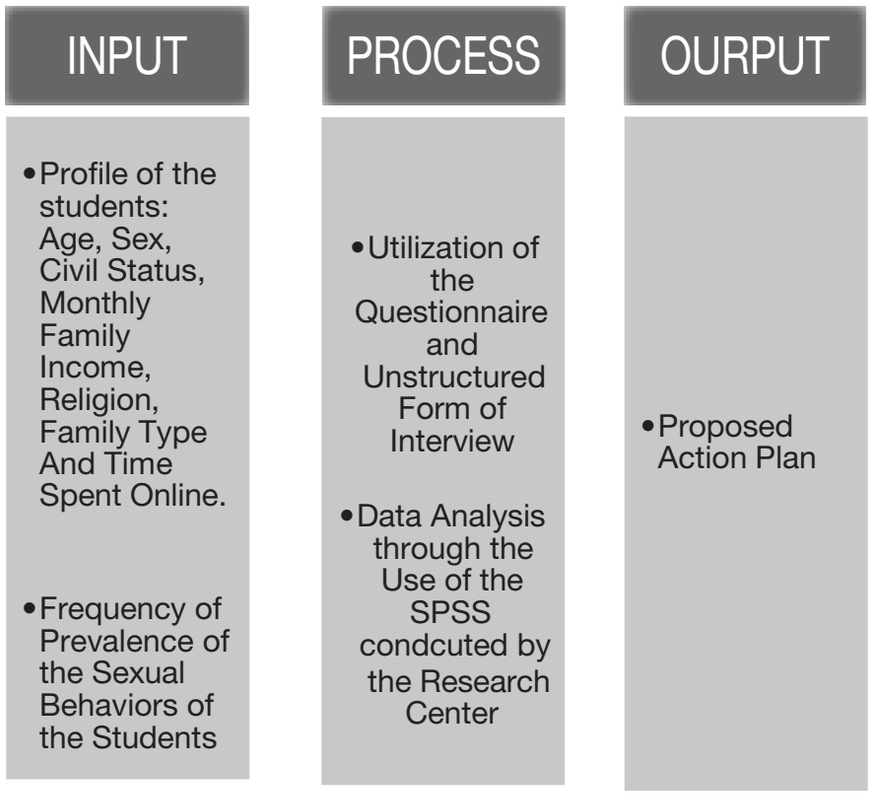


Figure 2. Research Paradigm

Results and Discussion

Table 2 Profile of the Respondents

Profile	Level	Frequency	Percentage
Age	31 - above	3	0.80
	26 - 30	9	2.30
	21 - 25	87	21.80
	16 - 20	301	75.30
Sex	Male	185	46.30
	Female	215	53.80
Civil Status	Single	391	97.80
	Married	3	0.80
	Single Parent	6	1.50
Monthly Family Income	50,000 - above	21	5.30
	30,000 - 49,999	46	11.50
	10,000 - 29,999	145	36.30
	9,999 - below	188	47.00
Religion	Roman Catholic	259	64.80
	Iglesia ni Cristo	28	7.00
	Jesus-Latter Day Saints	13	3.30
	Born Again	69	17.30
		31	7.80
Family Type	Nuclear	273	68.30
	Extended	76	19.00
	Single-parent	51	12.70
Time Spent Online	2 hours	109	27.30
	2 - 4 hours	158	39.50
	4 hours	128	32.00
	Never	5	1.30

Age. It is reflected in the Table 2 that majority of the students of Pangasinan State University-Urdaneta Campus are 16-20 years old as indicated by the frequency of 301 with a percentage of 75.30. Eighty-seven or 21.80% are 21-25 while nine (9) or 2.30 percent are 26-30 years old. Only 3 of them or 0.80% are 31 years old and above. The data imply that students are entirely in their actual age for tertiary education and have enrolled in their College on time. However, there are still those who are already staying beyond the College years due to the delay because of failing grades. The human sex ratio is the number of males for each 100 females in a population. Sex ratio above 100 means there are more males than females. Sex ratio below 100 means there are more females than males. Sex ratio of 100 means there are equal number of females and males. (Worldbank, 2019) [12]

Henking (2019) [13] said that the very significant shift of College Education in the Philippines is probably the massive growth in the adult student population in the higher education. Students who are enrolled in higher education are 38% percent and are over the age of 25 and one-fourth are over the age of 30. By 2019, students who are over age 25 is projected to increase by another 23%.

Sex. The Table 2 shows that most of the respondents are females as indicated by the frequency of 215 or 53.80% while there are 185 or 46.30% male students. The data imply that though the Campus' course hub is Engineering and Architecture, it is still dominated by women. In the Philippines particularly in 2015, the male to female ratio was at level of 101.31 males per 100 females, down from 101.78 males per 100 females in 2010. There is a change of 0.46 percent. (Knoema.com, 2015) [14]

Civil Status. The Table 2 reflects that majority of the students are single as evidenced by the frequency of 391 or 97.80%. Likewise, among the respondents, six (6) of them or 1.50% are single parents while a few or three students or 0.80% are already married. It is implied that since the respondents are still studying, they still opt to stay single so that they can concentrate on their studies.

Monthly Family Income. It could be gleaned from the Table 2 that most of the respondents have an average monthly income of 9,999.00 – below as indicated by the frequency of 188 or 47%. One-hundred forty-five (145) of them have an income of 30,000.00-49,999.00. However, only 21 or 5.30% of them have an income of 50,000.00 and above. The data imply that according to the newly established income bracket released during the pandemic time, families with an income of 11,690.00 and below belong to the poor. With this concept, respondents are poor because the income is below the clustered income which is Php 9,999.00 – below. Jonas (2012) [15] said that the families with middle income earn an average of P36, 934.00 monthly while families with lowest monthly income earn an average of P9, 061.00. Likewise, according to the data on the latest Family Income and Expenditure Survey of the National Statistical Coordination Board (NSCB) offers some, albeit not that exhaustive, information about income classes in the country.

Religion. The Table 2 reflects that majority of the respondents are Roman Catholics as indicated by the frequency of 259 or 64.80%. Twenty-eight of them or 7% are Iglesia Ni Cristo, 13 or 3.30% are devotees of Jesus Latter Day Saints, while there are 69 of them or 17.30% Born Again Christians. Since the country is Christian-centered, it is tantamount that the respondents are Roman Catholics. Roman Catholicism became the foundation of the heritage and the identity of the Filipinos for tens of hundred times in the Philippines since the invasion of Spaniards (Steven, 2014) [16]

Family Type. The Table 2 shows that majority of the students have a nuclear type of a family as reflected by the frequency of 273 or 68.30%. Seventy-six or 19% belong to the extended family. Further, fifty-one (51) or 12.70% of them are raised in single-parent family. The data imply that the respondents still employ close-family ties and exercise the sanctity of marriage and the value of family.

The sanctity of marriage and the essence of nuclear family remains intact because divorce is not permitted in the articles of the country's law or in the culture of the Philippine society keeping families to remain together making traditional nuclear families still exist. Likewise, the parents' responsibility of taking care of the children stays until parents become old and later the children reciprocate (Filipina, 2012) [17]

Time Spent Online. Online is already the world of students nowadays. It could be gleaned from the Table that most of the students spend their time online 2-4 hours a day as indicated by the frequency of 158 or

39.50%. This is followed by the '4 hours a day' as reflected by the 128 or 27.30%. Only 5 of them or 1.30% are not spending any time online. The data imply that students spend more time manipulating their gadgets because this is now the call of the time.

The very latest study conducted by the Kaiser Family Foundation stressed that students spend much more time making themselves busy with their mobile phones, tablets and iPods rather than staying in the classroom, browsing their notes and reading their books (Henderson, 2010) [18]

Frequency of Prevalence of Sexual Behaviours among Students of Pangasinan State University

Table 3 Frequency of Prevalence of Sexual Behaviors among students

Indicators	Frequencies				Mean	DE
	N	O	S	A		
Talking with your friends about sex	119	113	130	38	2.22	O
Talking with your friends about contraception	155	121	100	24	1.98	O
Dating	198	65	115	22	1.90	O
Watching pornographic films through the use of laptop or phones	213	113	50	24	1.71	N
Viewing a pornographic movie/video	199	142	48	11	1.68	N
Sexual fantasies	220	112	51	17	1.66	N
Masturbating alone	261	71	41	27	1.59	N
Kissing while on a date	307	53	30	10	1.36	N
Talking with your boyfriend/girlfriend about sex	304	57	35	4	1.35	N
Talking with your boyfriend/girlfriend about contraception	317	48	31	4	1.31	N
Petting or fondling	327	38	24	11	1.30	N
Reading pornographic magazine	322	53	21	4	1.27	N
Talking with your parents about contraception	321	58	20	1	1.25	N
Talking with your parents about sex	334	39	26	1	1.24	N
Oral sex	371	15	7	7	1.13	N
Sexual Intercourse with a person of the opposite sex	373	15	7	5	1.11	N
Forcing your partner to have sex	380	8	8	4	1.09	N
Being forced to have sex or having sexually abused	383	8	6	3	1.07	N
Sexual activity with a person of the same sex	386	6	7	1	1.06	N
Overall Weighted Mean					**1.43**	N

Note: Highest frequencies are in **boldface; DE –** Descriptive Equivalent
Legend: 1.00 – 1.75 **N – Never**; 1.76 – 2.50 **O – Often**; 2.51 – 3.25 **S – Sometimes**; 3.26 – 4.00 **A - Always**

It is reflected in the Table 2 that talking about sex with friends served as the number indicator about sexual behavior with the highest mean of 2.22. Out of the 400 respondents, 119 never had the motive of discussing about this matter, however, there were 38 of them who were always having this behavior of having a dialogue about sex with friends. The data imply that though the educational design is already patterned along Fourth Industrial Revolution, majority of the students are still hesitant and timid to share their thoughts about sex related matters because of strong influence, religiosity and sturdy ties among family members.

Sex is a normal part of one's life and talking about contraceptives instills taking responsible steps to protect oneself. This is about taking charge of one's own life in an adult process and responsible way and shows maturity. (www.your-life.com, 2015) [19]. Plante (2020) [20] said that it is imperative to talk with friends about sex. It can bring closeness between and among friends if there is open communication and conversation about sex in particular and can also provide fun and opportunities for validation. However, many people still believe that conversation about sex must be kept private because this seems intimidating or a bit awkward even amongst friends.

Likewise, talking with your friends about contraceptives was oftentimes prevalent among students of the institution as reflected by the mean of 1.89. One-hundred fifty-five (155) students never disclosed themselves towards this issue, however, there were twenty-four (24) of them who felt-free to share their views about contraceptives like condom and others.

The data imply that students are aware of the sexually transmitted diseases and of possibilities of acquiring them, that is why, they still have to convey concerns as regards contraceptives. In fact, there is a government thrust of giving free condoms to high school students across the country.

Parents must communicate honestly and openly with their teenage sons &/or daughters about sex and contraceptives because these help promote their child's health and lessen the chances that their teenage children will engage in behaviors that are not acceptable to the standards of the society (Albert, 2012)[21]

Moreover, dating is also oftentimes prevalent among students of Pangasinan State University (PSU) as reflected by the mean of 1.90. There were 115 of them, sometimes indulging in this behavior and only 22 of them were always engaging in this kind of behavior. This is attributed to the fact that men are still sexually active beings and this is manifested through dating, courtship and opposite gender attraction. Gavin (2012) [22] said that dating is a form of romantic relationship in which two people are emotionally and sexually attracted to each other. More so, findings revealed that dating in Federal University is a social exchange between two unmarried persons. The findings also revealed that the social factors that facilitate dating among students are academic pursuit, peer pressure, socio-economic background, parenting style and the need for high prestige. Finally, dating has both negative and positive implications. The positive impacts include ease of academic stress, improvement in emotional health and strengthening of self-esteem/confidence. The negative impact of dating includes prevalence of dating violence, sexual implications and high level of disrespect among students.

However, psychological aggression is the most common form of dating violence among college students placing young adults, particularly females, at risk for physical and psychological problems. Some students are unaware that certain behaviors constitute violence. Considering the prevalence of dating violence, it is necessary for counsellors to be aware of the ethical issues and dilemmas that can arise when working with clients (Maharaj, 2019) [23]

On the other hand, watching pornographic films through the use of laptop or phones (1.71), viewing a pornographic movie/video (1.68) and sexual fantasies (1.66) were never prevalent among students. It is also not surprising to note that there were 24 of them who do watch pornographic films using their phones because of an easy access of the internet browsing connections and an ample free data linkages from major internet network providers.

According to Flood (2012) [24], youths are routinely exposed to pornography. They encounter sexually explicit images while on the Internet, some watch X-rated videos and, like adults, they live in a culture increasingly saturated in sexualized representations. This study explores the likely effects of youth's exposure to sexually explicit media. It reveals that pornography exposure can lead to emotional disturbance, sexual knowledge and liberalized attitudes, shifts in sexual behaviour, and sexist and objectifying understandings. Particularly for boys and young men, the use of pornography may exacerbate violence-supportive social norms and encourage their participation in sexual abuse.

Masturbating alone has also been noted as never prevalent among students as indicated by the mean of 1.59. It is further reflected in the Table that 261 of them seemed never and only 27 of them were active and had the purpose of doing this behavior. However, Maslow, in his self-actualization and hierarchy of needs theory, said that sex has been a physiological need to be fulfilled. Therefore, this one is somehow a question and needed to be proven and examined. Castleman (2019) [25] suggested that masturbation was true for both women and men. Regardless of their health, men keep doing it. Seemingly, fundamentalist families do lesser frequency of masturbation compared with people who were raised in families who are religiously liberal. However, it is deemed as convenient vent for students who do not have partners.

Further, kissing, while on a date, has also been assessed as never prevalent as supported by the mean of 1.36. It could be seen that 307 students confirmed that they were not doing this behavior, possibilities are attributed to either they do not have partners yet or they are focused on their studies, that love interests are not yet their concern.

However, there were 10 of them who were absolutely actively doing this behavior. Physiological connections of warmth that includes kissing can slow down the effects of stress according to Affection Exchange Theory. Moreover, expressed affection, where kissing is a major instance, is directly related to depressing the stress hormone cortisol within the entire rotation of the day.

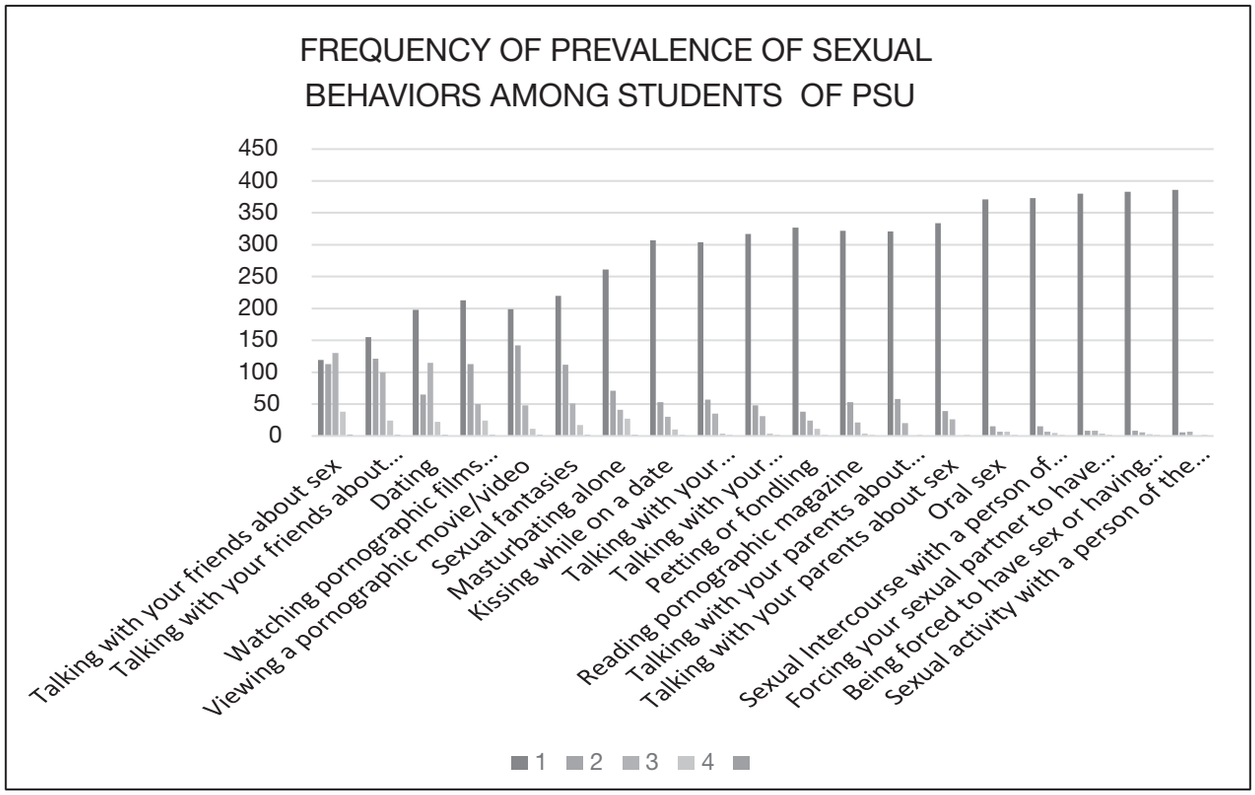
Indicators, namely talking with boyfriend/girlfriend about sex (1.35) and talking with boyfriend/girlfriend about contraception, (1.31) were also never prevalent among students of the Campus. The data imply that some of the students are still very conservative and still consider the value of sanctity. However, of the 400 respondents, more than 300 were never into this kind of sexual behavior but it is so interesting to note that only few of them were so vocal and overt expressing their viewpoints about this.

Another indicator is about petting or fondling in which these have been assessed as never prevalent among respondents as supported by the mean of 1.30. The data further revealed that only 11 of them were doing this behavior. It is on this aspect that young Filipinos are still very naïve and God-fearing. Students of the institution still consider purity-preservation despite of the emerging alarming conditions of the society on teenage pregnancy and pre-marital sexual activity. This can be disputable, nevertheless students of the University still manage their care for their future and love to earn their respective degrees.

A lot of young people at this time are not comfortable disclosing such issues about themselves to their parents. Likewise, talking about sex with them has been evaluated as never as indicated by the mean of 1.24. Majority of the students answered never as supported by the frequency of 334 yet only 1 answered yes for this indicator. Students seemed to be very timid and reserved when it comes to conversing about sexual matters with their parents. The data imply that they intend to keep matters like this in private because parents are not also very open or revealing about this concern.

Oral sex is an indicator on sexual behavior that was assessed as never prevalent, yet there were 7 of them always doing this behavior but a majority of the students were not performing this behavior as supported by the frequency of 371. This behavior is somehow a sexual gesture that others perceive as really a part of human sexual calisthenics. However, the data imply that only a few of the students were into this act because of their love for their partners as also their respect towards their loved ones. Lilywhite (2019) [26] said that oral sex is potential in enhancing an overall mood. This can also improve the extent of intimacy with one's partner.

An indicator that was also evaluated as never prevalent was along sexual intercourse with a person of the opposite sex as evidenced by the mean of 1.11. There were 373 of the students who answered never and only 7 answered always. Sexual intercourse is the very nature of humanity. However, it should be done with the right person. The data imply that students are mindful of the value of their partners. Women are less enthusiastic for casual sex as compared with men. This is true along desires for short-term mating with many different sexual partners and is even true for wanting to have sex with complete and total strangers (Schmitt, 2017) [27]



Legend:

1=never; 2=often; 3=sometimes; 4=always

Being forced to have sex or having sexually abused was assessed as never prevalent as indicated by the mean of 1.07. Majority of them or 383 have answered never and only 3 have answered always. It is so saddening to note that there were those students who were sexually abused. This is a very rare case yet still very alarming because this still prevails in the community. The data imply that the cruelty is still in store among students. This should be given immediate attention because this can also harm and can be a threat among students of the University.

Homosexuality is also very rampant in the society today through the very diverse nature of humanity in this realm of modernity. Though this is the situation of the world right now, the students never had an affair or a sexual intercourse with same sex as evidenced by the mean of 1.06. It has been the enigma of dynamism along sexuality in the society, however, very few still among the students did have an affair with same sex. This is so interesting to note despite the emergence of LGBTQA+ community in the society today.

Notwithstanding, there was always demonstration of sexual behavior among students of Pangasinan State University as evidenced by the over-all weighted mean of 1.43.

Correlation Between the Prevalence of Sexual Behaviour and the Profile of Students of Pangasinan State University

Table 4 Correlation between the Prevalence of Sexual Behavior and the Profile of Students of Pangasinan State University

Profile	Prevalence of Sexual Behavior		
	r	sig.	D
Age [a]	0.069	0.17	Slight
Sex [b]	0.268**	0.000	Strong
Civil Status [b]	0.135*	0.023	Weak
Monthly Family Income [a]	0.086	0.085	Slight
Religion [b]	0.104	0.374	Weak
Family Type [b]	0.049	0.927	Weak
Time Spent Online [a]	0.085	0.09	Slight

Note: ** Significant at 1% level, * Significant at 5% level; Superscript (a) indicates that the test used was **Spearman Rank Correlation**; (b) indicates that the test used was **Chi-square test of Independence**.
Legend: For (a) **S –** Slight /Almost Negligible, **L –** Low Correlation**, M –** Moderate Correlation**, H –** High Correlation**, VH –** Very High Correlation**.**
For (b) 0.10 – 0.29 **W – Weak** association between variables, 0.30 – 0.40 **M – Moderate** association between variables, 0.50 – above **S – Strong** association between variables.

Spearman's value revealed that age has slight correlation with the prevalence of sexual behaviors among students as indicated by the computed value of 0.17. The data imply that age is not a question as regards sexual behavior due to the fact that age can be a factor being so aware of the sexual behaviors. However,

monthly family income and time spent online have slight correlation with the sexual behaviors of students as supported by the computed values of 0.085 and 0.09, respectively.

Cognizant to the findings of the study, the study of De Jose (2013) [28] entitled, "Filipino Adolescents' Sexual Attitudes and Behaviors: Results from a University Cohort" revealed that six of the predictive factors (gender, sexual preference, age, school allowance, monthly family income, and attitude towards sex) were significantly correlated with sexual behavior. Stepwise regression analysis identified only four factors - attitude towards sex, monthly family income, gender, and sexual preference - as significant predictors of sexual behaviors. This composite term explains 16.1% of the total variance with the overall equation significant at $p < .001$.

On the other hand, chi-square test of independence results further revealed that sex has strong association with the sexual behavior among students as supported by the computed value of 0.000. However, civil status has a weak association with the sexual behaviors of students as evidenced by the computed value of 0.023. Lastly, religion and family type also have weak association with the sexual behaviors of students of Pangasinan State University as indicated by the computed values of 0.374 and 0.927, respectively.

Table 5 Plan of Action to Enhance the Sexual Behaviors of Students

Key Result Area	Objectives	Strategies	Time Frame	Personnel Involved	Budgetary Requirement	Expected Output
Students' sexual behavior identification	To screen the behaviors of the students through survey *(Having this information at the start will assist in setting up the plan with some baseline data)*	• Steps to Follow • Targeting the behavior • Intervention selection • Conferencing with the student • Tracking data to (hopefully) show progress • Knowing if an intervention worked	September 2020	CED, AdO, Guidance Counselor, Deans Chairs and Faculty	Php 20,000.00	Intensive identification of the sexual behaviors has been conducted.
Profound Knowledge of Students on Sexual Behaviors	To conduct information dissemination on sex, sexuality, PMS, sexual protection and HIV/ AIDS	Intensive and inclusive Information drive and campaign Creation of VLOGS and Web Blogs about the matter	October 2020	CED, AdO, Guidance Counselor, Deans Chairs and Faculty	Php 5,000.00	Inclusive, intensive and comprehensive Information drive and campaign has been put into place
Partnership	To establish partnerships with the DSWD, PNP and OCD	Memorandum of Understanding/ Agreement between the university and GO's other NGO's	December 2020	CED, AdO, Guidance Counselor, Deans Chairs and Faculty	Php 10,000.00	Partnership is strongly established

Rebranding of the Guidance Office	To revisit the process of the Guidance Office	• Revisiting of the Manual of Services of the Guidance Office • Inclusion and Involvement of the Advisers in the Conduct of Counseling • Enough personnel of the Office • Enough staff to accommodate the needs of the students	December 2020	CED, AdO, Guidance Counselor, Deans Chairs and Faculty	Php 50,000.00	Office rebranding is set.
Reconstruction of the Guidance Office	To establish privacy among students	More spacious area for guidance, counselling and testing.	January-April 2021	CED, AdO, University Engineer, Guidance Counselor, Deans Chairs and Faculty	Php 500,000.00	More spacious office is restructured
TOTAL					Php 585,000.00	

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Progressive Analysis of School-Based Management Program in Relation to Environmental Roles and Performance of Division of Antipolo City Schools: Basis for Quality Management System Intervention Program

Marie Rose F. Muñez

Abstract

The study focused on the **School-Based Management** implementation and school performance in Division of Antipolo City as basis for quality management system intervention program. The Researcher concentrated on the three consecutive years' performances of school, environmental roles and implementation of school based-management to evaluate its relationship and differences.

The respondents of the study were the total population of school heads in the division and the **School-Based Management** team per school. SBM Assessment Scores and Documentary Analysis was utilized by the Researcher in evaluating the implementation and performances of school. SBM Assessment highlights on the leadership and governance, curriculum and instruction, accountability and continuous improvement and management of resources while school performances converge thematic area, namely enrolment, drop-out, cohort-survival, completion and test result. Furthermore, environmental roles focus on change of leadership, attitude and participation, monitoring and evaluation, and sustainability.

Descriptive research design was utilized in the study since the respondents will determine the level of implementation of **School-Based Management** in their respective school using questionnaire-checklists based on the revised SBM Assessment Tool adopted by the division. School documents were gathered by the Researcher to determine the school performances in the division. To determine the environmental roles, Researcher-made questionnaire checklists were validated by the experts in the field and employed in the study. The result of the study made an intervention program focused on quality management system which will be presented in the division for further reference and action.

Based on the findings, the following conclusions were drawn: The level of **School-Based Management** is "Strongly Implemented" in schools of the Division of Antipolo City. Moreover, the level of performance of schools in the Division of Antipolo City for the last three years is in Satisfactory Level. There is significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of drop-out, cohort-survival and test results of the pupils. There is no significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of enrolment and completion rates. Furthermore, the level of **School-Based Management** in relation to environmental roles is "strongly implemented". There is significant relationship between level of **School-Based Management** implementation and the environmental roles in attitudes and participation. On the contrary, there is no significant relationship between level of **School-Based Management** implementation and the environmental roles such as change of leadership, monitoring and evaluation, and sustainability. Finally, the results of the study prompted the Researcher to propose a Quality Management System Intervention Program to contribute on the improvement of **School-Based Management** implementation, school performance and environmental roles in the Division of Antipolo City.

Key Words: School-Based Management Environmental Roles, School Performance

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Introduction

Background of the Study

Education is the foremost concern of a nation. Through education, people become equipped with the essential knowledge, usable skills, rightful attitudes, and moral values. Education plays a huge and vital role in the development of every individual. Access to quality education can be enjoyed by schools if modern trends of instructions that cater to quality learning will be given emphasis, thus it is the utmost concern of teachers to fully give the best possible learning experiences to every student.

According to Marte 2012, the changing world puts demands upon skilful leaders in school to practice effective management that promises and creates a wholesome breed of people in charge of the education system. The fast-changing pace of educational practice up to date demands a requisite of multitudinous roles of administrations--taking many perspectives and dimensions to pursue the mission, vision and goals of schools for the future.

On the other hand, the Revised **School-Based Management** Assessment Tool highlights that a school on the advanced level may apply for accreditation. The highest level, the "advanced", is a candidacy for accreditation. The said tool is guided by the four principles of ACCESs (A Child-and Community-Centered Education System). In addition, the unit of analysis is the school system which is classified as developing, maturing and advanced accredited level.

As stated in DepEd Order No. 8 s. 2012, otherwise known as the "Implementing Guidelines on the Revised **School-Based Management** (SBM) Framework, Assessment, Process and Tool (APAT)" and as supported by the Division Unnumbered Memorandum No. 283 s. 2017 which announced the functions of Division SBM Validation Team, to wit:

> Team will validate the submitted report on SBM level of practice through Document Analysis-Observation-Discussion (DOD); certify the SBM Level of Practice of each school; gather data on the issues/problems concerning SBM; provide technical assistance to address identified issues/problems; and determine the Best SBM Implementer and SBM Coordinator.

Serrano (2016:4) stressed that management is the process of utilizing the resources of the organization in an effective and efficient manner to attain targeted objectives through planning, organizing, staffing, leading and controlling.

On the contrary, the reported **School-Based Management** status vis-à-vis CI Project Completers in the division for the school year 2015-2016 (Domingo, 2017) stated that only three (3) elementary schools or 6.82% got maturing SBM level of practice while five (5) secondary schools or 23.81%. Presently, in the school year 2016-2017, there are 20 or 45.45% elementary schools which obtained maturing level and 10 or 47.62% at secondary level. Comparably, SBM level of practice, according to shifting schemes, shows an increase on the number of schools (both elementary and secondary) with "Maturing" level of practice in all shifts. There are thirteen (13) elementary schools with one shift, 11 schools with 2 shifts and 6 schools with 3 shifts in elementary, while 6 schools in one shift and 6 schools in 2 shifts for secondary level.

For the moment, SBM level of practice, according to size, presents that there is only one (1) school that got maturing level in very large school size, four (4) in large school, five (5) in medium and twenty (20) in small

schools in the elementary level. Similarly, one (1) school got maturing level in very large size, two (2) in large and medium schools and seven (7) in small schools in the secondary level.

In terms of School-to-School Partnership Program implemented in the division, 8 out of the 10 partner schools had "Maturing" SBM level of practice for the SY 2016-2017. Four schools improved from Developing to Maturing while the other four maintained their maturing level of SBM practice. Furthermore, eight (8) partner schools improved their SBM score from the previous year.

However, SBM level in the Division of Antipolo City confirmed that only twenty-five (25) elementary schools classified in Maturing Level (Level II) and nine (9) schools in Developing Level (Level I). In secondary level, thirteen (13) schools were classified in Developing Level (Level I) and ten (10) schools in Maturing Level (Level II). This data strengthens the Researcher to conduct a study since Advanced Level (Level III) is ideal level for one school to be accredited and based upon the report, no schools in the division got the said highest SBM level.

The Researcher doubted about the level of implementing **School-Based Management** (SBM) per school since there are only low percentage of schools mentioned on the preceding pages who got Maturing Level (II) and some schools are still in Developing Level(I). Historically, no schools in the division proceeded in the accreditation phase as mentioned; schools will only be accredited once they are leveled to Advance Stage (III). Apparently, there are many recommendations and crafted outputs as on how to improve such implementations in the school. Based on, the previous researches, they are still during the assessment and validation phase in the Division, the overall mean is Maturing, this has been supported by Domingo (2017).

Currently, the Researcher is a **School-Based Management** coordinator in her present station and taking educational management wherein principles of the present study are aligned to the concerns of the Researcher such as leadership and governance, curriculum and instructions, accountability and continuous improvement and management of resources. In view of this, the Researcher conceived this study to determine the level of implementation of School –Based Management in the division and its differences and relationships to school performances. The results of the study could serve as baseline data in quality management system implementation of schools in the division.

Statement of the Problem

The study focused on the school-based implementation and school performance of Division of Antipolo City as basis for quality management system intervention program.

Specifically, the study will seek to answer the following questions:

1. What is the level of **School-Based Management** implementation in the Division of Antipolo City for the last three years in terms of the following?
   - 1.1 Leadership and Governance
   - 1.2 Curriculum and Instruction
   - 1.3 Accountability and Continuous Improvement ; and
   - 1.4 Management of Resources

2. What is the level of performance of schools in the Division of Antipolo City for the last three years in terms of the following?

   2.1 Enrolment rate

   2.2 Drop-out Rate

   2.3 Cohort-Survival Rate

   2.4 Completion Rate

   2.5 Test Result

3. Is there significant relationship between **School-Based Management** implementation and school performance in the division?

4. What is the level of implementation of **School-Based Management** in relation to environmental roles in terms of the following?

   4.1 Change of leadership

   4.2 Attitudes and Participation

   4.3 Monitoring and Evaluation

   4.4 Sustainability

5. Is there significant relationship between **School-Based Management** implementation and environmental roles in the division?

6. What specific quality management intervention program will be developed as determined from the result of the study?

Null Hypothesis

The hypotheses framed for the study are stated below:

1. There is no significant relationship between **School-Based Management** implementation and school performance in the division.

2. There is no significant relationship between **School-Based Management** implementation and environmental roles in the division.

Scope and Limitation of the Study

The study focuses on the **School-Based Management** implementation and school performance in Division of Antipolo City as basis for quality management system intervention program. The Researcher will concentrate on the three consecutive years' performances of school, environmental roles and implementation of school -based management to evaluate its relationship and differences.

The respondents of the study are the total population of school heads in the division and the **School-Based Management** team per school. SBM Assessment Scores and Documentary Analysis have been utilized by

the Researcher in evaluating the implementation and performances of school. SBM Assessment highlights on the leadership and governance, curriculum and instruction, accountability and continuous improvement and management of resources while school performances converge thematic area namely enrolment, drop-out, cohort-survival, completion and test result. Furthermore, environmental roles focus on change of leadership, attitude and participation, monitoring and evaluation, and sustainability.

Descriptive research design has been utilized in the study since the respondents are to determine the level of implementation of **School-Based Management** in their respective school using questionnaire-checklists based on the revised SBM Assessment Tool adopted by the division. School documents have been gathered by the Researcher to determine the school performances in the division. To determine the environmental roles, Researcher-made questionnaire checklists which have been validated by the experts in the field and employed in the study.

The results of the study will be an intervention program focused on quality management system which will be presented to the division for further reference and action.

Research Design

This study will use the descriptive-survey method of research. According to Villanueva (2013), this type of research method is suitable wherever the subjects vary among themselves and one is interested to know the extent to which different conditions and situations are obtained among these subjects. The word "Survey" signifies the gathering of data regarding present conditions. A survey is useful in: **(1)** providing the value of facts, and **(2)** focusing attention on the most important things to be reported. In this type of survey, it is necessary to determine the psychological and social aspects of research by way of application or implementation of evidence to recognize between facts and influence. Additionally, it describes what exists and may help to uncover new facts and meaning.

Travers (1978) explained further that Descriptive Research provides a knowledge base which can be a springboard for other types of quantitative research methods because it maps the terrain of a specific phenomenon. It contributes to the formation of principles and generalization in behavioral sciences, contributes in the establishment of standard norms of conduct, behavior, or performance. It also reveals problems or abnormal conditions, and if correctly interpreted, the data gathered can provide useful insight which may lead to hypothesis – formation.

In relation to the nature of the study, it involves the gathering and interpreting of the detailed information to be used in ascertaining the implementation of **School-Based Management**, School Performance and Environmental Roles in the Division of Antipolo City as the basis for Quality Management Intervention Program, the descriptive research design is considered essential. Moreover, the Researcher assumed that the descriptive research design is the most suitable for the study because of its capability to describe and interpret the conditions as they exist at the period of the study.

Sources of Data

The sources of data of the study are the 45 Elementary School Heads, 21 Secondary School Heads, and 66 SBM Coordinators (both elementary and secondary schools) and 264 CI members (4 members per school) of Division of Antipolo City. The respondents will be identified using the purposive sampling technique.

Instrumentation and Data Collection

There are three data gathering instruments used in this study. The first is survey questionnaire to determine the SBM implementation in the City Schools Division of Antipolo. Another is school documents in getting the school performance such as NAT result, enrolment rate, cohort-survival rate, drop-out rate and completion rate. Another is interview questionnaire to validate the result of the study.

Summary, Conclusion and Recommendations

In this study, descriptive survey research has been employed in finding out the progressive analysis of **School-Based Management** implementation in relation to school performance and environmental roles in the Division of Antipolo City. The study is descriptive in form as it provides knowledge base which can be a springboard in quantitative methods and maps the terrain of specific phenomenon.

The respondents of the study are the School heads, SBM Coordinators and members in the schools' division of Antipolo City as stipulated earlier.

All the data gathered has been analyzed through the use of the Statistical Package of Social Sciences (SPSS) software package.

In order to determine the relationship of the described parameters involving the level of SBM implementation and its correlations to the school performance and environmental roles Pearson (r) moment of correlation was used.

Level of School-Based Management Implementation in the Division of Antipolo City for the Last Three Years in terms of Leadership and Governance, Curriculum and Instruction, Accountability and Continuous Improvement and Management of Resources.

The parameters used in the status of level of implementation of **School-Based Management** implementation in schools' division included;

1. Leadership and Governance;
2. Curriculum and Instruction;
3. Accountability and Continuous Improvement; and the
4. CI Output.

In this study, it is found out that the level of **School-Based Management** is "Strongly Implemented" in the schools in the Division of Antipolo City.

Level of Performance of Schools in the Division of Antipolo City for the Last Three Years in terms of Enrolment Rate, Drop-out Rate, Cohort-Survival Rate, Completion Rate and Test Result

School performance in schools' division for the last three years, utilized in the study involved;

1. Enrolment Rate;
2. Drop-out Rate;

3. Cohort-Survival;

4. Completion Rate; and the

5. Test Result.

It reveals that the level of performance of schools in the Division of Antipolo City for the last three years is in Satisfactory Level.

Level of School-Based Management Implementation in Division of Antipolo City Correlated to the School Performance for the last Three Years

As can be understood from the correlation, the null hypothesis of the study has been rejected because there is significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of drop-out, cohort-survival and test results of the pupils.

The study shows enough evidence to accept the null hypothesis in one of the performance indicators wherein there is no significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of enrolment and completion rates.

Level of School-Based Management in Relation to Environmental Roles with respect to Change of Leadership, Attitudes and Participation, Monitoring and Evaluation and Sustainability

From the point of view of the respondents, the level of **School-Based Management** in relation to environmental roles is "strongly implemented". A nearing of fully implementation level was on two variables-- change of leadership and attitudes and participation.

School-Based Management in Division of Antipolo City Correlated to the Environmental Roles

Another correlation is with regards to the level of **School-Based Management** implementation correlated to the environmental roles particularly attitudes and participation which provides positive significance. This means that there is significant relationship between level of **School-Based Management** implementation and the environmental roles in attitudes and participation.

On the contrary, the level of **School-Based Management** implementation correlated to the environmental roles in the three variables (change of leadership, monitoring and evaluation, and sustainability) which provide negative significance. This means that there is no significant relationship between level of **School-Based Management** implementation and the environmental roles such as change of leadership, monitoring and evaluation, and sustainability.

Conclusions

Based on the findings, the following conclusions were drawn:

- The level of **School-Based Management** is "Strongly Implemented" in schools in the Division of Antipolo City.
- Moreover, the level of performance of schools in the Division of Antipolo City for the last three years is in Satisfactory Level.

- There is significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of drop-out, cohort-survival and test results of the pupils.
- There is no significant relationship between the level of **School-Based Management** implementation and the school performance for the last three years in terms of enrolment and completion rates.
- Furthermore, the level of **School-Based Management** in relation to environmental roles is "strongly implemented".
- There is significant relationship between level of **School-Based Management** implementation and the environmental roles in attitudes and participation.
- On the contrary, there is no significant relationship between level of **School-Based Management** implementation and the environmental roles such as change of leadership, monitoring and evaluation, and sustainability.
- Finally, the results of the study prompted the Researcher to propose a Quality Management System Intervention Program to contribute on the improvement of **School-Based Management** implementation, school performance and environmental roles in the Division of Antipolo City.

Recommendations

Based on the findings and the conclusions drawn, the following are hereby recommended:

First, Division Personnel, School Heads, SBM Coordinators should deepen the implementation of **School-Based Management** in the Division of Antipolo City to improve its level of implementation.

Second, Supervisors, School Administrators and Subject Coordinators should conduct meetings, small group discussions or any training modalities that will improve the level of performance of schools in the Division of Antipolo City. It is recommended also to conduct continuous improvement projects on the subjects that are considered as priority for improvement.

Third, the intensification of **School-Based Management** implementation must be done annually to elevate the school performance, particularly on drop-out, cohort-survival and test results of the pupils.

Similarly, Enrolment and Completion Rates should be focused on during the implementation of **School-Based Management** as part of performance indicators in the school.

Fifth, School Administrators, SBM Coordinators and Teachers should build up the conduct of trainings, meetings and any form of communication to stakeholders that will create environmental roles in the implementation **School-Based Management** in school.

Finally, a similar study should be conducted, so as to generalize and validate the results of the study in the division.

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Study on the Best Practices of ICT in Teacher Education Programs

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Abstract

The main objective of this paper is to have a detailed study about the best practices of Information and Communication Technology adopted by the higher education institutions in the Teacher Education. The Teacher Education is considered as one of the noblest education services as it paves way for the creation of the good people in the society. The Teaching profession is one of the noblest professions recognised and respected by the people in the society across the globe. The Teacher is known as a continuous learner as they often adopt the changes and ensure the quality education to the people demanding education in the society. The teachers are now changing their role from the general teaching to the role of a facilitator. The usage of the Information and Communication Technology has changed the way of teaching. It has also made the teacher's extension activities very simple.

Key Words: Best Practices, ICT, Smart Class, Technical Faculty

Introduction

ICT in education, in India has been developed, based on master plans by the Ministry of Information and Communication Technology. The Indian Government is highly focused in the concept of Digital India. Through the Digital India they are trying to bridge the conflicts like corruption in India. The first Master Plan was focused on the establishment of world-class ICT infrastructure in primary and secondary schools. The objective of the second Master Plan was to enhance the quality of education by integrating educational contents and classroom activities with a focus on teacher capacity development. In addition, the National Education Information System (NEIS) was developed for efficient management of all education-related administrative tasks within the framework of e-Government initiatives. The third Master Plan has focused on the creation of sustainable learning environments with ubiquitous learning and future education through different services including the development of digital textbooks. The use of ICT in education in India has been driven by a strong cooperation among three key players: Central Government – Ministry of Education, Ministry of Human Resource Development, Ministry of Information and Communication Technology- the National Institute specialized in ICT in education – India Education and Research Information Service and MHRD have been coordinating the processes from policy planning to implementation. As a government agency, Ministry of ICT has been playing an exclusive role in supporting and planning implementation of the national ICT policy. All states of the Indian Government have been implementing the national ICT policy at the regional levels.

Implementation of ICT Policy in Education:

National Digital Literacy mission was one of the unique initiatives made by the government of India to educate the Indians the Digital Literacy Skills. Many official works are being digitalized and the corruption

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is being curbed. The establishment of ICT infrastructure in schools was aimed to promote education equity by bridging the digital divide. The School Advancement Project, which included the establishment of school LANs, Session 3 Internet-connected multi media labs, provision of PC and information devices for classrooms, and personnel support, was implemented according to the first Master Plan. Since the mid-1990s, national initiatives for supporting ICT integration into the school curriculum have been gathering momentum. The projects ranged from educational content such as supplementary materials and educational software for the development of digital textbooks. Educational content, almost in full, has been provided and shared in EDUNET, and plays an important role in the curriculum integration of ICT. Since the late 1980s the Government of India has provided teacher training for both ICT literacy and integration purposes. The focus of teacher training, however, has changed over the course of the three master plans from computer literacy to curriculum integration. In addition, the Government has built the teacher training framework for ICT in education to meet the specific needs faced by teachers throughout their career. The new teacher roles and adequate ICT competencies should be taken into consideration for the future design of teacher training.

The information service system in education is comprised of three main groups: EDUNET (for teaching and learning), EMIS and NEIS (for administration and CHLS (for home learning). EDUNET was developed to operate and provide multi- media materials, instructional lesson plans and evaluation items according to school level. EMIS focuses mostly on collecting annual statistical data from educational institutions while NEIS manages and integrates personnel, financial, and school affairs within or between institutions, regional offices and the Ministry of Education. Swayam is an online platform which provides individual learning materials and online tutorial support, in order to bridge the education divide for after school private tutoring. These services are aimed to provide an effective environment, improve productivity and efficiency, and harness ICT in education, nation-wide for teaching and learning and administrative purposes. As e-Learning technologies become increasingly utilized for educational courses, issues related to standardization for reusability and inter-operability, assurance of quality, and prevention of adverse effects become crucial.

Therefore, national standards for e-Learning were developed, a prime example is the enactment of the India Educational Metadata (IEM). Furthermore, in 2008, it was proposed to the Joint Technical Committee (JTC) 001/SC36 of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) to integrate South national standards for e-Learning in international standards. To enable quality control of e-Learning, the E-Learning Quality Assurance System (EQAS) was established using such criteria as content, services and platform. To promote and ensure a safe and sound cyberspace in the educational area, MHRD set up the Education Cyber Security Center (ECSC) and implemented various e-safety and e-ethics campaigns, as well as additional training programmes.

Innovative Technologies and Resources in Education

Key Trends and Prospects for Partnership Monitoring and Evaluation Systems are vital for the diagnostics of the current status of the initiatives, evaluation of the outcomes and planning of the measures for further improvement. The overall scheme of monitoring and evaluation of ICT policy in education consists of measuring ICT in education for schools, ICT literacy tests for students, as well as an external evaluation of major national ICT projects. Beyond domestic implementation, the government has expanded its cooperation with the global community to reduce the digital divide through ICT in education. Experts from more than 80+ countries visit the Government of India every year to benchmark best practices in this sphere. The number of

requests for consulting projects for ICT in education through UGC and AICTE Grants and also through the companies' CSR funds, have increased considerably. The achievements of e-Learning and ICT in education policy are recognized, as a result of a solid legal framework, systematic implementation mechanisms, secured budget and support, timely capacity building, successful cooperation between public and private sectors, and an effective monitoring and evaluation system.

First, existing ICT infrastructure is getting old, its maintenance and renewal is very important. Technical personnel are needed at the individual school level in order to address this issue properly.

Second, teacher capacity building has always been considered to be an important factor for ICT in education. The new paradigm of education needs new ways of teaching and learning. However, as new media is created, teachers tend to be overwhelmed by the new technology. Because new media continuously emerges to support the new paradigm of education in the future, teachers need open, flexible, and creative mindsets for new ICT technologies. Accordingly, future directions for teacher training and development should include comprehensive topics, not limited to ICT technology, to develop innovative ways of teaching with ICT for future students and future education. Finally, teacher training for ICT in education should facilitate teachers' pedagogical mind and performance in innovative ways.

Third, though curriculum integration of ICT is not easy because it requires more than the quantitative use of ICT, it rather ensures quality use of ICT for meaningful education. Large amounts of digital educational content have led many teachers to use ICT for their teaching. Moreover, the recent development of digital textbooks has provided a great opportunity for curriculum integration of ICT because these are textbooks and much more than that. However, if digital textbooks are successfully integrated into regular curriculum and add value to traditional printed textbooks, school curriculum should be well understood by policy makers and developers. Also, promoting strategies and events for school principals and teachers should be considered. Still many teachers are not familiar with digital textbooks.

Fourth, information service initiatives can be provided in three ways. A separate venture has also been setup in the name of ICT Academy to skill and bridge the gap and to educate the ICT among the new users of the nation.

It is important to establish collecting, creating and sharing processes and an organizational structure for quality educational resources for teaching and learning. EDUNET has evolved from an educational portal to the national teaching and learning centre, which coordinates and facilitates the efficient collaboration between the Central Government and Regional Government. Services were developed to support after- school learning opportunity, specially focused to bridge the socio-economic divide among student backgrounds. Innovation of the national governance through the initiatives of e-Government can be formulated by participation of various stakeholders and beneficiaries. In accordance with the implementation of the information service system, it is essential to develop national standards for educational resources and an adequate quality assurance system. Since each country has its own context, the specification of standardization processes and quality assurance categories and guidelines can vary. As the monitoring and evaluation of national projects become increasingly important, the government should continuously enhance the efficient and effective monitoring and evaluate system to diagnose the current status, check the outcomes and improve ongoing initiatives. Lastly, national policy intervention should focus on reducing and diminishing disparities

among gender, region, and economic status to improve and achieve sustainable equity in the education sector through mobilization of public resources and establishment of public private partnerships. Though accessibility is one of the key issues in policy, especially for developing countries, the development of the social and cultural environment and soft – skill human resources such as digital literacy should also be considered.

Stages of Our Research Journey – So Far

The main purpose of this paper is to present and explain stages of our long journey of adopting different research strategies – from traditional quantitative research design, through qualitative strategies up to quite a new and promising methodology, not yet well established. It also proves that in our area many situations, standards and well-established methodologies do not help. The reason is that often we as researchers cannot enter a certain reality, observe certain pedagogical intervention there and examine it in a traditional way. We will characterize – in a bit simplified and shortened manner – seven research stages we have passed through during the previous ten years

It is an interdisciplinary approach, in which researchers and practitioners (teachers) try to build pertinent theories of learning through designing, developing, studying and refining interventions for learning in real settings. This research methodology is attractive to us because:

- It is empirical research – that is, we may apply correct scientific methods to get answers to questions which arise from observing the real world around us;
- It is educational research – its goal is to expand our understanding of the learning processes;
- It is research mediated by development – that is, we are applying a methodology, when the researcher actively enters the learning process, tries to better understand it and in parallel support and enhance it through developing his/her interventions.

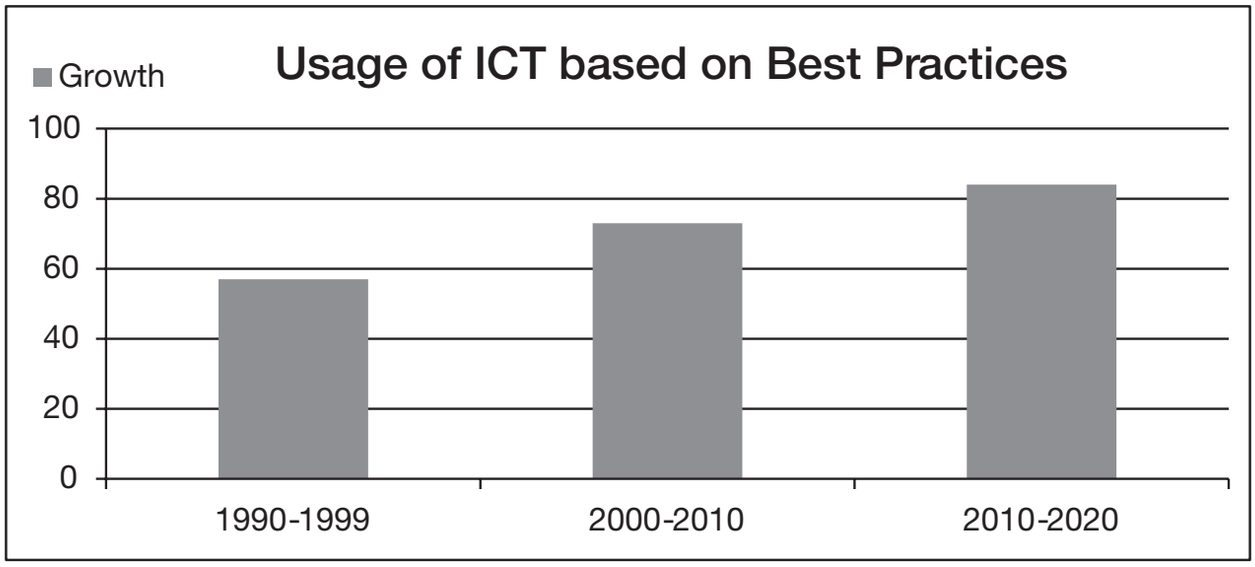

Fig: Usage Growth of ICT based on Best Practices Adopted

Conclusion

The aim of this paper has been to argue that if we want to (**a**) responsibly solve the problems, which extensively arise in the area of the Technology Enhanced Learning; (**b**) efficiently exploit the potential of new digital technologies, and also (**c**) minimize all possible dangers and various safety concerns-- we have to systematically engage high quality educational research. We need to learn how to apply well-established strategies; but in parallel with it we also have to discover, extend and develop other approaches – less established strategies, which are specifically well-suited for the questions typical in our field of interest. We have presented one such strategy, which had emerged already before ICT era, but has spread only recently. This approach offers us an educational design suitable for competent development of interventions for modern education. We should remember that ICT is not the goal for our educational research. What really interests us is the potential of new technologies for supporting modern education, for building new culture in schools. To discover and exploit it we necessarily need strategies, which will help us to find proper and valid answers to our emerging questions. And that is why we need quality educational research. In order to secure sustainable development of e-Learning and innovation in education, it is necessary to continuously pay attention to investment on ICT in education in all the areas.

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Article 4

Innovative Ways of Teaching Periodic Table at Secondary Stage

Dr. Ravijot Sandhu

Abstract

Periodic Table (Chemistry) of the elements has found its place in the syllabus of science at secondary stage in India. It has been observed across the years that students find Periodic Table and the other concepts related to it difficult to understand. Review of literature also shows that Periodic Table is considered difficult by students across the globe. Students consider this topic dry and abstract. Therefore, it becomes challenging for teachers and teacher educators to transact this abstract topic to students in an interesting way. This research paper focuses on the innovative ways of teaching-learning of Periodic Table which has resulted in enhancing learning curve and interest quotient among students.

Key Words: Innovative ways, Modern Periodic Table, Secondary Stage, Visually Impaired Students.

Introduction

In Chemistry, the Periodic Table of elements has been introduced at the secondary level of school education and is considered the the most fundamental topic. It is one of the most important tools through which various concepts of chemistry can easily be understood by learners, such as, idea of electronic configuration, atomic size, chemical bonding, metallic and non-metallic nature of elements, electronegativity etc. It provides information about elements and how these elements are related to one another. The Periodic Table can be used to predict the properties of even those elements, which are yet to be discovered. Therefore, it becomes imperative for students to understand Periodic Table meticulously, so that they can discuss the properties of an element just by looking at it.

The research studies have shown that teachers find various topics given at secondary level difficult to teach (Mokiwa 2007; Mehrotra & Koul 2012). Researches have also shown that many teachers find Periodic Table difficult to transact. Roddy, Knight Phares,2003; Matthias Bierenstiel, Kathy Snow, (2019) have also reported that 'Periodicity is an abstract concept', 'Periodic patterns are complex' and students do not have sufficient prior knowledge of the elements and their properties.

While teaching students of Grade X for the last 27 years, Researcher has observed that students face difficulty in learning the modern Periodic Table. Teachers also consider this topic difficult to transact to make students understand the grouping together of 118 elements (author's personal experience). In the beginning of Researcher's career, she used to transact this topic using large size coloured wall-chart of Periodic Table in the classroom. This was probably because she was trained in her pre-service professional training to teach this topic in this manner only. Over the years, Researcher realised that students feel this topic as a burden and stressful.

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While taking feedback from students about this topic, this was their response:

Students: *We are not finding this concept at all interesting. Some students said that they remember symbols and atomic number of elements of the Periodic Table by heart, but forget everything during exams.*

The Researcher also enquired about the experiences of her fellow colleagues about this topic. Following were the responses:

Teacher 1: *Yes! Students are not able to remember about the elements. Ohhh …I simply tell them to keep on repeating about the elements several times aloud. In this way only they are able to remember the elements.*

Teacher 2: *It was difficult for students even to remember the atomic numbers of the elements, as a result they would make mistakes while writing electronic configuration of elements.*

Teacher 3: *I have to struggle to make students visualise the abstract concept that atomic size of elements increases as we go down the group in a Periodic Table.*

Similarly, many more teachers showed equal discomfort in teaching this topic.

Researcher also tried to make this topic interesting using ICT, showing students online lessons and videos to strengthen this topic. It helped Researcher a bit but due to lack of internet facility, it was and is a big challenge for some students in a developing country like India. Sometimes internet facility is available, but speed of network becomes an issue.

Literature shows that very limited research studies have been done on teaching-learning strategies of Periodic Table. Considering this as a universal problem across the globe; Researcher developed, and also used various innovative teaching-learning strategies to make this topic interesting. The Researcher focused on the following research questions:

Do innovative ways of teaching Periodic Table enhance learning and to what extent than traditional ways?

Do innovative ways of teaching-learning of Periodic Table generate interest among learners of secondary stage?

Methodology and Design of the Study

Sampling and Tools

The study was conducted in the Government Schools of Delhi, India with Grade X students. Around 118 students participated in this study. The Researcher taught the Periodic Table to students through traditional methods using coloured wall mounted 2 D Periodic Table, textbooks, chalk and talk method etc. To access the conceptual understanding of students regarding the topic, the Researcher gave them a Pre-test in the form of questions and told them not to disclose their names on the Pre-test so that they could answer the questions freely and honestly. The focus was on the learning and not on the measurement of learning. Since the study was aimed at seeking answers to specific questions, the Researcher used the purposive (non- probability) technique of sampling.

Pre-test

Five questions were given in the Pre-test. In each question, students were asked to answer the question with reason(s). The responses of students are shown in Table-1. The Researcher has reported the original responses of the students without making any modifications. Similar responses given by the students are grouped together.

Table 1 Students Responses to Questions in the Pre-Test

SL NO.	QUESTIONS	RESPONSES	REASONS GIVEN
1	Which of the given elements A, B, C, D, E with atomic number 2, 3, 7, 10, 30 respectively belong to the same period?	• 2,3,7 by 56 students • 10,30 by 15 students • 3,7,10 by 10 students • 3,7,10 by 28 students but with wrong reason • 9 did not respond	• Don't know reason , have memorized • Lower atomic numbers belong to same period • Higher atomic numbers belong to same period
2	Write the symbols of Sodium, Aluminium, Phosphorus and Chlorine.	• Na, Al, P by 91 students • NA, AL, P by 4 students • S, A. P, C by 14 students • 9 students did not respond	• Letter in the beginning of word is the symbol • Each element has unique symbol • Symbols are taken from the names of elements in Latin, German or Greek.
3	Which one amongst the elements H, Na, K has bigger atomic size?	• H by 8 students • Same size by 60 students • K by 41 students • 9 did not respond	• These elements belong to same group, so size is same • H has special place as it has bigger size. • K is at the bottom, the size is big
4	Which is the outermost shell for elements of period 3?	• V shell by 51 students • M shell by 46 students with wrong reason. • N shell by 12 students • 9 did not respond	• Valence shell is the outermost shell named as V. • 3 shells are there in period 3. • K, L or M any letter can represent any shell.
5	Where would you locate the element with electronic configuration 2, 8 in the modern Periodic Table?	• 2nd Group by 71 students • 8th Group by 15 students • 18th Group by 23 students • 9 did not respond	• Elements with two shells will be placed in 2nd Group. • Element with electronic configuration 2, 8 has octet configuration so must be an inter gas which is placed in Group 18. • It has 8 valence electrons so belongs to 8th Group.

Analysis of Responses and Discussion

All the five questions were answered by students, only 9 students did not respond to any of the questions given in the Pre-test.

Question 1 was answered correctly by 38 students out of which 28 gave wrong reason. Some also admitted that they have simply memorised the concept.

Question 2 was answered correctly by 91 students and most of them had given correct reason, whereas 18 answered it incorrectly. This was made clear to them that the first letter of a symbol is always capital (Upper case) and the second letter as a small letter (lower case). Also, symbols of some elements are formed from the first letter of the name and a letter appearing later in the name, so Chlorine is Cl. Other symbols have been taken from the names of elements in Latin, German or Greek, so Sodium is Na from Natrium and Potassium is K from Kalium.

Question 3 was answered correctly by only 41 students. The Researcher observed the concept of increase in number of shells with increase in atomic number on going down the group needed to be strengthened using some innovative ways.

Question 4 was correctly answered by 46 students but none of them gave correct reason that 3rd period has 3 shells K, L, M, therefore, M is the outermost shell. The reasons given were quite vague. They could not comprehend that innermost shell is K and so outermost will be M. 51 students answered incorrectly, however they know that the valence shell is the outermost shell but named it incorrectly as V after valence shell.

Question 5 was answered correctly by only 23 students with correct reasoning that elements with electronic configuration 2, 8 has octet configuration, so must be an inert gas which is placed in Group 18. 2nd Group was answered by 71 students which was incorrect and Researcher observed that there was a lot of misconception as they had cited wrong reason that elements with two shells will be placed in 2nd Group.15 students gave incorrect answer citing wrong reason that it was placed in 8th group as it had 8 valence electrons.

Interventions

As was evident from the Pre-test responses that there were many reasons for students facing difficulty in learning periodicity. Also, a conversation between two students (given in box) forced the Researcher to give some innovative interventions.

Jatanbhola is a visually impaired child - Madam, how to learn this huge table and how are elements arranged here?

Arun is a sighted student–Jatanbhola, you leave this topic… It's not for you to understand. This conversation between two students forced me to think of a way where my visually challenged students could also understand Periodic Table easily.

The Researcher took it as a challenge and during intervention following innovative methods were used:

(i.) Relating roll numbers to atomic numbers

(ii.) Formation of human Periodic Table in playground

(iii.) Designing and creating 3 D Model of Periodic Table

And the journey began…

(1) Relating Roll Number with Atomic Number and Name of the Element

First challenge was to find an easy way to recall the elements and their atomic numbers correctly.

In classroom usually students are allotted roll numbers. So, each roll number was allotted the name of the element. For example, Roll Number1 of the class was called Hydrogen, Roll Number 2 of the class was called Helium…….. Roll Number 11 of the class became Sodium and so on…… This innovative way of relating roll numbers to the atomic numbers of the elements was something students easily adopted.

ROLL NUMBER = ATOMIC NO = NAME OF THE ELEMENT

This innovative way worked and within a month entire class became well versed with atomic numbers and names of elements till atomic number 40. the Most of times students used to address each other with the names of the elements. The new names given to the students almost became their 'Nick' names. Let us have a peep into the classroom during Roll Call-

Conversation during Class Attendance

Teacher: Class monitor, please tell me who all are absent today?

Class Monitor -Madam, today Oxygen, Sodium and Zinc are absent.

Teacher - Marked roll numbers 8, 11 and 30 absent in the attendance register.

This innovative method showed that students were taking interest unconsciously remembering the names of Transition Elements, even though these elements are not part of the syllabus at secondary level. Students were also motivated to design and develop 'Element I-Card' with all the related information of the element written on it along the symbol of the element. They were encouraged to wear 'Element I-Card' during science class. This innovative method helped the Researcher because unconsciously students were gathering information about elements and they were interested in knowing more; how the particular element was discovered and its importance in daily life.

(ii) Creating of Human Periodic Table on Ground

During teaching-learning process sometimes students were motivated to assemble in playground or any open space and encouraged to arrange in the form of a Periodic Table (Figure 1). Researcher observed that engagement of students in small groups (Groups 1,2,13.14.15.16.17.18) and then joining together to form a network of larger group not only helped them in understanding the Periodic Table but also inculcated values of cooperation, extending help to each other and communication skills. It was also observed that some students were hesitant in participating in such activities and were also unable to locate their position. The

Figure 1

Researcher assisted them by discussing their atomic numbers and their electronic configurations, number of shells the element has, in detail. The students were also encouraged to ask questions. Some students exchanged their 'Element I Card' and their positions to stand according to their height. On asking -why have they exchanged their positions? The answer surprised the Researcher. They said that the taller students meant larger atomic size and the one in front (shorter in height) represented element with smaller atomic size (Figure 2). This deliberate attempt showed that students were enjoying and showing interest in understanding the concepts given in Periodic Table.

Figure 2

Another innovative way turned into a game, where the Researcher would call out the Group Number and students of that group would march out or when Researcher would say Period 3 Group 2; Magnesium would run up to the Researcher to get a score on the Score Board. Sometimes students themselves coined new ideas; they had fun when a boy and girl ran together up to the Researcher to form NaCl !

This became a very interesting, well tried and tested way of transacting atomic numbers, names of elements, groups and periods while teaching 'Periodic Classification of Elements' to Class X students. The research study has also shown that the students' perception of the games became more favorable than for other class tasks used in the control group for teaching the Periodic Table of Elements at the High School Level (Antonio Joaquín Franco- Mariscal et.al2015)

(iii) Designing and developing 3-D Model of Periodic Table

Researcher planned to design and develop 3-D model by involving students, with a conscious attempt to use locally available eco-friendly material such as clay/ soil, broom sticks/twigs.

The class was divided into 6-7 groups. Each group was motivated to first prepare 18 'Group Sticks'. This way students learnt Modern Periodic Table in parts. On day one, students made small beads/balls of clay/ mud and coloured them. In each bead/ ball of clay atomic mass, atomic number and symbol of element was written. Care was taken to make same- coloured beads/ rounds belonging to one Group/Family. Students' experiences, previous knowledge, active participation, involvement and accommodating others point of view in developing and colouring the beads ensued learning from each other.

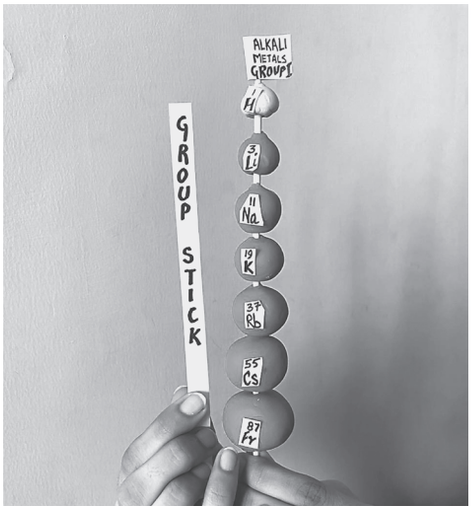

Figure 3

For example - Group 1 stick had H, Li, Na, K, Rb, Cs, Fr and care was taken to keep the size of the clay ball of Sodium smaller than Potassium than Rubidium and so on (Figure 3). Making one 'Group Stick' at a time helped them to digest the information more quickly. The Periodic Table was thus colour coded according to the types of elements. Students thus formed 18 sticks with balls of clay representing the elements belonging

to that group. Different Group Sticks were placed vertically on used cardboard boxes. Thus, slowly six to seven 3-D Periodic Tables were ready. The main attraction was that these Group Sticks were detachable and easy to refer during teaching-learning process. The students were excited to remove chlorine (in this case ball of clay/bead) and compare its size with Fluorine and then again fix it back on its appropriate position. This way they could easily visualise the increase in size of the elements on going down the group. This type of model was particularly useful for visually impaired students who were able to feel all the elements of the Group and compare its varying sizes down the group.

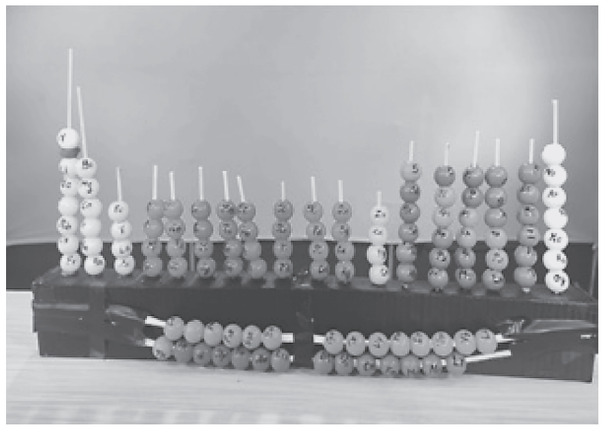

Figure 4

In two strings, element beads of Lanthanides and Actinides series were also made to complete the Modern Period Table (Figure 4).

As an assessment, extra clay balls/ beads were kept aside made by one of the teams and students were encouraged to string 1st, 2nd and 3rd Period on sticks placed horizontally. The atomic radius decreases in moving from left to right along a period. This is due to an increase in the nuclear charge which tends to pull the electrons closer to the nucleus and reduces the size of the atom(NCERT 2007). For example-on a horizontal stick in 3rd Period we have atoms Na, Mg, Al, Si, P, S, Cl, Ar (Figure 5). Thus, care was taken to keep the clay ball size of Chlorine smaller than Sodium.

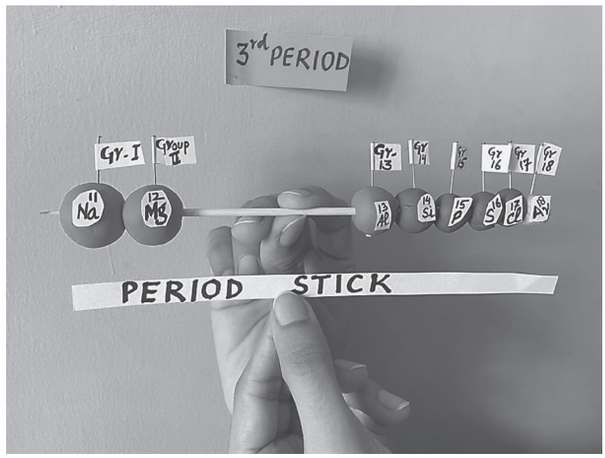

Figure 5

The Researcher was assessing the students in a constructive and positive manner, thereby preserving the confidence and self-image of the students. Since diversity is a part of what we call 'normal', so the approach was as per the students' capabilities, interests, motivations and experiences that are unique and individual (NCERT 2013). During this part of the study, the researcher also facilitated discussion with the students, responded to their queries, appreciated their ideas and thinking in developing a better understanding. Various research studies have also shown that how activity-based teaching and learning leads to improved learning outcomes by students. (Khan, Muhammad Ahmed, Et.al 2012, Koul 2014). Children with average to low verbal ability and with little previous knowledge learn more through project-based learning. (Mergendoller.J &Markham.T(2006); Mioduser.D & Betzer. Nadav (2008); Koul & Wazalwar, 2014).

After intervention, a Post-test was given to the students to ascertain whether there was any improvement in their understanding and competency on the topic 'Modern Periodic Table.'

Post-test

Five questions were given in the Post-test to the students and were asked to answer with reasoning. The responses of the students are provided in the Table-2. The Researcher has reported the original responses of the students without making any modifications.

Table 2 **Students' responses to questions in the Post-test**

SL. NO.	QUESTIONS	RESPONSES	REASONS GIVEN
1	Which of the given elements A, B, C, D and E with atomic number 10,11,15,18 and 30 respectively belong to the same period?	• 11,15,18 by 113 students • 10,11,15,18 by 5 students	• Third period of Modern Periodic Table contains elements with 11,15 and 18 atomic numbers. • 10 to 18 are in same period.
2	Where would you locate the element with electronic configuration 2,8,8 in the modern Periodic Table?	• 18th Group by 116 students • 8 th Group by 3 students	• Element with electronic configuration 2, 8, 8 has octet configuration so must be an inert gas which is placed in Group 18. • It has 8 valence electrons so belongs to 8th Group.
3	Which one amongst the elements Na, Mg, K, Ca has the largest atomic radii?	• K by 118 students.	• Top to bottom in a group atomic radius increases, whereas in a period from left to right it decreases. So, K will be largest in size.
4	Which amongst the elements Na, F, Mg and Al does not lose an electron easily?	• F by 107 students • Na by 11 students	• Metals can easily lose electrons and form electropositive ions whereas Non-metals gain electrons. F is a non-metal. • Na, Al Mg are metals and can lose electrons easily.
5	Which one amongst the elements -Na, Al, Si, P exhibit maximum number of valence electrons?	• P by 108 students • Al by 5 students • P by 5 students with wrong reason	• On moving from left to right in a period, number of valence electrons also increases. • P is on right hand side so has more valence electrons.

Analysis of Responses and Discussion

All five questions were answered by all the students. Question 1 was answered correctly by 113 students, 5 students were still confused. Since the students were working in groups, they helped each other in understanding this concept. The 'Period Sticks' of 2nd and 3rd periods (placed horizontally) were once again shown, and students were encouraged to take out all the element beads and rearrange them accordingly.

Question 2 was answered correctly by 116 students. Only 3 students answered incorrectly. The students were told to relate position in Groups to the valence electrons and electronic configuration of the elements. The students who understood better were motivated to explain to their peers. This helped the Researcher to a certain extent.

Question 3 was answered correctly by all the students. Na and Mg belong to the same period whereas Na and K are in the same group. Top to bottom in a group atomic radius increases, whereas in a period from left to right it decreases. So, K is largest in size. They said that they had made the clay balls of increasing size and put them in 'Group Stick' in order of increasing order. On asking, they said that it was easy to remember that on top we kept smaller balls and on the lower end of the vertical stick we had kept the bigger balls. They further said that on 'Horizontal Period Stick' left hand side had bigger balls and on moving towards right hand side, the size decreased. This they supported with correct reasoning.

Question 4 was answered correctly by 107 students with correct reasons. This question was thought provoking and it was encouraging to note that they had correctly argued that metals lose electrons and form electropositive ions. During discussion they had chosen Fluorine as the correct answer. This was supported by the reasoning that non-metals gain electrons and Fluorine was the only non-metal amongst them. On probing further, they pointed out to the structure of Sodium and said that amongst Na, Mg and Al; Sodium will lose electron most easily. This proved that students had understood the concept well. It is also important to know that sometimes students learn better by making errors and mistakes as it is an integral part of the learning process. Participation of all the learners in various aspects of teaching-learning should be ensured (NCERT 2013). 11 students who could not answer correctly, were constantly listening to their friends and through collaborative learning, gap was filled.

Question 5 was correctly answered by 113 students with correct reason; that on going from left to right hand side, number of valence electrons also increases. On probing they registered that as the group number increases, number of valence electrons also increases. Five students were still confused and could not relate the increase in group number to increase in the valence electrons.

Findings

On analysing the Pre-test (Table-1) and the post- test (Table- 2) responses, it was found that teaching Modern Periodic Table through innovative ways had a positive impact on students. Not only learning through innovative ways helped students to learn better but they were also given freedom to explore, inquire and discuss amongst themselves. All 118 students responded to all the questions in the Post-test. On comparing Pre-test and Post-test responses, it showed that there was improvement in both the conceptual understanding and generating interest amongst students. It is a myth that teaching a topic through activities takes longer time to finish the prescribed syllabus. As a Researcher, it was observed that if we use innovative methods, it becomes easier to transact any concept and students also understand concept without stress. Another interesting finding was that Group Learning brought improvement in self-reliability, independence in dealing with others, ability to make decisions, become considerate and helpful towards others. In the group, students jointly negotiated their understanding, planned tasks, explained things to each other, shared ideas and coordinated actions.

The following are the responses of students working in groups (in local language; translated by Researcher). These are presented here without any modification:

(i) "I love to play with clay and soil/ dough. It is so much fun. But my mother scolds me if I make the place dirty. Now I will tell her I am making balls or beads to represent elements or electrons".

(ii) "Colouring the clay balls was so much fun. I thought science was all about theory, notebooks and textbooks. It seemed as if I was in Art Class".

(iii) "Once the topic was complete in the class and we were asked to write our learning and experiences in our portfolio, we were bound to revisit concepts of that topic. While putting our thoughts in portfolio we thoroughly understood the concepts given in that topic while recalling".

(iv) "While preparing the 3-D model of Periodic Table, we felt so confident making our own Periodic Table".

(v) "My roll number is 8 and friends call me Oxygen. All living beings depend on me".

(vi) "Making Human Chain to form Groups is so easy to remember who all are there in my family".

Conclusion

It was observed by the Researcher that when Modern Periodic Table was taught through traditional method, students neither showed high level of interest nor scored high. Responses of the Post-test showed that while teaching Modern Periodic Table through innovative methods, students were enthusiastic to learn and showed keen interest in the preparation of 3-D Model and shared different views of preparing more such models and science games. This was possible only when a culture of excitement, curiosity, open thinking and exploration was created.

It was observed that the students who participated in this study attempted all the questions related to the Modern Periodic Table and gave correct responses in the term end exam as well, which established that there was retention of the concepts taught through innovative ways.

An important implication of the study is that teaching-learning of Modern Periodic Table by innovative methods resulted in high level of achievement in terms of scores and deep understanding of concepts. There are evidence, suggesting that the classroom participation increases, so there should be inherent flexibility in the learning approaches to provide ample scope to address learning needs of a diverse group of learners in a science class. An important implication of the study is that curriculum planners can take a hint from the curious questions/ responses of the learners and design innovative models/games on the science topics.

In an increasingly complex and changing pedagogical context, it is vital for teachers to move away from traditional way of teaching and embrace pedagogical shift in science education by providing more opportunities to students for scientific exploration and making it inclusive and meaningful. Every topic demands different treatment so teacher should use a variety of approaches and strategies that ensure active

participation of learners, collaboration among learners and recognition of their knowledge and previous personal experiences.

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Our Lives in Pandemic: Online Teaching – Learning

Manisha Wadhwa nee Dabas

Abstract

"As the pandemic continues, we all are stuck in our homes and trying to adjust to this new situation. For me a huge change has been learning online. I know studying is important but there should be more to online learning than just staring at a screen and listening to lectures for hours at a time. We all are trying our best to adjust but I am not a big fan of watching teachers present PPT's. It is difficult to communicate online, I understand that, but even then, we are trying to optimise our learning. Luckily, unlike most of my classmates, I am able to understand all the topics we are learning in class".

It is a student's reaction to online classes, conducted by her school. How do children perceive online learning? The paper tries to analyse how this pandemic has changed lives of children for better or worse. This paper provides a brief overview of online education in India during this pandemic of COVID 19. It also focuses on the lives of children in Class VI of a specific school where online education is said to be 'successful'.

Key Words: Online Learning, Screen Time, Elementary School Children, Daily Routines in Pandemic

Introduction

December 31, 2019, China declared a strange viral phenomenon COVID 19 in its Wuhan district. This viral infection continues to transmit from person to person and within two months it reached several countries of the world. On March 11, 2020 the World Health Organisation declared COVID 19 as a pandemic and India declared a nationwide lockdown for 21 days on March 24, 2020. At that time, nobody had imagined that how this would impact every one, every country, and the entire world. Today, after 9 months, it has affected all countries of the world, not a single part of any region is unaffected. When the lockdown was implemented, almost everyone thought that we would be able to break the chain of infection within three weeks and situations would be back to normal. Everything had been closed – including markets, schools, offices, trains, airlines. But lockdown continued – lockdown 1 followed by 2 then 3 and so on. During this time education came to a halt. Incidentally, schools and other educational institutions in India had summer break from the period of May – July. Many people thought that situation would be normal within the summer break and many others were prepared for the crisis.

The onset of Covid 19 continued. Educational institutes prepared their teachers for alternate mode of teaching-learning. Face to face teaching shifted to online teaching. This transition was neither easy for teachers nor for children and their parents. As per the statistics of an agency Kantar (reported in India Times, May 9, 2020) only 38% of children below the age of 15 years had access to internet. Thus, now there also existed a 'digital divide' in our society. There was no question of online teaching for children without internet access

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or a digital device. The underprivileged were the hardest hit or most affected during this pandemic times. The Ministry of Human Resource and Development (MHRD, 2020) released Pragyata: Guidelines for Digital Education, in which it was suggested that television &/ or FM radio would be used for broadcasting videos and audios for children who did not have access to internet or a device. An effort was being made by the State Governments to reach out to all children enrolled in schools.

The small private schools, (also labelled as budget schools) which run on fees paid by students, were on the midst of a 'Covid-enforced shutdown' as these were not able to pay salaries of teachers, rent of the school space and cost of shifting to an online infrastructure. These schools and students enrolled in these were in a bad state. High courts of many states including that of Haryana and Delhi had directed schools to take only tuition fees from children. Children, in these schools ,come from working class or middle-class families and are not able to pay school fees due to their deteriorating financial situation.

There are few private schools, which were able to foresee the situation and learn from international experience, and started working on ways of online education since March. They trained their teachers in these new ways of teaching. These schools engaged IT professionals and developed a Learning Management System (LMS) of their school. Learning Management System, also called Moodle, is a kind of a dashboard where students and teachers have access to teaching – learning resources, teachers can put up assignments or educational games, students can upload homework/ any task assigned to them. Students can leave messages for teachers and peers too. If many people are online at the same time, then they can chat with one another. Teachers can read students' submission on the Moodle and give feedback to students. Students view their feedback and if there is a need, they may edit submission too. Everything is done online. In this paper an attempt has been made to find out how online education is affecting students and teachers in these schools.

Case Study

This school, located in the North Delhi, invested in un-learning and re-learning by teachers. Teachers un-learned the conventional ways of teaching and re-learned how to plan differently for a video mode of classes. Teachers are used to teaching with an eye contact with learners for ascertaining who is learning/ paying attention. This new style does not allow teachers to find out who is following the lesson and who is not. Most teachers and students face band- width issues of internet, so cameras are off for most of the times. Otherwise also, students visible in small boxes on screen, it is difficult to pay attention to individuals as in face to face classes.

The daily online schedule of the school is as follows:

Morning:

7:30 am to 8: 15 am: Fitness Sessions – Sports, Yoga, Aerobics (On alternate days)

9:00 am onwards - 4 subject classes with 10 to 15 minutes break in between two classes

Evening:

One Fine Arts class (music/ dance/ drawing/ theatre) (on alternate days)

The class size for teaching periods is 35 students with one teacher. It is heartening to see the kind of interest, time and energy is put in by each teacher for his/her daily planning. Teachers use power point presentations,

video or any other tool for keeping students engaged and motivated during the class. Teachers use technological tools like Pear deck, white board, mentimeter, kahoot, quizziz, crossword, hotpotatoes and many other devices. When students login to Pear deck or White board in class, then teacher is able to see every student's work, as if she is checking their notebook. It is important to note here that teachers participated in online workshops for learning and using these tools in classrooms. Many service providers like 'Zoom' or 'teamie' also give an option of distributing students in break up rooms where students participate in small group discussions. Teachers move in from one break up to another for giving feedback to students. Assessments are also planned through google forms with different formats of questions like - multiple choice type, fill in the blanks, true / false, short answer types or long answer type using open book test type of formats. In this case, everything is happening online from physical activities to studies and other co-curricular activities. Classes are not limited to teaching but there are small group interactions, presentations by students, assessment and feedback.

A google form for students has been created with 11Questions related to their lives in pandemic, addressing the issues of daily routine, diet, physical exercises and screen time. The language of questions has been kept easy. Questions were simple and linked to their routine. The following are questions asked from Class VI children:

1. What are you liking the most in this lock down?
2. What time do you get up in the morning?
3. For how many hours do you sleep?
4. What do you generally eat for breakfast? At what time you have your breakfast?
5. What do you eat for lunch? At what time you have your lunch?
6. What do you eat for dinner? At what time you have your dinner?
7. Which of the following do you have during the day?

   Fruits / Biscuits/ chocolates/ chips or wafers/ fizzy drinks/ packed juices/ home-made snacks/ dry fruits/ any other
8. Do you do any kind of physical exercise? If yes, specify which one and for how long.
9. Other than online classes, activities and homework, in which of the following tasks do you keep yourself occupied the most?
   - Movies and Cartoons on Television
   - Video Games
   - Exploring different tools for creating posters/ GIFs/ Cartoons/ coding
   - YouTube videos on phones and tablets
   - Reading online story books
   - Engaging with educational software like Mind Spark, Byju's
   - Net surfing
   - Chatting or video calling with family and friends
   - Any other
10. How much time do you spend on screen in a day?

Data Collection

The data was collected online through the use of google forms in the month of August 2020. The questionnaire was created on google form and its link was shared with students of Class VI through Whatsapp groups and/ or email. 58 students studying in different sections of Class VI responded. This represents sample of the research. Students clicked the link, filled the necessary information and responded to the questions. Wherever, there was a need, students were contacted telephonically for further clarification. The information has been collected and analysed.

Data Analysis

The data was analysed question wise.

What are you liking the most in this lock down?

Most children (76%) responded that they are liking the time spent with family. A few students replied that when they were going to schools and parents to their office, then life was too busy and hectic for everyone. They hardly got to spend time with each other. Now they watch television together even do household chores and help their parents. 7% of students said that they are liking as there is no travel to school. Some of these children spent an hour on an average everyday for travelling to school. A few (10%) are also trying and enjoying new hobbies like Cooking/ Baking/ Dancing. A few students replied that they love playing with their friends, siblings and pets. As data was collected after 5 months since lockdown was announced due to pandemic, many students responded that they are missing actual school, meeting their friends and talking to one another.

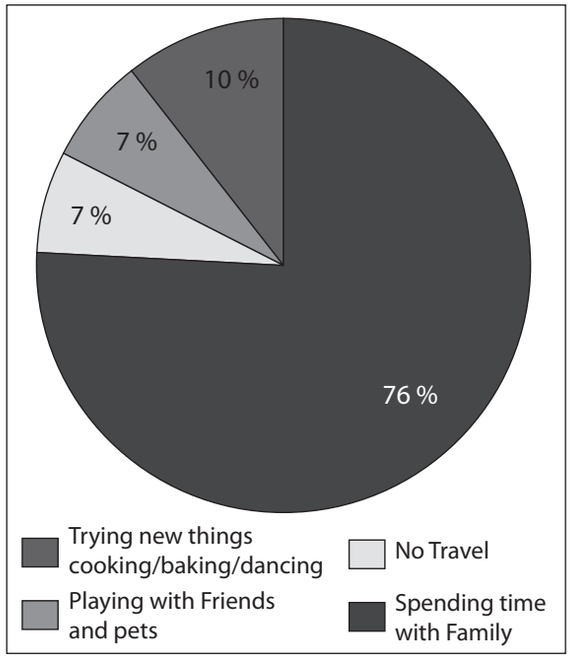

Figure 1. Likings during Lockdown

Sleep Pattern

For understanding how children's daily routine has changed, a few questions were asked about their time of getting up in morning; duration of sleep. As the online school starts at 9:00, only 10% of children are waking up before 7 am. Otherwise when they were going to school, they used to leave home for school buses or cabs by 7am. A close to 40% are getting up after 8 am. They must be attending their first class in a sleepy mode. However, most of them are sleeping for eight hours in a day. But their routines have turned topsy turvy. They are going to bed late and getting up late too.

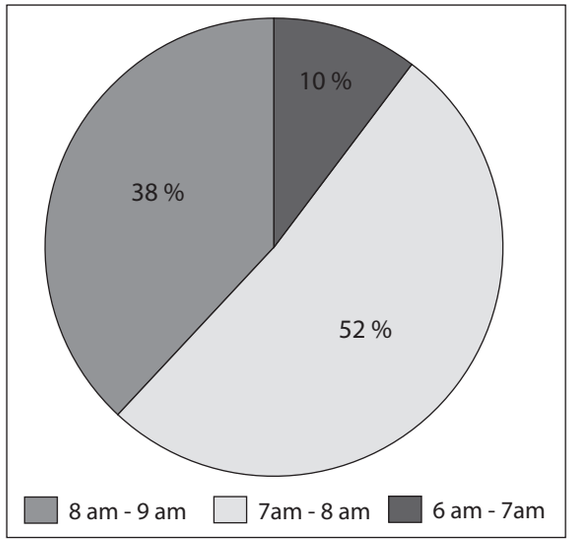

Figure 2:Sleep pattern

Food Pattern

Children were asked questions about what do they eat during the day for different meals. Most of the children were having breakfast at 10 am. The most popular breakfast was found to be oats, cereals, porridge, cornflakes.

Category 1: Milk/ banana

Category 2: Oats/ Porridge/ Cereal/ Cornflakes

Category 3: Bread – Butter/ Bread – cheese/ Sandwiches/ Pan cakes

Category 4: Upma/ Idly/ Poha/ Sabu-dana

Category 5: French toast/ Omelette

Category 6: Paratha

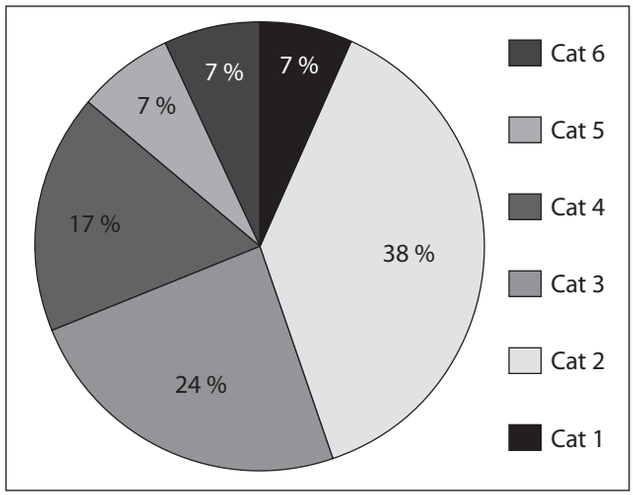

Figure 3:Food items for breakfast

If analysed carefully this kind of breakfast requires least amount of time spent on cooking. It typically indicated that it was a 'convenient breakfast'. The lunch and dinner were found to be a combination of regular north Indian food–Pulses (dal), rice, vegetable, roti, paratha, curd and salad. A lot of variety was found in snacks ranging from noodles, pasta, pizza, maggi, cakes, biscuits, chips, chocolates, fruits and dry fruits. It clearly indicated that parents are pampering children by providing them a lot of variety in snacks. They are putting in lot of time in preparing these. In this scheme of eatables, the proportion of fruits is only 17% and that of dry fruits is 14%. Another point here to flag is that each child has chosen more than one option for snacks. It also indicated a variety they were having for snacks.

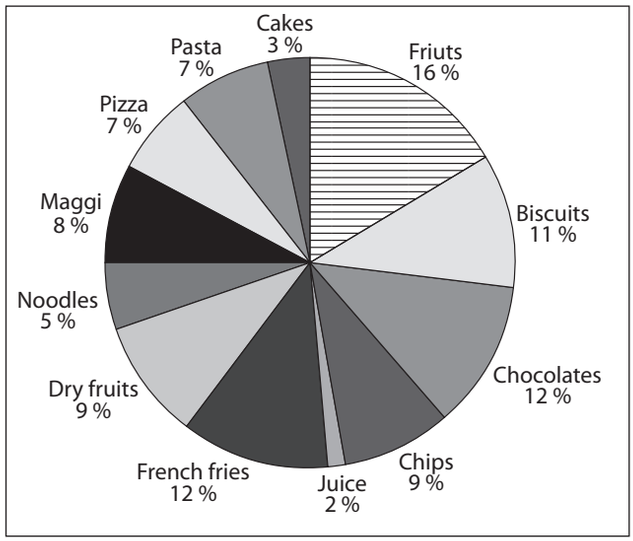

Figure 4:Snacks eaten by Children

Physical Exercises

When children were asked about whether they engage themselves in physical exercising or not, 34% responded as no engagement and other 66% participate in physical exercises. In that, yoga and dance were found to be most popular and running, skipping and badminton were least popular. The reason of yoga and dance being most popular is that these can be easily done within children's homes. The activities like cycling were done by children in their societies– park/cycling area. But only a few children were going out of their homes for any physical activity too. Less physical activity results in disturbed sleep.

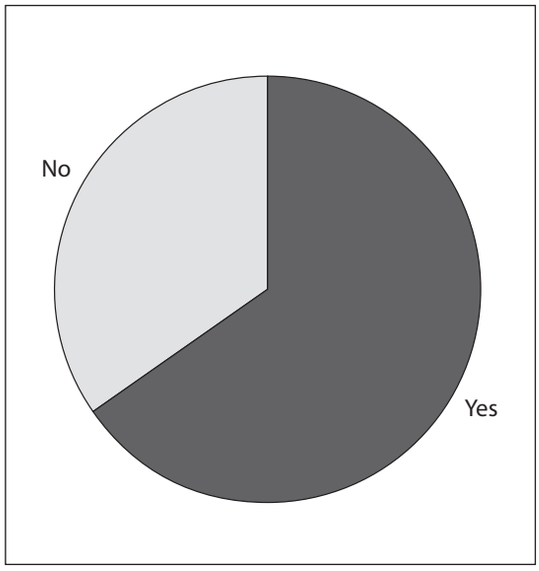

Figure (5b:) Popular Physical Activity

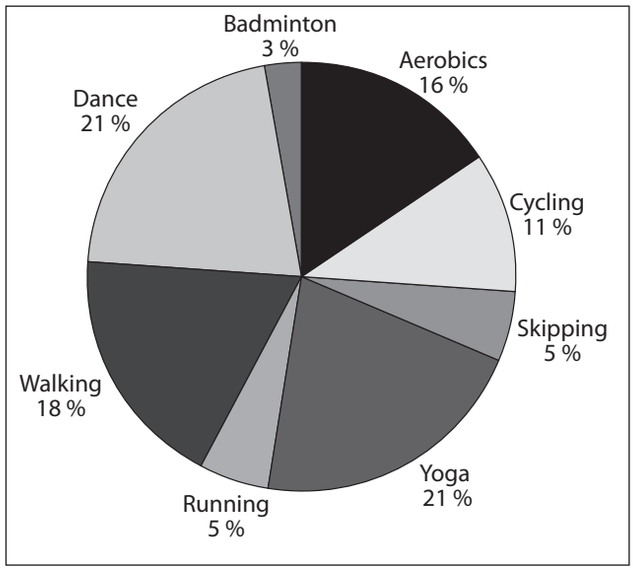

Figure 6: Participation in a Physical Activity

Time Spent on Screen

In response to the question on how much time do they spend on screen and how they spend that time, surprisingly shocking results were found. Almost 60% of our sample is spending six to eight hours daily on screen and 27% is spending even more than 8 hours per day. For such children they were spending more than one third of their day on screen.More screen time results are also resulting in consumption of more junk food. Secondly, more screen time is making them mentally tired. This results in irregular diet pattern with food which is not healthy.

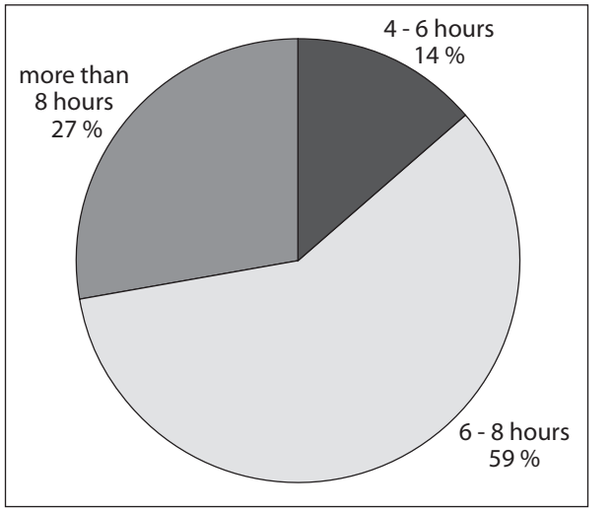

Figure 7: Time Spent on Screen

When it was asked about the activities, they do on screen, it was found that from reading to entertaining, everything is done via screen. On one hand children are watching television for entertainment, surfing net, watching YouTube videos, on the other they are reading books online, learning coding, engaging with applications like 'Mindspark' for developing mathematical and logical reasoning, experimenting on different tools to make their own animations. A lot of options are available online to children. In this context one should not be asking the question about how much screen time but rather 'Is it a good screen time?'

Conclusion

This research clearly showed that learning continued to happen even during these pandemic times for those who have a device and internet connection. Online teaching – learning is a doable proposition. Teachers with

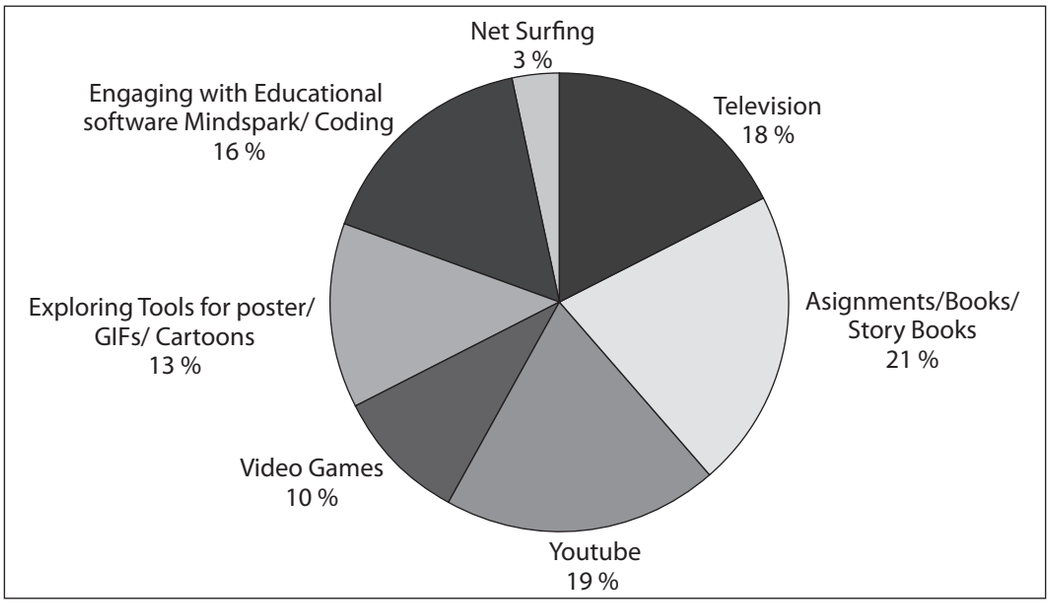

Figure 8: How Time is spent on Screen

technical support learnt and utilized ICT tools for making their classes interesting and engaging for children. Teaching, learning, group activities, co-curricular activities and assessment were well planned and executed in the school under the case study. However, from children's perspective they are tired of online school and are missing fun of togetherness as in the 'real' school. It was also found that a large number of children under study have irregular routines, disturbed sleep pattern and were found to be having a lot of junk food with missing physical activities. Moreover, the role of school as a socialisation agency where in children learn to interact with peers and other significant adults can't be taken for granted. It is necessary part of social and moral development. At this point of time, it is not taken care of. Actually, there is no way of doing it when every child is in her/ his isolated territory, far removed from others. It is necessary to have a regular routine and disciplined life like the one, when children were going to school.

There is need that the government should ensure the broad band facilities to reach across the entire nation at the earliest. Otherwise, there will be widening inequalities in different regions of the country. Children living in rural and remote areas will be left behind. These children are accessing education through broadcast medium. Here, there is only one way of communication. Their doubts and confusions are left to themselves. In certain areas, few teachers and Non-Government Organisations are trying to engage them through WhatsApp conversations or calls. It is only a time gap arrangement. There is a need to address this concern too.

The news reports across the world tend to indicate that the pandemic is here for a long time. We need to learn to live with this new normal,under which e-learning or online learning will be a part of life. During these tough times schools and educational institutions have explored the merits of online education like a large number of students can attend classes. Lectures or presentations can be recorded and shared with students before the class. Students come to class after viewing / watching video and then discuss their doubts. Students may watch that video multiple times. Following this, students can comprehend content better, built on concepts. In regular teaching, the focus was on imparting information and providing knowledge. Now in online classes, if information is shared through a video or presentation beforehand then there will be definitely

better comprehension of concepts. Teacher will be able to build on students' misconceptions. Thus, it can be said that higher level of Bloom's taxonomy like application and analysis can be addressed to online classes. We as teachers need to explore the advantages of online learning and apply to our educational settings.

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Article 6

Analysis of Students' Learning Performance in Science at Middle Level

Professor Anjni Koul

Abstract

All children by nature have curiosity, and it is this curiosity that leads them to search. Keeping this in view, National Council of Educational Research and Training, India has developed activity- based textbooks which promote skill of reasoning and self expression. In this study, learning performance of students studying at middle level (upper primary stage; Classes VI-VIII) was done by giving questions according to their cognitive level. The study reveals that unfortunately students have not shown the expected performance even though the textbooks give ample space to child to think and explore. The study shows that either the teachers are not able to use the textbooks in the expected way, may be due to lack of desired infrastructure or they are not trained in inquiry- based science teaching-learning process.

Key Words: NCF-2005, Middle Level, Activity- Based Teaching-Learning, Reasoning Questions, Language Difficulty.

Introduction

Children are curious by nature. Given the freedom, they often interact with and experience things around them. Children enter middle stage after completing primary schooling. At this stage children can and should be provided plentiful opportunities to engage with the processes of science: observing things closely, planning and designing activities, posing questions and finding answers to these questions, recording observations, discussing and presenting data, drawing figures, plotting graphs and of course drawing inferences from what they observe. Literature also shows that science process skills are effective in teaching-learning of science (Brotherton &Preece, 1995; Chang & Mao, 1999; Harlen, 1999; Key & Bryan2001; Turpin & Cage, 2004; Walters & Soyibo, 2001; Wilke & Straits, 2005). Sufficient time and opportunities have to be provided for this. The children at this stage are to be engaged in learning the principles of science through familiar experiences, working with hands to design simple equipment units and models. Scientific concepts are to be developed mainly through activities and experiments.

In India, National Council of Educational Research and Training (NCERT) is a leading body for school education. It is an autonomous body constituted by the Government of India. The main functions of this organisation are : Curriculum Development; Teacher Training; Extension Activities; Evaluation and Consultancy. The four Curricular Frameworks for school education have been brought out by the NCERT in the years--1975, 1988, 2000 and 2005. National Curriculum Framework -- 2005 (NCERT, 2005), recommends a pedagogy that is hands–on and inquiry-based. While this is widely accepted at the ideational level, practice in India has tended to be dominated by chalk and talk method. To make any progress in the desired direction, some changes were made at the level of the syllabus (NCERT, 2005). It was decided that science content from Classes VI to X should be compulsory subject for all and not be

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framed along disciplinary lines, but rather organised around themes that are potentially cross-disciplinary in nature. Generally, the choice of themes and sub themes reflects the trust towards weakening disciplinary boundaries that was one of the central concerns of NCF-2005. On the basis of these themes, National Council of Educational Research and Training (NCERT) has developed textbooks and other resource materials for middle level (upper primary stage) in science. Since the textbooks (NCERT,2006; NCERT,2007; NCERT,2008) are in use for almost a decade in the school system, a research study has been taken to assess the performance of the children with respect to various concepts in science at middle level (upper primary stage; Classes VI-VIII).

Methodology

For Classes VI, VII and VIII, separate tools to assess the performance of students were developed. Before finalization, the tools were tried out with forty students of each class of a Government school. The modified, tools for Classes VI, VII and VIII were used for the present study **(Annexure)**.

These tools were administered on 1054 student (Class VI-385 students, Class VII-336 students and ClassVIII-333 students). No time limit was fixed for answering the questions. The data was collected and analysed.

Analysis of data

Analysis of data was done manually because most of the questions were open ended. Item wise analysis of data for Classes VI, VII and VIII is shown in Tables 1, 2 and 3 and the graphic representation has been shown in Figures 1, 2 and 3

Table 1	Class VI	Number of Students – 385		
Question No.	**Correct %**	**Partially correct %**	**Incorrect %**	**Not attempted %**
1.	00.00	38.91	45.19	15.90
2.	10.65	62.34	21.82	5.19
3.	4.16	75.84	8.05	11.95
4.	0.26	39.22	37.66	22.86
5.	10.13	79.22	8.05	2.60
6.	2.60	12.73	28.83	55.84

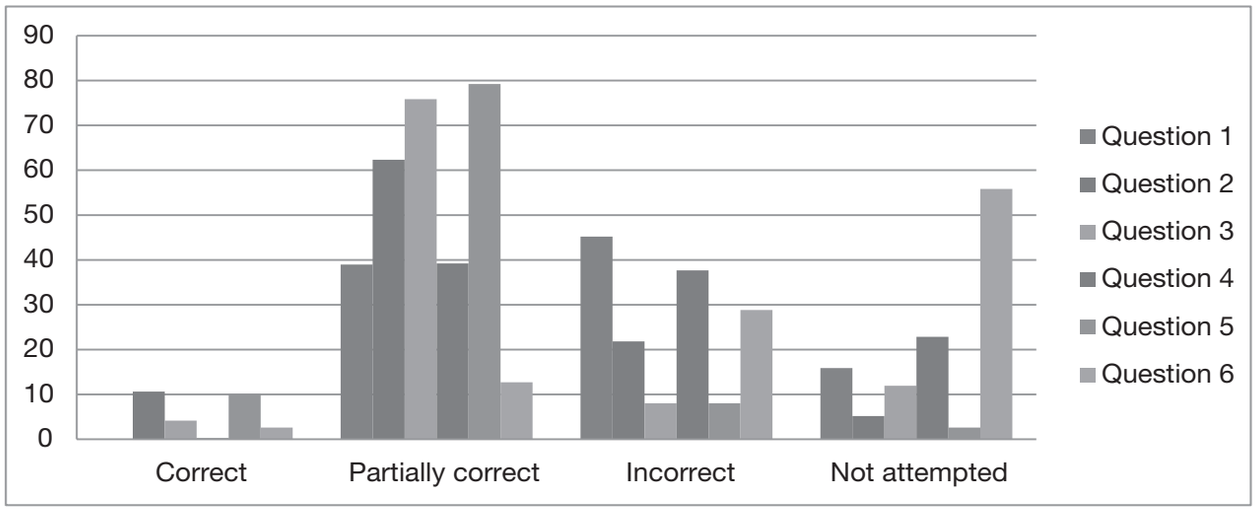

Figure 1: Graphic Presentation

Table 2	Class VII	Number of Students – 336		
Question No.	**Correct %**	**Partially correct %**	**Incorrect %**	**Not attempted %**
1.	0.60	38.40	37.00	24.00
2.	13.00	25.00	42.00	20.00
3.	05.00	27.00	40.00	28.00
4.	7.00	2.00	32.00	59.00
5.	9.00	69.00	10.00	12.00
6.	0.30	27.00	22.00	50.70

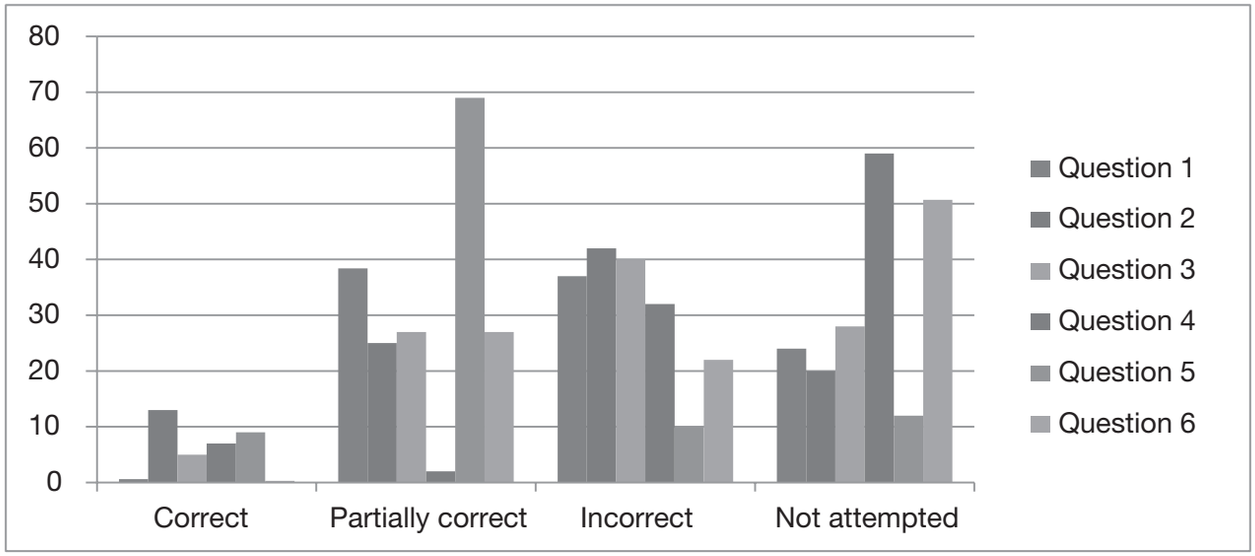

Figure 2: Graphic Presentation

Table 3	Class VIII	Number of Students – 333		
Question No.	**Correct %**	**Partially correct %**	**Incorrect %**	**Not attempted %**
1.	2.70	91.80	4.20	1.30
2.	0.00	36.04	20.42	43.54
3.	0.00	79.58	2.10	18.32
4.	1.50	74.40	9.10	15.00
5.	0.30	79.58	1.80	18.32
6.	1.50	29.43	25.83	43.24

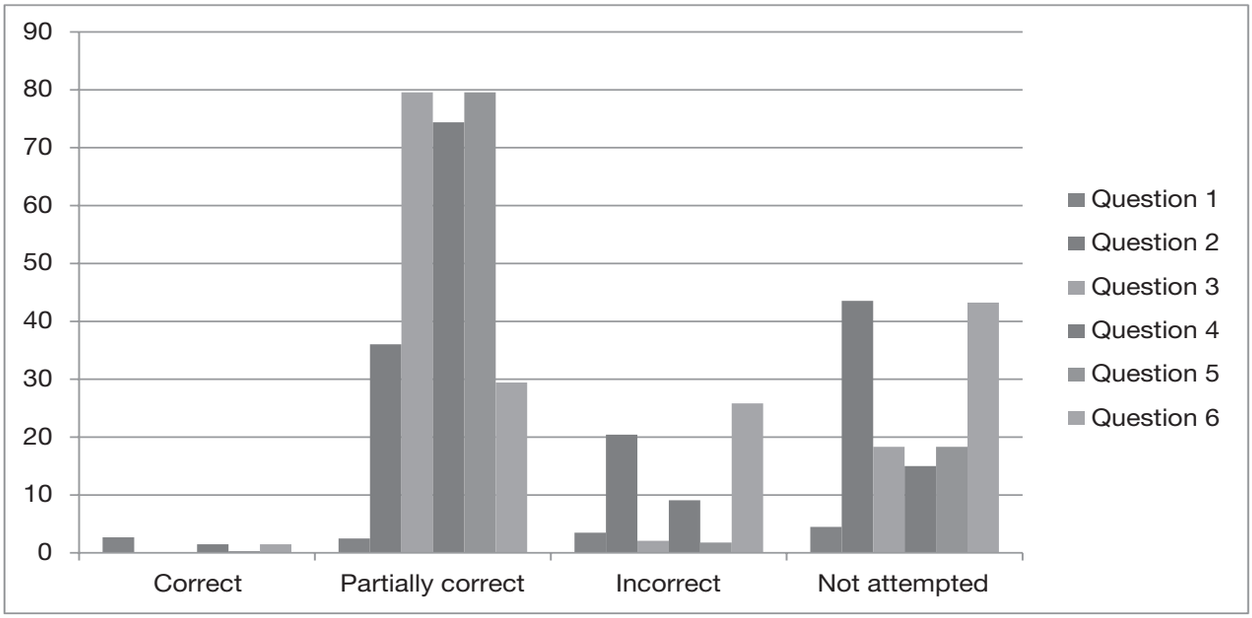

Figure 3: Graphic Presentation

Interpretation of data

CLASS VI

Question 1: The item was related to identification of the natural fibres and the processes leading to making fabrics. Most of the students (45%) could not give correct response for identifying the two processes - knitting and spinning. A number of activities have been given in NCERT science textbooks and these need to be done by students in the classroom for better understanding of these processes. Perhaps the **format of the question was unfamiliar** to the students.

Question 2: The format of this question seemed familiar to students. 22%students failed in reporting 'odd one' related to 'floating' and 'solubility' of liquid material in water because they were perhaps not familiar with the concept of solubility. It seems that the students were not **familiar with technical terms like 'solubility'**.

Question 3: The items were related to separation of substance by identifying the correct and wrong statements and re-write the correct version of the wrong statements. Around 75%students identify all correct and wrong statements but only 4% could re-write the correct version of wrong statements. It appears that students **either overlooked the second part of the question or were reluctant to write the corrected statements in their own words**.

Question 4: The question had two parts. Part (a) of the question was related to the separation of four components of a mixture. The students had to choose the methods from the list and give appropriate order to them. 37.66% students gave incorrect response to this question. It seems students could not give the correct sequence of the methods to separate the components from the mixture. It appears that students were confused by the list which contains various methods of separation. Very few students had attempted part (b) of the question which was very easy. They might have overlooked it due to too much engagement with the part (a). May be, the students were under the impression that **all seven methods of separation have to be used.**

Question 5: The question is related to identification of the changes which can be reversed or which cannot be reversed from a list of ten changes. 79% had given partially correct response to this question. It seems the students were **confused about the format of the question**. Perhaps, one example could have been given for their guidance in the tool.

Question 6: In this question two activities were given from which students had to draw some conclusion. The conclusion for the first activity (a) was that air was present in the bottle which escaped from the bottle on tilting in the water filled in the tub. However, it was found that the students have concluded that oxygen was present. It seems that students are **confused between air and oxygen.** The activity (b) was related to condensation of water from the air around the surface of glass which was filled with ice cubes. In this case some students have not given the reasons and some had sketched the diagram which was already given in the question. 55% students left this question un-attempted. It appears that most of the students had **difficulty in comprehending the question.** This could possibly be due to the deficiency in language.

CLASS VII

Question 1: The question is aimed at assessing the knowledge of the students about the correct sequence of steps involved in obtaining woolen fabric from its fibre; Part (b) is concerned with the stage in the life cycle of the moth which produces silk fibre. In the first part of the question many students (38.40%) were able to give partially correct sequence of steps. Most of the students were **unable to identify the stage in the life cycle of moth** from which fibre is produced.

Question 2: The question aims at assessing the application of known concept in a given situation. The students had to give scientific reason behind choice of colour of the tent during summers. This question fetched varied answers from the students. 13% students answered this question correctly. Many students chose white or a light colour but could not give **exact scientific explanation as white colour being a good reflector**.

Question 3: The question is related to test the understanding of the students about neutralization reaction. They were expected to identify bases from the list of given substances. Besides this they were expected to predict the change of colour of litmus during neutralization. Most of the students were able to identify only

one or two basic substances. 40% students responded to this question incorrectly. It appears most of the students **did not have a hands- on experience of use of litmus paper.**

Question 4: The question pertains to identification of acid, bases and neutral solutions with turmeric as an indicator. Though this concept has been dealt beautifully in the book with interesting card making activity, most of the students could not answer it correctly (32%), rather they gave uses of turmeric in cooking, as an antibiotic and for healing of wounds, thus connecting it with their daily life experiences. Almost 60% students did not attempt the question. It seems that most of them did not comprehend the question. **Hands on experience of the activity given in the book might have improved the performance.**

Question 5: The question is aimed at classifying the given changes as physical or chemical. Most students were able to identify physical changes correctly while only few could identify chemical changes. 69% students gave partially correct response to this question. **Exposure to various physical and chemical changes might have improved the performance.**

Question 6: The question is to ascertain whether the students are aware of purification of polluted water by aeration, filtration and chlorination. Students were asked to identify the type of impurities removed by each of these processes. Also, they had to give two causes responsible for cholera, typhoid, dysentery. Some students gave correct answer for the role of chlorination. Some had given correct answer for removal of impurities by sand filter. Nearly 50% students did not attempt part B of the question, although **it could have been answered on the basis of general awareness.**

Class VIII

Question 1: Students found difficulty in identifying the materials which are fire resistant, material of which handle of pressure cooker is made and the material which can be dried easily. 91% students gave partially correct answer. **Exposure and discussion on various materials could have improved the performance.**

Question 2: Most students could relate the property (acidic nature of oxide) with the nature of element (non-metals). However, they generally marked one or two correct choices out of three. **Reason for the answer** was not given by majority of students.

Question 3: Students were mostly familiar with properties of metals and non-metals but there is **confusion regarding some of the properties** such as reaction with acids, bases, formation of acidic oxides and basic oxides. Most of the students seemed to believe either acid reacts with metals or with non-metals. Therefore, even the properties common to both- metals and non-metals, were marked only against one of these. 80% students gave partial response to this question.

Question 4: The concept of **exhaustible and inexhaustible sources of energy is generally not clear** to the students. Only 1% students could identify exhaustible and inexhaustible sources of energy. 9% students attempted this question incorrectly. Most of them gave partially correct (74%) response.

Question 5: Most of the students do not seem to have **clear concepts about spontaneous combustion and ignition temperature.** They were not able to choose correct or incorrect sentences. 80% students gave partial response.

Question 6: Most of the students could not relate to pollution and measures to control it. From their responses it appears that students are exposed to different kinds of pollution and their effects, but awareness has not been created in them about the causes and measures to control it. Although this question was **related to day-to- day life**, even then 43% students did not attempt this question.

Limitations of this study

Some of the factors which might have affected the outcome of this study are:

- The test was administered without any advance notice to avoid examination- related stress among the children. Lack of preparedness might have affected the performance of students.
- Students were informed that achievement in the test will not affect their score in any manner. Some of the students might have taken the test casually.
- Most of the questions appeared long because of the format adopted but their expected answers were in fact short. However, it is possible that the length of some questions might have turned some students off.
- Generally, in the present assessment system students are assessed by questions having only one part. However, in the present study questions had more than one part. Due to this, it is possible that performance of the students may have been affected.
- The intention was not to ask direct questions. So, only a few questions were memory based and most of the questions were application based. It is likely that the children were not trained to answer such questions.
- The lack of proficiency of language (English/Hindi) may have affected the performance.

Conclusion

From the analysis of data, it has been revealed that students have given partially correct answers to most of the questions. This suggests that either students have not understood the concept(s) or the concepts(s) has/ have not been transacted in the classroom effectively.

The present set of science textbooks were written in accordance with the recommendations of NCF-2005, with the hope that they will wean children away from rote learning and promote skill of reasoning and self-expression. With these objectives in mind, activities were introduced as part of teaching- learning process. The idea was that students will not only learn doing things by hand, but will arrive at conclusion after discussion with other students, in the process developing skill not only of reasoning but also of data presentation, argumentation and counter argumentation and expressing themselves in cogent logical terms. One of the major structural problems that plague science education at this level is the **lack of experimental facilities**. Many activities at this stage can be **performed with 'low cost' material**, it is unfair to deny children the opportunities of handling simple devices such as, magnet, litmus paper, test tubes, tumblers etc.

This study shows, unfortunately, that the teachers are not being able to use the textbooks in the way expected, perhaps due to **lack of desired infrastructure and environment** conducive for teaching-learning process.

The study reveals that students are severely handicapped because of deficiency in language. Some of the students cannot write correctly words of everyday use. Many of them cannot **comprehend question**

consisting of a few simple sentences. When they are asked to write even a single sentence giving reason for their answer, they find it difficult. With this kind of severe language disability, it is unreasonable to expect students to understand science, which contains technical terms which are difficult even to pronounce and spell correctly. This study suggests that in earlier classes the focus should be on **developing language skill** so that subject like science can be learnt more meaningfully in later years.

In spite of these constraints, it must be appreciated that even without prior notice students appeared in this test without creating any fuss. They even sought clarification where ever questions were not clear to them. **This shows clearly that students are eager to learn; only necessary conditions need to be created to satisfy their urge for learning.**

Recommendations

Some of the recommendations to improve teaching-learning process in the school system are as follows:

- NCERT has developed science kits for the upper primary stage which can be used to carry out almost all the activities suggested in the textbooks. Teachers need to be given training for the usage of kits on massive scale, so that these kits can be used effectively in the classroom by both students and teachers during teaching-learning process.
- Teachers need in-depth training in activity-based teaching-learning where they can relate new knowledge to children's local environment and prior experience.
- They should be trained as facilitators of knowledge rather than transmitters of knowledge during their pre-service programmes.
- For learning of science at middle level (upper primary level), it is important to emphasize on developing language abilities at primary level.

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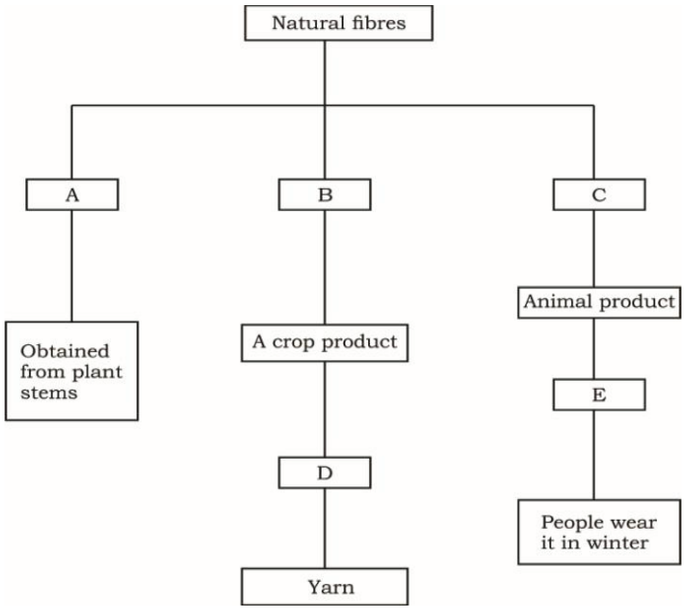
Annexure

CLASS VI – SCIENCE

Try to attempt all the questions

1. Identify the natural fibres A, B, C, and the processes D and E from the following figure.



A ____

B ____

C ____

D ____

E ____

2. Find the odd one out in each of the following lists on the basis of hint given in the bracket.

a) Book, notebook, pen, newspaper (material of which the objects are made).

b) Salt, sugar, sand, glucose (solubility in water).

c) Plastic lid, table tennis ball, iron key, small piece of wood (floats in water).

d) Cardboard, wooden door, glass window, aluminium foil (transparency).

e) Vinegar, kerosene, lemon juice, milk (mixes well with water).

3. Identify the following statements as right or wrong. If wrong, then write a correct statement for it.

a) A mixture of oil and water can be separated by filtration.

b) Salt can be separated from a salt solution by the process of evaporation.

c) Farmers separate husk from seeds of grain by threshing.

d) A mixture of sawdust and iron balls can be separated by hand picking.

e) Pebbles are separated from sand by sieving.

f) Only a limited amount of salt can be dissolved in water.

4. (a) Riya is provided with a mixture of iron filings, sand, common salt and kidney beans. Help her in deciding the sequence of separation of components and the method used in each step from the following.

I. Filtration

II. Hand picking

III. Winnowing

IV. Use of magnet (separation by magnet)

V. Evaporation

VI. Decantation

VII. Threshing

VIII. Dissolution in water

(b) Which device would you require to carry out the separation of husk and flour?

5. Some changes can be reversed and some cannot be reversed. Tick Mark (√) your response in the appropriate column for the following changes:

S. No.	Change	Can be reversed	Cannot be reversed
1.	Rolling of chapatti		
2.	Melting of ice cream		
3.	Bursting of a balloon		

4.	Threading a needle		
5.	Drying of a wet cloth		
6.	Folding a paper to make a toy aeroplane		
7.	Burning of a candle		
8.	Evaporation of water		
9.	Falling of leaf from a tree		
10.	Blooming of flower		

6. Two activities are given here. What do you conclude from these? Write each answer in not more than two sentences.

a) Shambhavi dipped the open mouth of an empty bottle into a tub filled with water (as shown in Fig. A) and then tilted it slightly (as shown in Fig. B). She observed bubbles coming out of water.

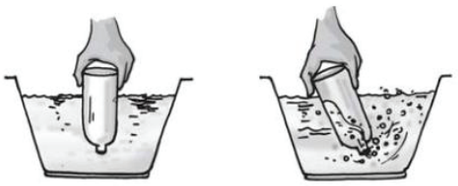


Fig. (A) Fig. (B)

b) Kamal took a glass half- filled with water. Then he added some ice cubes in it. After two minutes he observed water droplets all around the outer surface of the glass.

Fig. Drops of water appear on the surface of the glass containing ice cold water

CLASS VII – SCIENCE

Try to attempt all the questions

1. a) Wool is obtained from fleece of sheep or yak. Arrange the following steps in correct sequence which are involved in the processing of the fibre into woolen fabric: Sorting, picking out burr from hair, shearing, dyeing, spinning and weaving, scouring

b) A particular type of fibre is produced by feeding a moth on mulberry leaves.

(i) At which stage of the life cycle of the moth the fibre is obtained.

(ii) Name the process in which these moths are reared for obtaining this particular type of fibre.

2. At a camp site, the tents are made from fabrics of two shades - white and black.

(i) Under tent of which colour would you prefer to rest on a hot summer afternoon?

(ii) Give reasons for your choice.

3. (a) Which of the following substances can be neutralised by adding vinegar?
Baking soda, lemon juice, milk of magnesia, soap solution, common salt solution?

(b) How will you identify the above neutralisation reaction with the help of litmus paper?

4. (a) You are provided with acidic, basic and neutral solutions separately in three test tubes. With the help of turmeric solution how will you identify all the three solutions?

(b) What is the role of turmeric powder in this activity?

(c) Name any other substance which can be used in place of turmeric powder.

5. Read the following processes carefully and tick (√) mark them in appropriate column.

S. No.	**Process**	**Physical change (which can be reversed)**	**Physical change (which cannot be reversed)**	**Chemical change**
i.	Shaving of wooden block			
ii.	Melting of wax			
iii.	Burning of fire- crackers			
iv.	Dissolving common salt into water			
v	Digestion of food			
vi.	Preparation of sugar candy from sugar solution			
vii.	Combustion of magnesium ribbon			
viii.	Melting of ice			
ix.	Rusting of iron			
x.	Tearing of paper			

6. (a). You are provided with a sample of polluted water. Aeration, filtration and chlorination are the steps for its purification, answer the following:

(i) What types of impurities are removed by the sand filter?

(ii) What is the role of chlorination?

(iii) Which step changes the odour of the water?

(b). Mention two causes that are responsible for many diseases such as cholera, typhoid, and dysentery.

CLASS VIII- SCIENCE

Try to attempt all the questions

1. Some articles/uses are given in the following Table. Select and tick mark (√) the more appropriate material out of the two choices given in the next column. Write reason(s) for your choice in the last column.

S. No.	Use/Article	Material	Reason(s)
(a)	Umbrella	Cotton ☐ Polyester ☐	
(b)	Fire-resistant object	Melamine ☐ PVC ☐	
(c)	Handle of pressure cooker	Iron ☐ Bakelite ☐	
(d)	Covering of electrical wire	Tin metal ☐ PVC ☐	
(e)	Quick drying fabric	Natural fibre ☐ Synthetic fibre ☐	

2. A substance X burns in air and forms its oxide. The oxide is shaken with water and strips of both red and blue litmus are put in it. (See Fig.)

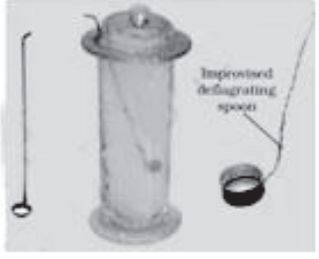


Fig. a

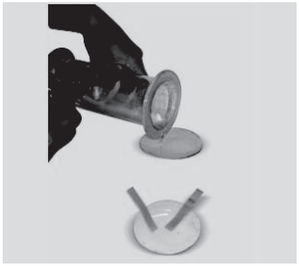


Fig. b

After sometimes, it was observed that both the litmus paper strips are red in colour.
Which substance/substances would show behavior similar to that of the substance X ?

(i) Iron (ii) Sulphur (iii) Copper (iv) Charcoal
(v) Phosphorus (vi) Magnesium

Given reason(s) for your answer.

c)

3. Some general properties of metals and non-metals are listed in the first column of the given Table. Mark (√) against each property in the relevant column/columns.

S.No.	Property	Metals	Non-Metals
i.	Poor conductor of heat and electricity		
ii.	Reaction with water		
iii.	Reaction with air		
iv.	Malleability		
v.	Reaction with acids		
vi.	Reaction with bases		
vii.	Formation of acidic oxides		
viii.	Formation of basic oxides		

4. Answer the following questions:
   A. What are exhaustible and inexhaustible sources of energy?
   B. Classify the following sources of energy as exhaustible or inexhaustible. Mark tick (√) in the appropriate column in the given Table.

S.No.	Source of energy	Exhaustible	Inexhaustible
i.	Solar energy		
ii.	Coke		
iii.	Liquefied Petroleum Gas (LPG)		
iv.	Wind energy		
v.	Fossil fuels		
vi.	Hydroelectric energy		

5. Mark the following sentences as *correct* or *incorrect*. Write the incorrect sentences after making corrections.

   i. Burning of LPG is spontaneous combustion.

   ii. A substance does not catch fire below its ignition temperature.

iii. Essential requirements for production of fire are fuel, air and heat.

iv. Goldsmiths blow the middle zone of the flame with a metallic blow pipe for melting gold and silver because it is the hottest zone of the flame.

v. Substances with very low ignition temperature are called inflammable substances.

vi. White phosphorus catches fire on its own on keeping in air. Its combustion is spontaneous.

6. During the past 5-10 years, the quality of air and water has drastically gone down. Following Table gives a list of the types of pollution or their effects in Column-1, Write any one measure to control in Column-2.

Column-1 **Pollution or its effect**	**Column-2** **Measure to control**
Air pollution	
Water pollution	
Acid rain	
Green house effect	
Damage to ozone layer	

Internet Memes and Its Emotional Impact on Pre-Service Teachers

Vemma Mae R. Guinto

Abstract

Internet Memes are generated contents to express their information, to entertain, to ridicule and to self-actualize. This study aimed to determine the emotional impact of memes and its relationship with the profile of the Pre-Service Teachers of Pangasinan State University- Bayambang Campus. The study made use of descriptive-correlation research method. To test the impacts of internet memes towards the emotions of Pre-Service Teachers a questionnaire-checklist was used. Frequency counts, percentages average weighted mean was used in the treatment of data. Pearson-r (Pearson Product Moment of Correlation) and Chi-square was used to determine the relationship between profile and the emotional impacts of Internet Memes. The findings of this study showed that the Pre-Service Teachers predominantly specialize in Enhanced General Education, are females, and spend 4-6 hours on social media per day. There is a significant relationship between gender and impacts of memes in terms of positive emotions aside from hopefulness. The relationship between gender and impacts of memes specifically negative emotions are found to be highly significant. There is no significant relationship between exposure to social media and impacts of memes. Internet memes greatly affect the emotions of Pre-Service Teachers. Future studies on the impact of Memes to Educational and Political factors may be conducted.

Key Words: Emotions, Internet Memes, Pre-Service Teachers

Introduction

Most of our pre-service teachers are exposed to internet memes. Majority of internet memes are captioned photos that are intended to be funny, often to publicly ridicule human behaviour [1]. Additionally, memes are rapidly created and distributed, reaching an extended audience without being limited by geographic boundaries, they also can focus on seemingly unimportant—but highly shareable—sound bites [2]. Memes serve many purposes and functions, but at a fundamental level, they serve as an expression of people's opinions and emotions [3].

A recent study indicates that people reporting strong, effective responses to meme showed greater intent to spread it. The recent study indicated that the rapidity with which online users spread information enhances contagion which is—emotional contagion. Emotional contagion, a form of contagion, leads to convergence of a person's emotional state with the state of emotions of those with whom he or she is interacting with or observing [4]. That is when, online users watch internet memes, they tend to experience similar emotions as the people in the memes, and by spreading that meme, they anticipate that the recipient will experience similar feelings.

While it may seem like memes are just cute pictures and nothing else, they could have negative impacts on people and just life in general. One of the well-known cases is that of Tide Pods. In just 2018, there have been 37 cases of people eating detergent pods, with about half of them being intentional. There are other instances

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where the consequences are far more serious. One of them is the Star Wars Kid. After the video was released on the internet, Ghyslain Raza, the titular Star Wars Kid, became severely depressed over the countless negative comments video received. He lost multiple friends and even left the school campus for private tutoring. Furthermore, Chubby Bunny Challenge and Cinnamon Challenge included countless deaths. Not all memes bring negative effects. In fact, some of them may even make depressed people have a reason to live. Jacob Arnold, who looks at memes every day, believes that memes have become an inspiration for his daily life [5].

There are a lot of preceding studies regarding memes, however, there is not much study done on the emotional impact of memes.

Objectives of the Study

Generally, this study, aims to determine the emotional impact of memes and its relationship with the profile of the Pre-Service Teachers of Pangasinan State University- Bayambang Campus.

Specifically, this excerpt of a study, aimed to answer the following specific questions:

1. What is the profile of the Pre-Service Teachers in terms of Specialization, Sex and Exposure to Social Media per day?
2. What is the impact of internet memes towards the positive and negative emotions of the Pre-Service Teachers?
3. Is there a significant relationship between the emotional impact of internet memes and the profile of the Pre-Service Teachers?

Materials and Methods

The descriptive-correlation method was employed in this study to describe the impacts of memes towards the emotions of Pre-Service Teachers. Since the present study is concerned with the influence of memes towards the emotions of the respondents, this method is appropriate to examine the relationship between the two variables.

The respondents of the study are 231 Pre-Service Teachers who are enrolled during the Second Semester S.Y. 2019-2020. The specializations of Pre-Service Teachers involved are Enhanced General Education, Science, Math, Physical Education and Technology and Livelihood Education.

A researcher - made questionnaire-checklist was used as the main instrument in the study. The first part of the questionnaire was on the profile of the respondents which determined their sex, exposure to social media and specialization. The second part of the questionnaire was on the impacts of memes on the emotions of the students. The questionnaire-checklist were distributed by the researcher to pre-service teachers.

To determine the student's profile which consists of sex, exposure to social media and strand, frequency count and percentage rates was used. To determine the impacts of memes on the emotions of Pre-Service Teachers, Average Weighted Mean was used. To determine if there is significant relationship between the impact of memes and the profile of Pre-Service Teachers, Chi-Square and Pearson- correlation was used.

Result and Discussion

Profile of the Respondents:

Table 1 Profile of the Pre-Service Teachers

Profile	(*f*)	(%)
Sex		
Male	70	30.3
Female	161	69.7
Total	**231**	**100**
Exposure to social Media		
2-3 hours	57	24.7
4-6 hours	80	34.6
7-8 hours	79	34.2
Others	15	6.5
Total	**231**	**100**
Specialization		
EGE	88	38.1
Math	51	26.8
Science	62	22.1
PE	19	8.2
TLE	11	4.8
Total	231	100

Table- 1 presents the profile of the respondents according to gender, exposure to social media and specialization. The Table 1 indicates that out of 231 respondents, 69.7% are female while 30.3% are male. This means that females outnumbered males by 39%.

The highest percentage of the respondents reported that their exposure to social media is between 4-6 hours a day. Based on the Table, 38.1% of the students are Enhanced General Education major, followed by Science and Mathematics majors, with 26.8% and 22.1% respectively. Physical Education and Technology and Livelihood Education has the least percentages of 8.2% and 4.8% of respondents.

Emotional Impact of Memes

This part presents the findings on the level of emotional response in memes of the Pre-Service Teachers in terms of the two kinds of emotions with their respective indicators.

Table 2	Positive Emotional Impact of Memes to Pre-Service Teachers	
Indication	**Average Weighted Mean**	**Equivalent**
Happiness		
1.I feel better despite being sad	3.40	High
2.I become more cheerful	3.51	Hight
3.I enjoy sharing and posting on social media	3.30	Moderate
4 I can always laugh	3.41	High
5 I can't stop smiling	3.31	Moderate
Inspirational		
6 I feel enthusiastic about my works	3.13	Moderate
7 I become energetic	3.23	Moderate
8. I don't think negative things	2.97	Moderate
9. I gain self confidence	3.13	Moderate
10 I realized I can do better	3.41	High
Hopefulness		
11. I think I am not alone	3.42	High
12. I feel motivated	3.42	High
13. I start to believe in myself	3.44	High
14. I become optimistic	3.37	Moderate
15.I see life in a new perspective	3.42	High
Average Weighted Mean:	**3.32**	**Moderate**

Table 2 shows that the Pre-Service Teachers highly feel better, became more cheerful, and laugh when they see memes. The respondents enjoy sharing memes, feel enthusiastic, energetic, confident, and optimistic in a moderate level. Overall, there is a moderate positive emotional impact of memes to pre-service teachers.

Table 3 shows the negative impacts of meme to the respondents' emotions. As seen in the Table, all the indicators average weighted mean is interpreted as low. It concludes, that memes do not give any negative

Table 3	Negative Emotional Impact of Memes on Pre-Service Teachers	
Indicators	**Average Weighted Mean**	**Equivalent**
Irritation		
1. I get mad easily	2.50	Low
2. I suffer mood swings	2.56	Low

3. I feel like I am bullied	2.45	Low
4. I suddenly want to log out	2.43	Low
5. I overeat	2.31	Low
Stress		
6. I feel frustrated	2.39	Low
7. I think I'm being mocked	2.39	Low
8. I lose appetite to eat	2.27	Low
9. I become pessimistic	2.42	Low
10. I can't sleep	2.56	Low

emotions to the respondents even when they are exposed to it. The results indicate that the negative influences of memes are very low.

Relationship between the Impact of Memes and the Profile of Pre-Service Teachers

This part discusses the relationship between the impact of memes and the profile of Pre-Service Teachers with certain profile variables, which consists of gender, specialization, and exposure to social media. The Pearson-r and Chi-Square was used to show the relationship between the profiles of the pre-service teachers and the impact of memes. Correlation value was used to test the significance of Pearson-r at the 0.05 level.

Table 4 presents the computed chi-square values which determine the relationship between sex and impacts of memes.

Table 4 Relationship between Emotional Impact of Memes and Sex

	Value	Df	Asymptotic Significance (2-sided)
Sex*Happiness	49.784[a]	34	.039
Sex*Inspirational	52.301[a]	28	.004
Sex*Hopefulness	46.252[a]	33	.063
Sex*Irritation	67.658[a]	40	.004
Sex*Stress	122.359[a]	46	.000
Sex*Sadness	119.566[a]	49	.000

It is observed in Table 4, the computed chi -square value between happiness and sex is .039 with a critical chi-square value of 49.784 with degree of freedom (df) 34 which is less than 0.05 level of significance. Also, the computed chi-square value between inspirational and sex is .004 with a critical chi-square value of 52.301 with df 28 at 0.05 level of significance. In contrast, it is shown in the same Table that the computed chi-square value between hopefulness and sex is .063 with the critical chi-square value of 46.252 with df 33

that is far below at 0.05 level of significance. This means that there is no significant relationship between hopefulness and sex. Most of the respondents found memes as source of happiness and inspirational, it is because it is relatable and realistic.

Table 4 also shows the relationship between the negative impacts of memes namely, irritation, stress and sadness which were found to have significant relationship with gender. The computed chi-square value of .004 between irritation and gender with the critical chi-square value of 67.658 and a df of 40 is found to have a significant relationship. In addition, the computed chi-square value between sex and stress is .000, same with sadness and sex with the critical chi-square value of 119.566 with df 49 which is way below 0.05 level of significance. This means that there is highly significant relationship between sex and emotions such as irritation, stress, and sadness. It illustrates that regardless of their sex, the respondents do not find memes as irritating, stress-causing, and saddening but its counterpart.

Tables 5.1 and 5.2, present the relationship between impacts of memes and exposure to social media using the Pearson r correlation.

Table 5.1 Relationship between Positive Impact of Memes and Exposure to Social Media

	Hours	Happiness	Inspirational	Hopefulness
Pearson Correlation	1	.117	.052	.092
Sig. (2-tailed)		.076	.429	.166
N	231	231	231	231

Table 5.1 shows the relationship between the respondent's exposure to social media and positive impacts of memes namely, happiness, inspirational and hopefulness with significant values of .076, .429 and .166 which is far below 0.05 level of significance. It implies that the number of hours the respondents spend on social media does not guarantee the impacts of memes to their emotion. This means that the null hypothesis which states that there is no significant relationship between positive impacts of memes and exposure to social media is not rejected.

Table 5.2 Relationship between Negative Impacts of Memes and Exposure to Social Media

	Hours	Irritation	Stress	Sadness
Pearson Correlation	1	.025	.024	.016
Sig. (2-tailed)		.703	.719	.806
N	231	231	231	231

Table 5.2 illustrates the respondent's exposure to social media and negative impacts of memes in terms of – irritation which gained .703, stress with significance value of .719 and sadness with .806 which is greater than 0.05 level of significance. This implies that the number of hours the respondents spend on social media has nothing to do with the impacts of memes. It is not necessary for the respondents to react from it.

Tables 5.3 and 5.4 present the significant relationship between impacts of memes and specialization.

Table 5.3 Relationship between the Positive Impacts of Memes and Specialization

	Specialization	Happiness	Inspirational	Hopefulness
Pearson Correlation	1	.169*	.327**	.178**
Sig. (2-tailed)		.031	.000	.007
N	231	231	231	231

Under positive impacts are happiness which obtained .010, and hopefulness that obtained .007 which is believed to have significant relationship between strands. In like manner, inspirational obtained .000 which is considered highly significant.

Table 5.4 Relationship between Negative Impacts of Memes and Specialization

	Specialization	Irritation	Stress	Sadness
Pearson Correlation	1	.107	-.076	-.051
Sig. (2-tailed)		.106	.248	.444
N	231	231	231	231

Table 5.4 shows the relationship between negative impacts of memes in terms of; irritation with a significance value of .106, stress with .248 and sadness with .444. These values are believed to be greater than 0.05 level of significance. This means that memes do not give off irritating, stressing and saddening content towards the respondents. Therefore, the relationship is not significant.

It also means that regardless of what specialization the respondents are in, it does not guarantee that it will affect their perspective with memes.

Conclusion and Recommendations

Based on the findings, the following conclusions are arrived at:

1. The respondents were female dominated with161 or 69.7 percent over 70 or 30.3 percent of male respondents. Majority of the respondents are specializing in Enhanced General Education. Most of the respondents spend 4-6 hours a day on social media.
2. Internet memes positively affects the Pre-Service Teachers moderately while it does not negatively affect the respondents.
3. There is significant relationship between sex and impacts of memes in terms of positive emotions namely, happiness and inspirations, aside from hopefulness which is found to have no significant relationship. In addition, the relationship between sex and impacts of memes specifically negative emotions, irritation, stress and sadness are found to be highly significant.

4. There is no significant relationship between exposure to social media and impacts of memes is accepted.
5. There is a significant relationship between specialization and the impacts of memes positively. However, there is no significant relationship between specialization and the impacts of memes negatively.

Based on these conclusions, the following recommendations are provided from this study:

1. College Instructors can make use of memes in introducing a new lesson to make it entertaining in an educational way.
2. Future studies on the Impact of Memes to Educational and Political factors may be conducted.

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Role of Cartoons as Pedagogical Tools in Teaching - Learning Process

Akanksha Shukla
Prof. Anjali Bajpai

Abstract

What do you feel when you find any colorful picture, image, cartoon or simple sketch within your boring textbooks or during a boring lecture? We all have enjoyed reading comics in our childhood days. When we remember the characters' names, then their actions and statements come into the mind in the visual form spontaneously, which help us to recall the scene and content. Cartoons attract the attention and interest of children as well as adults very easily. So, these cartoons can be utilized as an effective tool to impart education from pre-primary level to higher levels of education as many researches have proved. The present study aims to reveal those educational fields where cartoons have been utilized as pedagogical tool and their different effects on the teachers as well as on students.

Key Words: Cartoons, Pedagogy, Tool.

1. Introduction

1.1 Pedagogy

Pedagogy is a study of teaching methods, aims of education and the ways in which goals of teaching-learning process may be obtained. This is based on psychological theories of learner and learning and to some extent it is also based on the philosophy of education, which considers the aims and values of education from a philosophical perspective. The learners are the primary concern for the teachers. For making teaching-learning process effective, they use some tools in teaching such as books, visuals, and any other suitable materials. So, for the same purpose various pedagogical approaches are used by the teachers also**.** Thus, Pedagogy refers to the methods and practice of teaching, for an academic or theoretical concept which imparts knowledge and skills to the learners. The word "Pedagogy" springs from the Greek words "Paidos" and "Agogos," where, "Paidos" means "child" and "Agogos" means "Leader," hence it is simply "To lead a child." Pedagogy is an art of teaching in which various methods and strategies are used by the teacher (Pedagogue) according to the requirement of subjects, students' level, and situation for creating learning environment fruitful and effective, in order to achieve learning outcomes.

In this context Howard Gardner's theory of visual special intelligence is also related to pedagogical strategies, which emphasizes that the visualization is a key element in the mental processing by which we primarily think in images or pictures. Our brain uses nine types of multiple intelligence for different tasks according to Howard Gardner (Frames of Mind, 1983) which can be understood by the image given here:

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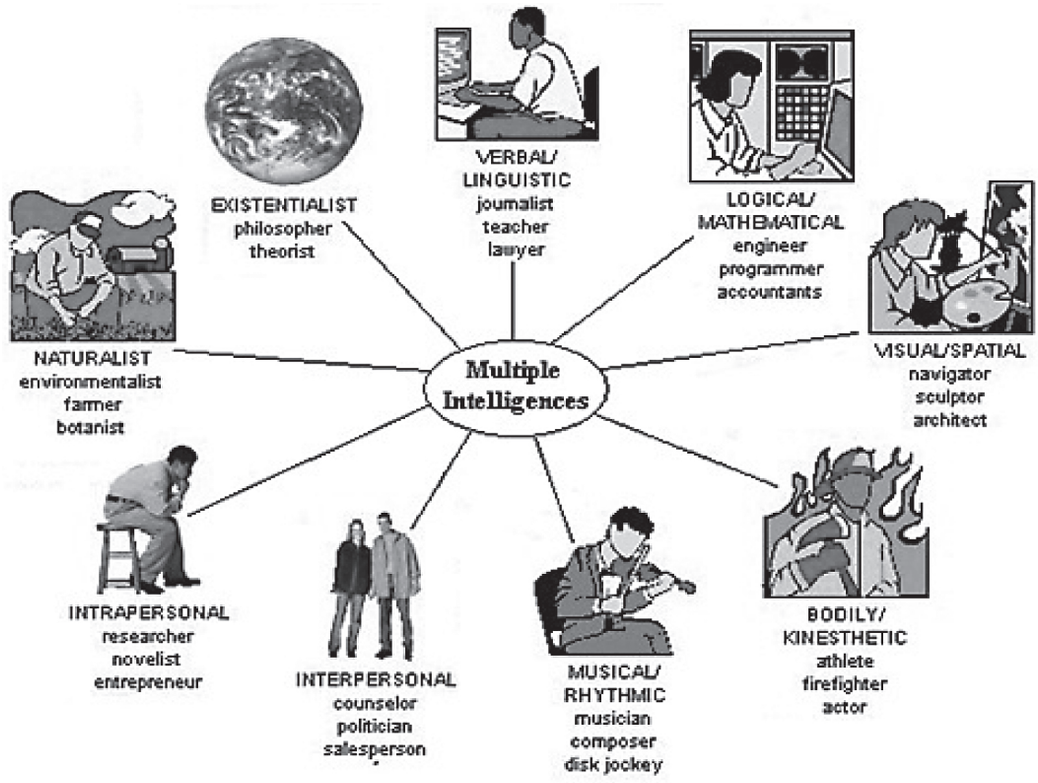


Source: https://rldworld.com/2018/03/09/multiple-intelligence-theory/

According to Multiple Theory of Intelligence, students learn effectively when teachers deliberately incorporate various kinds of intelligence based pedagogical strategies. Accordingly, use of Cartoons have been proven very effective in teaching-- learning process because these are visual representations of the concepts through which students enjoy a learning environment, which stimulates them to think critically and creatively, when they can relate classroom instructions to tasks and experiences, they encounter in their realities, and they can learn better and achieve new skills.

Teaching is a profession in which a lot of effort is needed for transferring knowledge and information from one's brain to someone else's brain. The success of acquiring outcomes from the teaching is dependent on how the piece of information or knowledge is being communicated to the students. So, for realizing this success, teaching profession requires a lot of new innovative ideas, approaches, methods, strategies, techniques and technologies to make the task easier. We all know that teaching is also a dynamic process which keeps updating over time. In this regard, today's scenario provides a broad and open access to be updated through media and technology to the students as well as teachers. In such a situation, our education should be adopted through such mediums, which will not become a mere informer, but inspire critical and creative thinking**.** In this regard 'cartoon' is one of the visual media, with lot of humor, which can be either in the form of single picture or series of pictures, captioned or non-captioned and which have been found very effective by many researchers. Cartoons can also contribute pedagogically for removing the monotony of the class. It is well said that 'a picture is worth a thousand words' as it can convey many complex ideas in a very easy way without providing its description.

Students always like the classes of those teachers who can convert the boring classes into an enjoyable class. It is often heard that students form a negative attitude towards monotonous and only information giving nature of the subjects which follow only chalk and talk type of teaching strategy. In fact, very often the success or failure of the complex subjects, depend on the classroom environment and the pedagogical materials presented to the students.

In this context, various visual cartoons, images, and pictures have great potential to be utilized as sources of unquestionable input to gain crucial output from the class. Concept cartoons have been used as teaching tool, teaching approach, instructional strategy and teaching method by the researchers in various subjects like Biology, Chemistry, Physics, Mathematics, Languages, Science and Technology and Social Studies, for investigating the effect on the achievement in the mentioned subjects. In addition to this, many researches, related to attitude and perception towards using cartoons as teaching tool of teachers as well as students also, have been conducted to gather information related to their positive or negative opinions about the cartoons based pedagogy. Cartoons are liked by children and adults because they are easy on the eye and easy on the brain. It is generally accepted that the majority people absorb approximately 75-80% of data visually. It appears logical that the visual nature of cartoons would therefore make information processing easier

According to Perceptual Psychologist, Rudolf Arnheim (1969), the habit of using one's eyes to learn is acquired early. Arnheim has elaborated the method of vision as subtle and thoughtful. Gradually we learn to recognize, categorize, and sort out all manner of objects, people, activities, and phenomena such as weather, colors, or moods. Similarly, Developmental Psychologist like Jean Piaget also made it clear that we tend to learn all of this from interactions with our concrete and physical atmosphere, which gradually comes to include not just physical components, but conjointly representations of those in pictures and signs. Most images, first shown to us as simple pictures, are often used to help us learn the concepts.

For making learning atmosphere a little bit lighter, cartoons can be used as an effective resource. However, cartoons must not be used merely to fill in time . As a matter of fact, using cartoons would certainly break the monotony (Rae, 2000) of reading text after text in the schoolbooks. For example, very often a picture speaks louder than the words and has more impact than just reading the text. It is conjointly believed that the usage of cartoons will cut back ennui and reduce learners' boredom, anxiety, and disruptive behavior. The pedagogic importance of cartoons in various aspects of teaching and learning process has been brought out by some studies. In an experimental study conducted by Oruc & Teymuroglu (2011), the point was emphasized that cartoons are effective in improving the attitude of students towards social science and prevents the class from being monotonous also. In another study, it was found that cartoons have the potential to promote thinking processes and discussion skills (Clark, 2000). In the same line Alaba (2007) found that the use of educational cartoons and comics have significantly enhanced the creativity of the pupils when compared to those that did not use the creative teaching strategies. Thus, pedagogical aspect of cartoon as teaching tool cannot be denied.

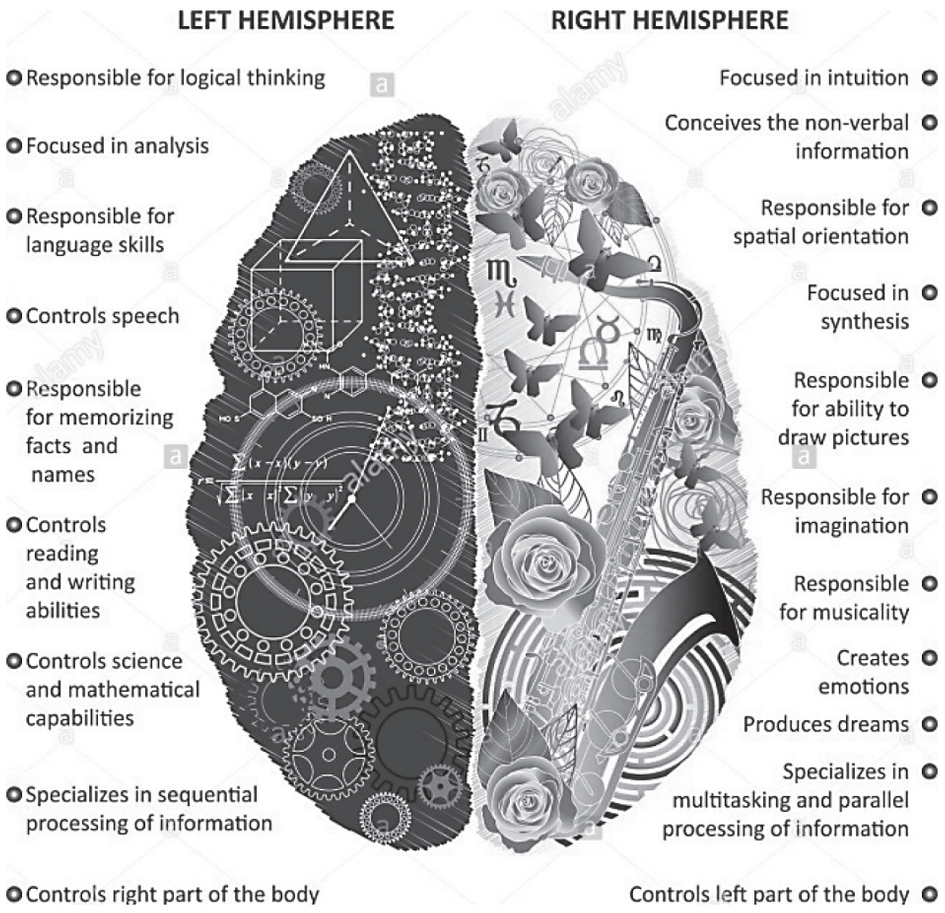
1.2 Cartoons

Cartoon is a simple drawing with the nature of humor, satire, and exaggeration. According to **Tall (1991)**, cartoon is a drawing which is funny and thought- provoking, that is equipped to handle any event about people,

society, political irony, and present it with exaggeration. Cartoons are proven to stimulate critical thinking and provoke discussions. These cartoons have remarkable capabilities to present serious social, political, economic issues in very light but exaggerated mood. Along with this, science and maths misconceptions can also be diagnosed with the cartoons.

2. Mental Processing of Cartoons as Visual Aid

According to Kroehnert (1999), "when the cartoons are utilized, then the learners are compelled to use their lateral thinking which is the ability to think in a creative way or "outside the box." Lateral thinking involves breaking old modes of thinking and discarding established patterns and create mental notions (Bono, 1967). Lateral thinking is also associated with humor, arguing that there is a switch-over from a familiar pattern to a new, unexpected one. It is this moment of surprise, generating laughter and new insight, which facilitates the ability to see a different thought pattern. Visual information which is being presented in the form of cartoons is usually processed by the right side of the brain which is considered to be the holistic, creative, artistic side, while the verbal engages the left facet of the listeners' brains. The left brain is analytical, recognizes and interprets words, performs calculations and so on (Roger.W.Sperry). However, recent research says that functioning of the brain depends on the nature of task



Source: https://www.alamy.com/stock-photo-brain-left-analytical-and-right-creative-hemispheres-infographics-124967758.html

A lecture may be informative, but after a while, the learners will feel the humdrum of the same manner of instruction in the classroom. However, by using cartoons, we invoke the visual, as well as the auditory senses, providing an effective environment for making learning easier.

By showing the suitable cartoon(s), the teacher would be able to place vital teaching points in an exceedingly short or compact kind while not having to mention or repeat several words.

Richard (2003) pointed out in his study that information is represented in the thinking process in Verbal and Imagery dimension style. For instance, it is possible to set down thoughts on paper in two possible ways - in words or in sketches after reading any novel, concept, story, or idea - so they may also be represented during thinking in those two modes. People can think in words, or they can think in terms of mental pictures or images. On this dimension, people may be categorized as Verbalizers or Imagers. Verbalizers think about the knowledge they scan, see, or hear, in words or verbal associations. When Imagers consider information, they experience fluent, spontaneous, and frequent mental pictures either of representations of the information itself or of associations with it.

It is incontestable that cartoons have variety of uses. Cartoons can be used individually, in pairs, small groups and even in large lecture classes. Many researches have been conducted in the field of education from elementary to higher level education because Cartoons are a wonderfully versatile medium in enhancing teaching and learning. Visually, the impact of cartoons is immediate, irrespective of age or background, and are able to convey in some ways to the educational point being made. With the mixture of words and caricatures or pictures, it can attract attention and interest. Other desideratum benefits are the promotion of understanding, motivation towards learning, improved attitudes, productivity and creativity. Cartoons can also improve the relationship between teacher and students as cartoons produce a light and playful mood. However, those who associate learning only with more formal classroom activities may see cartoons as a waste of time and do not take their valuable contributions seriously. In fact, every learner responds instantly to cartoons as per his/her personal interpretation. In interacting with the cartoons' stimuli, they are refining their own learning and understanding while at the same time, being encouraged to develop critical higher order cognitive skills.

Concept cartoons, as prompted by Keogh and Naylor (1996) believed that this approach encompasses a direct and immediate impact within the room. They seemed to promote a purposeful approach to practical work. It has been found that concept cartoons result in variety of learning developments like a shift from negatively-worded statement to positively-worded statements, a shift from statements to questions and a shift from single alternatives to multiple alternatives. Concept cartoons are supposed to be a place to begin to stimulate discussion and for eliciting ideas from the learners, and thus students will be able to contemplate on their thoughts, feelings and opinions

Cartoons are commonly used in science teaching. However, sociologically, cartoons are also strong means for providing social and political comment. (Ziegler, 1998) As a result of this, typically they reveal the distinction between perception and reality (Witkin, 1999).

By nature, cartoons typically exaggerate a specific side or state of affairs that may facilitate specialization in an appropriate teaching/learning purpose. They are seen as a neutral resource, and students are able to respond, joke about possible interpretations, and react to the exaggerations without being offended. Cartoons are often used with students to objectively analyze everyday social behaviour and a stimulant to

reflection on attitudes. Without a doubt, the employment of cartoons would certainly promote a high level of involvement among learners who are normally reluctant to get involved in discussion. In this direction Wyk (2011) also conducted a survey on Bachelor of Education students, through which it was pointed out that Cartoons positively enhance constructive learning, cooperative learning, and collaborative learning amongst peers in Economics classroom. Oskey and Efil (2016) revealed that concept cartoons in Chemistry affected secondary level students' academic achievement in positive ways and also provided them with the opportunity for the reasoning. The reason behind the positive effect of cartoons on the academic achievement may be that learning can be enhanced with the use of cartoons over other visual media as it is usual in this media for visual distractions around the focal point of the image to be reduced, allowing people to concentrate on the issue at hand (Fleischer, 2010). Similarly, OzayKose (2013) studied the effect of cartoons on the achievement in Biology subject by mixed method research design. In the study it was found that achievement of experimental group was higher than the control group. Cartoons are meant to humor also which brings many desirable effects in the classroom. It increases students' attention and motivates them to participate in lessons (Ulloth, 2002). In the same way, Rule and Auge (2005) conducted a study with sixth graders for teaching concepts of Minerals and Rocks, in which they found that students in the experimental condition exhibited higher motivation and significantly gain higher scores than students in the control condition. Furthermore , Ertugrul (2010) found that students in the treatment group got significantly higher scores than the students in the control group when concept cartoons were used for teaching the concept of heat transfer. In addition, it was also observed that instructional comics increased the participation of reluctant students in the classroom.

The study also revealed that students' higher performance was attributed to their intense engagement with the content through the scaffolded cartoon activities. In addition to this, Eker and Karadeniz (2014) researched for the effect of cartoons on the retention scores of students in social studies. These researches showed that cartoon was more effective than the teaching based on traditional methods, in relation to their retention score. This result has been consistent with the research results of Mauro ve Kubovy, 1992; Kılınç, 2006; Durualp, 2006; Ozalp, 2006; Toh, 2007; Kose, 2008; Üner, 2009; Şengul, 2011. This emphasizes that drawing the cartoon/s in the lesson increases academic achievement. According to the results that had been attained by Oren and Meric's (2014) study, the students stated that it is necessary to continue using that technique in science and technology course. In addition to this, students also stated that courses taught with concept cartoons were enjoyable and there had been deep and long- lasting learning. Inel and Balm (2013) concluded from their research that including concept cartoons in the module helped to make lesson entertaining, encouraged active participation in learning process and made the learning process meaningful and permanent for the students. For investigating the views and opinions of teachers regarding the utility of cartoons in teaching –learning process, they have been executed also, using concept cartoons in instruction to rescue students from boring traditional lecturing, helping teachers improve their instruction and align it with the constructivist learning theory, making the lecture more interesting and entertaining and students becoming more actively involved in the lecture. Moreover, concept cartoons create discussion environment where students can improve their critical thinking skills and influence in positive way students' attitudes towards the lesson in particular and school in general and may have an important role in improving students' academic achievement. (Birisci, Metin and Karakas, 2010).

Similarly, Khalid , Meerah and Halim (2010) also stated that teachers had positive view towards using cartoons in teaching and learning process of Physics as it created positive learning environment for the

students and were able to stimulate students' imagination and creativity. It is unquestionable that for deciding the appropriate pedagogical strategy it is also crucial to know the students' preferences for the instructional approach for the subjects, so that desirable outcomes of the learning can be obtained by the students also. For this purpose, Sexton (2009) conducted a research for investigating the preferred approach of the students to mathematics' teaching-learning process by using concept cartoons based on behaviouristic and Constructive approach . Thus, the concept cartoons provided a way of accessing information about student learning preferences too. These cartoons, used primarily in science education, have proven to be a purposeful assessment tool and a useful way of accessing student preferences. Another study done by Kaplan (2015) in mathematics' education for investigating the effect of concept cartoons on academic achievement in instruction on the topics of Divisibility, revealed that students, who were taught by concept cartoons, showed significant difference in their academic achievement than the students taught by activity based instruction. So, cartoons can be used as a potential pedagogical tool in mathematics also. In the same way, Sengul and Dereli (2013) also indicated that use of cartoons promoted the social learning environment which was very jubilant for the students and made their attitude positive for the mathematics subject. Other than this, in the medical education field also Junhasavasdikul, Sukhato, Srisangkaew, Ampornpunt, Anothaisintawee and Dellow (2017), revealed that post test learning score of cartoon –style handout was higher than the traditional handout and cartoon style handout was also successful in attracting the attention of the preclinical medical students.

Zousel, Rule and Logan (2013) studied primary grade students in which they compared the concept learning with enjoyment about perfectionism by bibliotherapy and cartoons. This study demonstrated that students were more engaged while being taught by the cartoons which gave them opportunity to appreciate humor and encouraged to be creative.

The Researcher recommended the use of both bibliotherapy and cartoons combination. Rabbani and Amri (2017) conducted a quasi experiment with pre-test/post-test with Fourth Grade students in order to investigate the effect of cartoon/s on the awareness of water issue in social studies. From the study, it was concluded that using cartoon/s increased the awareness of water issue among the students. In addition to this the Researchers also observed a changed interaction pattern for those students who were considered as less active in class. Along with these results, strong positive attitudes toward using the cartoons in social studies was also revealed. Researchers have demonstrated that cartoons are engaging and supportive educational tool by which students enjoy the lesson till the end of the class. Moreover, cartoons make students more attentive. The aforementioned pedagogical utilities of the cartoons are also supported by the study conducted by Yin and Fitzgerald (2017). This study was a mixed method explanatory design with quantitative methods which were followed by a follow –up interview. They found that critical thinking and performance was correlated with peer learning with concept cartoons. The results also revealed that cartoons were able to improve attitudes, increase productivity, creativity, and divergent thinking in Economics education. Srinivasalu (2016) also experimented with cartoons in teaching and learning process of History. In this study positive effect of cartoons was found in the achievement of the secondary level students. The pedagogical importance of cartoons as an effective instructional material of language has been considered by some studies also. In this direction Sharma (2016) examined the effectiveness of teaching English writing skill by using cartoons through experiment. After analyzing the data gathered by feedback forms and Achievement Test, it was revealed that there was amelioration in writing skills, and it sustained the interest in the English classroom.

3. Precautions for Selecting Cartoons for Teaching and Training

Selection of the method of teaching often comes after the setting of the learning objectives. The method selected should respond to the learners' needs, not the teacher's, or the facilitators'. The same procedure applies to the selection of cartoons. It is through the careful selection and use of appropriate and relevant cartoons that an element of humor can be introduced, where appropriate, without distracting from the intention of the teaching situation. When we have decided on the particular cartoon/s to be used, it is essential to practice using it at least once with a group of learners. This will help find out if the cartoon selected is going to work in the expected way with the expected results. The cartoons selected must be evaluated for their worth and effectiveness. If they do not produce the desired effect, then it might need to be scrapped or modified. There is a need for a careful balance with humour and the content that we would like our students to learn." (Khauan Wai Bing and Chua Hong Tam 2003, Taher Bahrani Rahmatollah Soltani, 2011). In the same line, the following tips can also help the teachers to better utilize cartoons in their classrooms:

- Use cartoons that are interesting to the students
- Carefully select the cartoons, keeping in view the goals of the specific subject
- It is essential to practice using them at least once with groups of learners before finally including in the textbook.
- Overuse of cartoons or possible "unintended consequences", particularly of caption humour, which are sensitive to certain groups of people in culturally diversified society, must be avoided.

Following criteria can be used to review the cartoons:

- Based on visual relief and fun
- Improve teaching and learning
- Provides background information in the text to help the students appreciate the message
- Helps to expand students' imagination
- Be sensitive with respect to various caste, ethnic, religious, gender and regional minorities-- messages the cartoons give about the people and political Institutions.

Conclusion

As teachers, we are constantly looking for new ways of teaching to enable learners to be actively involved in their own learning particularly in developing their real life experiences. In this respect, cartoons can make a valuable contribution, if they help the doors of the conversation in classes to be opened up. This is because cartoons provide visual impact, which is immediate and permanent. As a matter of fact, cartoon *as* a visual media, having a lot of humor, either in the form of single picture or series of pictures, captioned or non-captioned-- have been found very effective by many researchers. This kind of artistic and creative pedagogical material helps the teachers to develop imaginative powers amongst students by building proper knowledge. Cartoons can be helpful for initiating debate and focused group discussions in a classroom among learners as it stimulates them and engages in critical thinking – and their views and opinions can be assessed. However, like any teaching strategy, one has to be careful not to overuse cartoons otherwise their effect will be diminished, if not lost.

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Brown v. Unnikrishnan: A Tale of Two Landmarks

Dr. Suman Lata

Abstract

Rise in the powers of Judiciary and increasing dependence on courts for the declaration and promotion of socio-economic rights in democracies is a global phenomenon. Proactive role played by Judiciary in safeguarding rights of citizens through creative interpretation of the Constitutional tenets and adapting to the changing structures of society and rights discourse, has generated a debate about the role of Judiciary. It has earned all types of positive and negative titles ranging from saviour, pioneer, activist, over enthusiastic, usurper etc. Efficacy of judicial pronouncements, in the area of socio-economic rights, is a moot point getting mixed responses from scholars. This paper discusses the role of Judiciary, in the area of school education with specific reference to two landmark judgments by the Supreme Courts of the United States of America and India. It is an attempt to understand the significance of these two judgments in terms of their implementation and impact.

Key Words: Brown, Judicial Activism, RTE, Segregation, Unnikrishnan

Two developments in the area of school education in two countries, are vastly different in very many ways, which promised to change the way children would go to schools in these countries. One is an, undisputed super power and the other is a struggling nation with many challenges ahead to tackle poverty and backwardness. What is common between the two, however, is commitment to democratic ideals and a robust independent Judiciary. The most important thread that binds the two developments, discussed in the paper are, that both are the result of a proactive role played by a branch of the government that is not supposed to step into policy making, i.e., Judiciary. Both triggered a debate about the boundaries of the role of Judiciary in a democracy. Both also brought in to focus the efficacy or otherwise of judicially mandated policies. This paper discusses these two cases which 'revolutionized' school education in the United States of America and India, respectively. One is famously known as the Brown case and the other as Unnikrishnan case and will be referred to as such in the paper.

Brief History of the Cases

The Brown v. Board of Education of Topeka in the USA in 1954 is a landmark case in which the Supreme Court ruled against the prevalent racial segregation in schools. Prior to this judgment, it was a common and legally and socially acceptable practice in the USA to have separate schools for 'white' and 'black' children. Racial segregation in public utilities was a very common practice. In 1896, another famous or rather infamous case known as Plessy v. Fergussen (Plessy v. Ferguson 163 U.S. 537) challenged racial segregation in public services such as trains and buses. There were 'white only' and 'black only' trains and buses. A black man, Homer Adolf Plessy refused to vacate seat in the 'white only' compartment and was arrested and later fined. He appealed against his punishment citing 'equal protection clause' of the Fourteenth Amendment of the

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Constitution that mandates all states to provide equal protection under law to all the people including non-citizen[1]. His appeal was rejected by the court and later by the Supreme Court of Louisiana. If the facilities provided were at par, ruled the Court, then there was no violation of the principle of equality. 'Separate but equal' became a famous doctrine which legitimized segregation of blacks and whites in almost all spheres. This continued, till the Brown judgment overturned the Plessy judgment.

In the Brown case, Oliver Brown's daughter Linda Thompson Brown, along with others was denied admission in an all white elementary school in Kansas. Brown and others challenged the denial of admission in the Kansas court, but the state Supreme Court did not give them any relief. Plessy's 'separate but equal' plea was taken by the defendants that the other school for blacks had equal facilities and hence there was no violation of anybody's rights on the principle of equality. The judgment was challenged in the Supreme Court. Under the umbrella of NAACP (National Association for the Advancement of Colored People), five similar cases including that of Oliver Brown were brought before the Supreme Court of USA. The Court agreed to look into the matter and clubbed all such cases together as one case with the title, 'Brown v. Board of Education of Topeka'. It took about three years for the case to conclude. Finally, after lot of interesting debates and initial differences, a judgment overturning the Plessy judgment was unanimously passed by the Supreme Court. The Court declared that in the field of education 'separate but equal' had no place and made famous the new doctrine that 'separate is inherently unequal.' This judgment was hailed as a landmark judgment giving tremendous impetus to civil rights movement against segregation in other areas too. The Court continued to pass further orders to desegregate schools in the USA.

Unnikrishnan v. State of Andhra

Coming to the Unnikrishnan case in India, it all started when in 1991, Mohini Jain, a medical aspirant got admission in a medical college in Karnataka but was asked to pay much more than students admitted under 'government seats' and those belonging to state of Karnataka as per a notification issued by the government of Karnataka. Jain filed a writ petition in the Supreme Court challenging the notification of the government as a violation of her Fundamental Rights. (Mohini Jain v. State of Karnataka 1992 3 SCC 666) One of the issues among others that came up before the Court was whether education was a Fundamental Right under the Indian Constitution or not. Fundamental Rights, granted by the Constitution, are special rights as these are justiciable rights. It means citizens can approach the Judiciary in case of any type of violation of these rights by anybody. Courts can declare any legislation or policy as void if it violates Fundamental Rights. The Fundamental Rights mentioned in the Constitution did not include right to education as one. That was the plea taken by the defendants in the case. Educational rights figure in the Directive Principles of State Policy (DPSP), which are 'in the nature of guidelines' for the government and are non-justiciable. Citizens cannot approach the judiciary for the implementation of these Principles. In 1992, the Supreme Court passed the judgment in the case which is a classic example of ingenuity of the Court in interpreting Article 21 of the Constitution pertaining to life and liberty. Article 21 reads as under:

'No person shall be deprived of his life or personal liberty except according to a procedure established by law'.

Interpretation of Article 21 had already been expanded by the Judiciary in some earlier judgments to conclude that 'Right to Life' went beyond mere physical existence and meant right to be able to live with dignity. The Court reiterated those judgments and specifically pronounced:

> The Right to Education flows directly from Right to Life. The Right to Life under Article 21 and the dignity of individual cannot be assured unless it is accompanied by the Right to Education. The State Government is under obligation to make endeavour to provide educational facilities at all levels to its citizens. The Fundamental Rights guaranteed under Part III of the Constitution of India including the right to freedom of speech and expression and other rights under Article 19, cannot be appreciated and fully enjoyed unless a citizen is educated and is conscious of his individualistic dignity. The "Right to Education", therefore, is concomitant to the Fundamental Rights enshrined under Part III of the Constitution. The State is under a constitutional-mandate to provide educational institutions at all levels for the benefit of the citizens. (http://india.lawi.asia/miss-mohini-jain-v-state-of-karnataka-and-ors-2/

The judgment, specifically the issue of declaring education at all levels as a Fundamental Right was hotly debated. This was quite a sweeping judgment as it declared Right to Education as a Fundamental Right at all levels of schooling as well as higher education. Some scholars found it to be flawed and impractical, while others hailed it. Again, the Supreme Court was called upon to have a re look at the judgment and the Court revised its own judgment in the landmark case of Unnikrishnan J P & Others v. State of Andhra. (Unnikrishnan J.P. v. State of Andhra Pradesh 1993 1 SCC 594, 603, 605, 645) In this case, the Supreme Court again examined the issue whether as per the Constitution; education at all levels was a Fundamental Right or not. This judgment is very important because of the way the Court interpreted the relationship between the Directive Principles and Fundamental Rights. The Court reiterated that Right to Education flowed from Article 21 but considering Article 45 of the DPSP, it declared that the responsibility of the State to provide free and compulsory education was up to fourteen years of age. So, it declared that education up to fourteen years of age, i.e., elementary education is a Fundamental Right as per the Constitution. The declaration by the Court necessitated Amendment to the Constitution and Right to Education was added to the list of Fundamental Rights.

Creative Interpretation by the Judiciary

How did the two cases come up before the Judiciary? Judiciary can take cognizance of certain situations on its own, i.e., suo motu. But both the cases were brought up before the Judiciary by the concerned parties. The Brown case was a class action suit, against the State, somewhat resembling our Public Interest Litigation. Mohini Jain and Unnikrishnan too were brought before the court by the affected parties for personal grievance redressal. Irrespective of how these cases landed in the courts, what matters is how the opportunity was used by the two Supreme Courts to interpret innovatively the existing Constitutional provisions. The judges went by what seemed to be just to the judges rather than what would have been purely a sterile interpretation of legal provisions which is ostensibly the mandate of the Judiciary. It would not be an exaggeration to say that the Courts first realised what justice demanded and then found a Constitutional way out. Both the judgments fall under the tag of 'Judicial Activism', a much explained, debated and still a controversial term. The two judgments generated lot of scholarship on the role of Judiciary as such.

Judicial Activism: Courts' Interpretative Creativity

Judicial Activism is a term that has many connotations, positive as well as negative. It has its critics and supporters. Traditionally the role of Judiciary is to interpret the Constitutional tenets and decide cases based on that. Many Constitutions, including Indian Constitution, have granted the Judiciary the power of 'judicial review'.[2] It means the Judiciary has the power to declare null and void any legislation or policy which goes against the spirit of the Constitution. Whenever a Judicial decision seems to be intruding into the domain of legislature and the executive, it is termed as Judicial Activism, i.e., the act of the Judiciary beyond its Constitutional mandate. Any such decision is either lauded or condemned depending upon the impact on the affected parties. World over in democratic countries, Judiciary is frequently stepping into the domain of other organs of the government because of a variety of reasons.

Both Brown and Unnikrishnan have the traces of Judicial Activism. Judicial Activism is generally understood as an act of Judiciary wherein, the judges, in order to protect or expand individual rights, go beyond 'the established precedent or are independent of or in opposition to supposed Constitutional or legislative intent.'[3] In both the cases under consideration, the judgments contain strong reference to the significance of formal education in modern times. Being sensitive to the importance of the role of education in social upliftment, the judges were keen to safeguard the educational opportunities of citizens. It is worth quoting a little longer extract from the Brown judgment to appreciate sensitivity of the Court to the issue of educational opportunity:

> "Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principal instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms. We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other "tangible" factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe it does." (JUSTIA US Supreme Court)

Once convinced of the importance of real equal opportunity, the Court discarded the precedent to look for other evidence in favour.

In the Brown case, the Supreme Court of USA did not go by Plessy precedent though it was a similar case. Rather, the Court reversed the earlier verdict legitimizing segregation. Plessy case had declared that if the facilities and services provided are equal, then segregation does not violate the Constitutional provision of equal protection before law. Going by that precedent, Brown had no genuine claim in asking for desegregation or rather integration. That is why plaintiffs lost the case at the state level. Supreme Court could have done the same. Here the act of the Court of "overruling Judicial precedent" meets one of the strongest criteria of Judicial Activism as propounded by leading Constitutional scholar, David Strauss.[4] Adapting to the changed environment, the Court went by sociological and psychological studies to overturn the precedent. The Court depended upon the famously known "dolls experiment" by Dr. Kenneth Clark and his wife. The couple had

conducted a number of tests using black and white toy dolls to study the impact of segregation on black children. Their study concluded that due to segregation black children developed a sense of inferiority and even internalized the negative attitude towards African Americans. (James 2014). The judgment observed:

> Segregation of white and colored children has a detrimental effect on the colored children. The impact is greater when it has the sanction of law; for the policy of separating the races is usually interpreted as denoting the inferiority of the negro group. A sense of inferiority affects the motivation of a child to learn. Segregating with the sanction of law, therefore, has a tendency to retard the educational and mental development of Negro children and to deprive them of some of the benefits they would receive in a racially integrated school system. (Brown, 347 U.S. at 494).

The final judgment refers to the findings of Clark couple in a foot note. The landmark judgment was celebrated among African Americans. At the same time, there were protests against the judgment.[5] The judgment did not go down well with many legal scholars also who felt that the Court had gone beyond its Constitutional mandate by taking recourse to sociological evidence as against the established norms of following precedent. Some even questioned the validity and methodology followed by Clarks to reach the conclusions they did.[6] After a year, in 1955, the Court delivered Brown ii verdict for clarifying the deadline and modalities of the desegregation process. The Court ordained that the desegregation should be implemented 'with all the deliberate speed.'[7]

Similarly, in the Mohini Jain case (which is actually a precursor to Unnikrishnan), the Supreme Court of India like the Supreme Court of the USA, emphsised the importance of equal access to education. In the words of the Court:

> The Preamble (Constitution of India) promises to secure justice " social, economic and political" for the citizen…The objective flowing from the Preamble cannot be achieved and shall remain on paper unless the people in this country are educated. The three-pronged justice, promised by the Preamble is only an illusion to the teaming-millions who are illiterate. It is only the education which equips citizens to participate in achieving the objectives enshrined in the Preamble…The dignity of man is inviolable. It is the duty of the state to respect and protect the same. It is primarily the education which brings forth the dignity of a man…An individual cannot be assured of human dignity unless his personality is developed and the only way to that is to educate him". (https://indiakanoon.org/doc/40715)

Thus, convinced of the need to provide education to the 'teaming-millions', the Court went about deliberating whether education is a Fundamental Right or not. Arguments put forward by the defendants that Indian Constitution did not recognize education as a Fundamental Right was quite self explanatory. A Judiciary confining itself to a conservative role of interpreting the Constitution would not even have discussed the issue. During the drafting of the Constitution, the Constituent Assembly had debated the issue and finally 'free and compulsory education up to fourteen years of age' was relegated to the Directive Principles of the State Policy and not the justiciable fundamental rights.[8] It was not an act of omission. Rather it was a well thought out deliberate move on the part of Constitution framers. So where was the scope for any other interpretation? But since the judges were conscious of the three essential dimensions of justice as envisioned in the Preamble, they took the 'activist' route of innovative interpretation of the Constitution in sync with the need of the hour. Luckily, the Court had Judicial precedent of creative interpretation of Article 21 in the Fundamental Rights. [9]

Here, the Court combined the spirit of DPSP and the liberal interpretation of Article 21 together to bring the Right to Education in the 'justiciable' fold. The judgment explained:

> Although a citizen cannot enforce the Directive Principles contained in Chapter iv of the Constitution but these were not intended to be mere pious declarations…The Directive Principles which are fundamental in the governance of the country cannot be isolated from the Fundamental Rights guaranteed under Part iii. These principles have to be read in the Fundamental Rights. Both are supplementary to each other. The state is under a Constitutional mandate to create conditions in which the Fundamental Rights, guaranteed to the individuals under Part iii, could be enjoyed by all. Without making Right to Education under Article 41 of the Constitution a reality, the Fundamental Rights under Chapter iii still remain beyond the reach of large majority which is illiterate.

Based on this line of interpretation and a strong conviction to equip citizens 'to participate in achieving the objectives enshrined in the Preamble', the Court came up with a sweeping judgment to declare education at 'all levels' including higher education a Fundamental Right. However, this was too broad a verdict and was challenged in the famous Unnikrishnan case. Once again, the Court was called upon to have a relook on the issue of education being a Fundamental Right along with a host of other related issues such as role of private enterprise in education and mainly the issue of capitation fee. This time the Court revised and 'corrected' its own judgment. Interestingly, the Court's stance on the role of education in a democracy remained unchanged rather sounded more passionate. The judgment waxed eloquent on the significance of education. Sample the following:

> Victories are gained, peace is preserved, progress is achieved, civilization is built up and history is made not on the battlefields where ghastly murders are committed in the name of patriotism, not in the Council Chambers where insipid speeches are spun out in the name debate, not even in factories where are manufactured novel instruments to strangle life, but in educational institutions which are seed-beds of culture, where children in whose hands quiver the destinies of the future, are trained. From the ranks will come out when they grow up, statesmen and soldiers, patriots and philosophers, who will determine the progress of the land."(https://indiakanoon.org/doc/1775396)

In Mohini Jain case, the Court had focused on all the three Articles-41,45 and 46 in the DPSP[10] and particularly on Article 41which states:

> The State shall, within the limits of its economic capacity and development, make effective provision for securing the right to work, to education and to public assistance in cases of unemployment, old age, sickness and disablement, and in other cases of undeserved want.

In Unnikrishnan Case, the Court maintained the expanded meaning of Article 21 but in deciding upon the relationship between DPSS and Fundamental Rights, particularly picked up Article 45 which stated:

> The State shall endeavour to provide within ten years from commencement of this Constitution, for free and compulsory education to all children until they complete fourteen years of age.

The Court pointed out that this was the only Article in DPSS that had set a time limit of ten years and if 'endeavour has not been made till now to make this Article reverberate with life and articulate with

meaning, the Court should step in.' Emphasizing on the complementary relationship between the DPSS and Fundamental Rights, the Court ordained:

"The right to free education is available only to children until they complete the age of 14 years. Thereafter, the obligation of the State to provide education is subject to the limits of its economic capacity and development."

Incidentally, the judgment refers to the Brown judgment and the excerpt quoted above. This is how the ingenuity of the Court in interpreting the Constitution gave the children of this country a fundamental, justiciable right to elementary education. Just like the Brown judgment in the USA, this judgment activated the civil society that demanded legislation on the subject.

Impact of the Judgments

There is no doubt that the judgments were real milestones in the history of education in the two countries. Lot of effort and jurisprudential jugglery went into these. But the moot question is how effective the judgments have been in realizing their purported objectives of desegregation and universalisation of elementary education? The question brings forth the issue of effectiveness or otherwise of judiciary mandated socio-economic rights. A plethora of literature is available on the Brown verdict and its aftermath. In contrast, the Unnikrishnan verdict generated different type of debate. It is not much about questioning the role of Judiciary as such but mainly about how the judicial mandate was dealt with by the government.

Impact of Brown Judgment

Since Brown happened about more than six decades back, there has been enough time to examine the impact of judgment. While initially the verdict was celebrated as a big victory for the coloured people, a number of scholars who studied the impact of the judgment on desegregation and the civil rights movement later on, have commented on the inefficacy of the judgment in bringing about any major change in racial equality. Prominent among such scholars is Gerald Rosenberg, who has written extensively on the impact of the judgment and the role of U.S. Supreme Court in bringing about social change. The rhetorical title of his controversial book, 'The Hollow Hope: Can Courts Bring About Social Change?' published in 1991, began a debate on the issue with scholars either supporting him or thrashing him. In the second expanded edition of the book in 2008, not only did he respond to his critics but with further evidence proved his point that the U.S. Court being a 'constrained' court[11], was incapable of delivering effective social rights, rather as in the Brown case, it had the opposite effect because of the resistance to the verdict. Other prominent scholars to join the bandwagon are Klarman, Patterson and to some extent Tushnet[12] among others. They argue that in any case, the change would have occurred without the Court's intervention and it was a waste of time and resources. Critics have also lamented that even after sixty years of the verdict, racial equality is a distant dream. In one of his articles, Patterson quotes Linda Brown Thompson, 'the Brown of Brown v. Board' as saying on the fortieth anniversary of Brown, "Sometimes I wonder if we really did the children and the nation a favor by taking this case to the Supreme Court. I know it was the right thing for my father and mother to do then but after nearly forty years we find the Court's ruling unfulfilled". She went on to suggest that it probably couldn't or wouldn't be, given the nature of American society.' (Patterson 2001p. 10).

On the other hand, there are those who think that even if the Brown verdict did not lead to immediate or eventual integration in public schools, it still had other intangible positive impact in the sense of giving impetus to civil rights movement in general. (Neil G. Williams 2004). Then there are others who think that evaluating the impact of the verdict is a little complex. On the one hand, it stands as a 'landmark emblem of social justice' and at the same time it is a pointer to the' limitations of the court led justice'. (Martha Minow 2014). Despite such contrasting views, there seems to be a consensus that the Court's verdict did not have any immediate impact and it has been a long and still- continuing journey towards racial equality and that Judiciary, even when working as a catalyst cannot achieve the desired objective without the active participation of government and civil society.

Impact of Unnikrishnan Judgment

Efficacy of Indian Supreme Court's decision in making Right to Education a reality has not been studied on the lines of Brown studies in U.S. that focus on a particular verdict and its impact. However, there are studies on the efficacy of the Supreme Court, in the area of socio- economic rights in general wih passing references to Right to Education verdict. After the pronouncement of Unnikrishnan judgment, focus of activists and scholars was mainly on seeing to it that the verdict found its way in to the Fundamental Rights. But the very fact that it was only in 2002, almost nine years after the SC verdict that 86th Amendment to the Constitution included Right to Education in the list of Fundamental Rights shows that the Court's verdict did not have any immediate impact. The Amendment added to existing Article 21 on protection of life and personal liberty by inserting Article 21A which reads:

The State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may by law determine.

Amendment also introduced corresponding changes in Article 45 of DPSP and Article 51 of Fundamental Duties.[13]

Amendment was criticized by activists (Anil Sadgopal 2001) for obvious reasons because instead of declaring Right to Free and Compulsory Education 'up to fourteen years of age' as mentioned in the original Article 45 and the Supreme Court judgment, it restricted the period from six to fourteen years. Moreover, it gave the State complete flexibility by adding 'in such manner as the State may by law determine.' Subsequent to the Amendment, draft for legislation on the Right remained pending for a long time with changes being introduced from time to time after protests. Finally, it was in 2009 that the Right to Free and Compulsory Education Act for children from six to fourteen years of age was passed. So, it took almost seventeen years after the Unnikrishnan verdict for official recognition of the Right! Even though, there are hardly any impact studies on the verdict, these basic facts are self explanatory.

Recently, there have been a few studies focusing on the role of Judiciary, specifically Supreme Court in advancing socio- economic rights in general. While referring to studies on Judiciary in other countries, the studies of Indian judiciary recognize the unique nature of Indian SC in ushering socio economic rights. Regarding Unnikrishnan or Right to Education, there is no equivalence of Rosenberg's deep disappointment as such, but there is not much sanguineness about Judiciary's path breaking judgment either. Skeptics have questioned the sagacity of turning to Judiciary for the promotion of socio-economic rights. [14]Supreme

Court's jurisprudence in the matter of socio-economic rights has been variously termed as, 'declaratory rights' (S.Muralidhar(2002)', 'conditional social rights-a rare private law model of public adjudication' (Madhav Khosla 2010) and focusing on "the strength of rights rather than the remedies." (Shankar & Mehta 2008). Even the proponents of judicial intervention, in the area of socio- economic rights, believe that judicial intervention in itself is not sufficient to bring about desirable changes. Some scholars even wonder whether Unnikrishnan ruling has really been beneficial or detrimental to the cause of education. (Dam and Tewary: 2005)

Conclusion

So, where do we actually stand in terms of Judiciary mandated reforms in education with reference to Brown and Unnikrishnan? There is no doubt that such Court verdicts do generate a feel- good factor and add to the arsenal of activists with a potent weapon to press the government for their implementation or to attack it for non implementation. After the Unnikrishnan judgment, the demand for free and compulsory education became vociferous and after the enactment of RTE Act, number of petitions to seek implementation of various provisions increased manifold. Similarly, after Brown, segregation elsewhere and everywhere was challenged. But was it really worth spending so much time and effort on the part of petitioners and the Judiciary to gain these indirect effects? Would there have been the need to approach Judiciary for the realization of such basic social rights, had the other two branches done the needful on time? Can such issues be resolved without the corresponding changes in administration and societal attitude? Clearly, courts alone cannot resolve such complex issues unless supported by a willing government and enlightened citizenship.

P.S.

Linda Brown was in the news everywhere when she died at the age of seventy- five on March 25, 2018. Mohini Jain herself did not get the desired relief and J P Unnikrishnan was actually one of the petitioners who challenged the right of the State to regulate fee charged by the private institutions!

End Notes

1. Equal Protection Clause-A clause in the Fourteenth Amendment to the U.S. Constitution that declares that no state shall deny to any person within its jurisdiction the equal protection for the law. See Legal Dictionary at https:''legaldictionary.net/judicial-activism.
2. The Constitution does not specifically mention the word 'judicial review' but this power conferred upon the Supreme Court and State High Courts is quite explicit due to many Articles in the Constitution. See Articles 13, 32, 131-136, 143, 145, 226, 242 and 376. However, the Courts examine the validity of any legislation or policy only when challenged or when the issue may arise during the course of hearing a case. It is also not applicable to 9th Schedule of the Constitution.
3. Merriam Webster dictionary. https://www.merriam-webster.com/legal/judicial%20activism
4. Other forms that Judicial Activism, according to Strauss can take are-the act of overturning laws as unconstitutional and ruling contrary to a previously issued constitutional interpretation. He cites the Brown case as a good example of Judicial Activism. See Legal Dictionary at https://legaldictionary.net/judicial-activism/
5. According to Rosenberg, the judgment rather 'energized civil rights opponents'. It had to 'confront a culture opposed to that change' and the 'American Judicial system, constrained by the need for both elite and popular support, was unable to overcome this opposition'. (Rosenberg 2005 p.810)

6. For example, Clarence Thomas questioned the psychological theory developed by Clarks that children in all black segregated schools suffered from inferiority complex. (Quoted by Patterson 2010 p.10.)
7. The Court asked schools to desegregate and ordained the local authorities to see that it took place 'with all deliberate speed'. Since no specific time limit was set for the purpose, schools took advantage and did not desegregate for a very long time. See J. Chen, With All Deliberate Speed: Brown ii and Desegregation's Children. Law and Inequality: A journal of Theory and Practice. Vol. 24, issue 1. 1-9
8. During drafting of the Constitution, sub- committee on Fundamental Rights had recommended that Right to Free and Compulsory Education should be in the list of Fundamental Rights which are justiciable i.e., for any violation of these rights, Judiciary could be approached. But the Advisory Committee put the right in the Directive Principles of State Policy which are non-justiable and are guiding principles for the State to follow. (righttoeducation.in/how-was-original-article-45-constitution-arrived)
9. Article 21 has been expanded too liberally by Judiciary to interpret all sorts of rights as part of right to life and liberty. Much before Mohini Jain and Unnikrishnan, the Supreme Court in Francis Coralie vs. Union Territory of Delhi had declared that Right to Life means more than mere physical existence. The right includes, 'the right to live with human dignity and all that goes along with it, namely the bare necessities of life such as adequate nutrition, clothing and shelter and facilities for reading, writing and expressing one-self in diverse forms, freely moving about and mixing and comingling with fellow human beings'. AIR 1978 SC 597.
10. All the three Articles of the DPSP focus on education. While Article 45 was about Free and Compulsory Education up to fourteen years of age, Article 46 reads, "The State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation."
11. According to Rosenberg, in order to be effective in promoting rights of the people, Courts need to be 'dynamic'. 'Constrained Courts' cannot be effective in the implementation of socioe-conomic rights and American Supreme Court, according to him falls in the category of Constrained Court and therefore it is a 'hollow hope' to expect Judiciary to promote and safeguard socio-economic rights of the people.
12. Michael J Klarman (1994, 2004) argued that racial change would have come regardless of Court's intervention and that Brown had only a token effect on desegregation. He believed that Supreme Court decisions could not 'fundamentally transform a nation.' Patterson (2001) too called the Brown judgment 'a troubled legacy' because of the backlash and ineffectiveness but he acknowledges its contribution to civil rights movement. Mark Tushnet (2004) too generally agrees with Rosenberg and believes that actual desegregation took place only when the government pitched in and the Congress enacted the Civil Rights Act in 1964 that denied funding to discriminating districts.
13. Since original Article 45 was shifted to Fundamental Rights with some changes, it was modified as 'The State shall endeavour to provide early childhood care and education for all children until they complete the age of six years.' Additional clause 'k' was added to Article 51 A containing Fundamental Duties: 'who is a parent or guardian to provide opportunities for education to his child, or as the case may be, ward between the age of six and fourteen years.'
14. For example, Shubhankar Dam & Vinay Tewary (2005) are very critical of the activist role of Judiciary in the area of socio- economic rights. According to them judiciary presumes that 'every problem of life could be remedied by writs, orders and directions…Every problem of life is not a problem of law.'

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An Assessment of the Cooperative Learning Activities (CLA) Utilized for Learners with ADHD

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Abstract

Handling learners with handicapping conditions–special needs – requires deep love, understanding, empathy and highest degree of commitment which undeniably is the very core of service-driven teachers. This study aimed to determine the level of effectiveness of the Cooperative Learning Activities utilized for learners with Attention Deficit Hyperactivity Disorder (ADHD) in the Division II, Province of Pangasinan of the Philippines. A total of twenty-eight (28) teachers who handle learners with ADHD were considered in the study. This initially identified the profile of the Special Education (SPED) Teachers in the Division II of Pangasinan in terms of their age, sex, highest educational attainment, specialization, academic rank and seminars attended related to SPED. The Cooperative Learning Activities utilized for learners with ADHD along multi-sensory activities, group dynamics learning activities and game-based activities were also identified. The study, likewise, determined the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD along academic instructions, behavioral interventions and classroom accommodations. Lastly, it determined the significant difference between the effectiveness of the Cooperative Learning Activities utilized for learners with ADHD across their profile variables.

This study utilized the descriptive-correlational survey method of research. The Researcher-made questionnaire checklist was utilized as the main instrument in gathering the needed data of the study. Descriptive and inferential statistical tools like frequency, percentage distribution, average weighted mean, rank and ANOVA were employed to analyze and interpret the facts and data that were gathered from the respondents.

The study found out that majority of the teachers are female, 25-49 years old, Baccalaureate degree holders and have participated in international SPED-related seminars. Results have shown that Cooperative Learning Activities were utilized for learners with ADHD. Along multi-sensory activities, the respondents utilized Blind Walking which is ranked as number 1 as evidenced by the frequency mean of 3.7. Along group dynamics activities, Video Scavenger Hunt has been identified as rank 1 as supported by the mean of 4.0. Lastly, along game-based activities, the Boat is Sinking -is utilized as number one (1) in rank indicated by the mean of 2.6.

Along level of effectiveness of Cooperative Learning Activities utilized for learners with ADHD, the study found out that the Cooperative Learning Activities utilized for children with ADHD along academic instructions are highly effective as evidenced by the average weighted mean of 4.52. In like manner, Cooperative Learning Activities along behavioral interventions are highly effective as indicated by the average weighted mean of 4.49. Lastly, Cooperative Learning Activities utilized for learners with ADHD along classroom accommodations are highly effective as evidenced by the mean of 4.40. This study further found out that there is no significant difference on the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD across categories of their profile variables.

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The study concluded that SPED teachers utilized various Cooperative Learning Activities like multi-sensory, group dynamics and game-based for learners with ADHD. Cooperative Learning Activities utilized for learners with ADHD are highly effective for the academic instructions, behavioral interventions and classroom accommodations. Lastly, the profile variables of the SPED in the Division II of Pangasinan are not significantly different to the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD. Moreover, the study strongly recommended that SPED teachers should pursue higher studies not only to have the higher rank and to be promoted but to have the personal growth and professional development. Teachers should always employ various collaborative learning activities for ADHD learners to meet their educational needs and to be able to perform well in the classroom. Since Cooperative Learning Activities are highly effective in the teaching-learning process, teachers should keep themselves abreast with the new strategies in teaching so that their pupils become more interactive, engaging and productive. Lastly, SPED Teachers should be attending seminars which are internationally-based to adapt the new and effective strategies in managing learners with ADHD.

Introduction

Education for All – The major thrust of the Department of Education of the country, is that 'Every child should have the right to education' (Article IV, Philippine Constitution) [1]. Normal individuals or even the handicapped should matter. No one should be left behind in education, even if that individual has Attention Deficit Hyperactivity Disorder (ADHD).

Attention Deficit Hyperactivity Disorder (ADHD) is the most prevalent neuro behavioral disorder diagnosed in nearly 3.8 % children in the country (Philippine Census, 2002) [2]. Given the prevalence of ADHD, considerable research has explored treatment options for this population. Literature reviews and meta-analyses of treatment options including medical management, psychosocial interventions, and educational treatments are available in their respective fields (Hattie & Carroll, 2002) [3].

A lot of things were done to address this problem. Working with a holistic approach to the ADHD issue, envisions many more possibilities and strategies to help kids who have attention and behavior difficulties. As it is, most advocates of children with ADHD tend to have a conservative attitude toward the range of strategies that might help an individual child. However, the problem is that most books on ADHD tend to approve only a very few "treatments" (usually, medication, cognitive-behavioral therapy, parent training, and a few educational accommodations), while regarding 'anything else' as "unscientific."

Children with Attention Deficit Hyperactivity Disorder (ADHD) often have serious problems in school. Inattention, impulsiveness, hyperactivity, disorganization, and other difficulties can lead to unfinished assignments, careless errors, and behavior which is disruptive to one's self and others.

It is believed that to address the identified problems of the disorder, Cooperative Learning could be effective. Cooperative Learning enhances social interaction, which is essential to meet the needs of at-risk. (Johnson, 2006)[4]. Within the framework of Cooperative Learning groups, students learn how to interact with their peers and increase involvement with the classroom activities. Positive interactions do not always occur naturally and social skills instruction must precede and concur with the Cooperative Learning Strategies. Social skills encompass communicating, building and maintaining trust, providing leadership, and managing conflicts. (Maheady, et. al., 2001) [5].

Cooperative Learning has been found to be a successful teaching strategy at all levels, from pre-school to post-secondary. The developmental characteristics of school children make Cooperative Learning a good fit

of teaching strategy for the needs of the students. Young children need to socialize, be a part of a group, share feelings, receive emotional support, and learn to see things from other perspectives. Cooperative Learning groups do not separate students on the basis of class, race, or gender and the goals of middle schools are consistent with the goals of Cooperative Learning theories. It is a peer-centered pedagogy that promotes academic achievement and builds positive social relationships (Sapon-Shevin, 2010) [6].

There were identified children with ADHD in the different SPED Centers in the Division of Pangasinan II, it is for this reason that the Researcher would like to find out whether their teachers also utilize Cooperative Learning Activities in managing them.

Objectives of the Study

This study aimed to determine the effectiveness of Cooperative Learning Activities utilized for learners with ADHD. Specifically, this study sought answers to the following problems:

(a) What is the profile of the SPED Teachers in the Division II of Pangasinan in terms of their age, sex, highest educational attainment, specialization, academic rank and seminars attended related to SPED?

(b) What are the Cooperative Learning Activities utilized for learners with ADHD along multi-sensory activities, group dynamics learning activities, and game-based activities?

(c) What is the level of effectiveness of Cooperative Learning Activities utilized for learners with ADHD alongwith academic instructions, behavioral interventions and classroom accommodations? and

(d) Is there a significant difference between the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD across their profile variables?

Assumption of the Study

There is significant difference between the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD across their profile variables.

Materials and Procedure

This study has utilized the descriptive-correlational survey method of research. Descriptive research can be explained as a statement of affairs as they are at present with the Researcher having no control over variable. Moreover, "descriptive research may be characterized as simply the attempt to determine, describe or identify what is". Moreover, descriptive research is "aimed at casting light on current issues or problems through a process of data collection that enables them to describe the situation more completely than was possible without employing this method". In its essence, descriptive studies are used to describe various aspects of the phenomenon. In its popular format, descriptive research is used to describe characteristics and/or behaviour of sample population.

The Researchers used the descriptive survey because the focal point of the study was to determine the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD of schools in the Division II of Pangasinan, Philippines

The respondents of the study were the Special Education teachers who are managing children with Attention Deficit Hyperactivity Disorder (ADHD) in the Division II of Pangasinan, Philippines. A total of 28 teachers who handle learners with ADHD served as the respondents of the study. The Researcher-made questionnaire checklist was utilized as the main instrument in gathering the needed data of the study.

The instrument had three parts which reflected in **Part I**– the profile of the SPED teachers who handle the learners with ADHD in terms of their age, sex, highest educational attainment, specialization, academic rank, and seminars attended related to SPED.

Part II– elicited the Cooperative Learning Activities utilized for learners with ADHD along multi-sensory activities, group dynamics learning and game-based activities.

The **last part** focused on the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD along academic instructions, behavioral interventions and classroom accommodations as perceived by the teachers. The Researchers sought permission from the Office of the Schools Division Superintendent of the Division II of Pangasinan for the approval of administration and conduct of the study. Likewise, a letter was served to the Principals of the SPED Centers of the schools also for the approval of the administration of the questionnaire to all teachers involved. Lastly, the Researchers personally conducted and administered the questionnaire to establish credibility, integrity and authenticity of the data. Also, interview was conducted to elicit first-hand information from the respondents.

Descriptive and inferential statistical tools were employed to analyze and interpret the facts and data that was gathered from the respondents like frequency counts and percentages, mean, ranking and Analysis of Variance (ANOVA)

Result and Discussion

Table 1 **Profile of the Teachers of SPED in the Division II of Pangasinan, Philippines**

Profile		Frequency	Percentage
Age	25-49 years old	25	89.29
	24 years old and below	3	10.71
Sex	Male	5	17.86
	Female	23	82.14
Highest Educational Attainment	Master's Degree	8	28.57
	Baccalaureate Degree	20	71.43
Specialization	Guidance and Counselling	1	3.57
	Special Education	27	96.43
Position/Rank	SPET I	21	75.00
	T-1	7	25.00
Seminars Attended Related to SPED	Local	1	3.57
	Regional	6	21.43
	National	6	21.43
	International	15	53.57

Age. This is defined as the length of an existence extending from the beginning to any given time (wwww.thesaurus.com). It could be gleaned from the Table, that majority of the teachers of SPED are 25-49 years old as evidenced by twenty-five (25) or 89.29%. However, only three (3) of them are 24 years old and below as supported by the percentage of 10.71. The data imply that there is now new breed of young teachers who are equipped with the new trends in handling pupils with exceptionalities and can address the present situation of the learners with ADHD.

Sex. The Table shows that most of the respondents are female as evidenced by the frequency of 23 or 82.14% while only five (5) of them are male as indicated by the 17.86%. The result supports the common notion that teaching is still a female-dominated profession.

Highest Educational Attainment. It could be seen from the Table that twenty (20) or 71.43% of the teachers are Baccalaureate degree holders while only eight (8) of them or 28.57% are Master's degree holders. The data imply that teachers of the SPED are generally bachelor's degree holders.

Specialization. The Table shows that majority of the SPED teachers are experts in special education as evidenced by the frequency of 27 or 96.43 while only one (1) or 3.57% has the specialization along guidance and counselling.

The result implies that specialization of teachers who teach in the SPED are aligned to their field and all of them meet the requirements/criteria of becoming a SPED teacher.

As supported in the Dep Ed Order (DO) 12, s. 2011[7] - Guidelines on the Allocation of New Special Education Teacher I Items Teachers to be given item should possess any of the following qualifications: Bachelor of Elementary Education specializing in Special Education; Bachelor of Science in Elementary Education major in Special Education; Bachelor of Science in Elementary Education plus 18 units in special education at the graduate level with 3 years of teaching experience to children with special needs and with very satisfactory performance in the regular schools for the last 3 years; Bachelor of Science in Elementary Education plus 15 units in special education with 4 years of teaching experience in children with special needs and with very satisfactory performance in the regular schools for the last 3 years; Bachelor of Science in Elementary Education plus 12 units in special education with 6 years of teaching experience to children with special needs and with very satisfactory performance in the regular schools for the last 3 years; and Bachelor of Science in Elementary Education plus 9 units in special education with 9 years of teaching experience with children with special needs and with very satisfactory performance in the regular school for the last 3 years.

Academic Rank. It is shown in Table that twenty-one (21) of them or 75% having the position of SPED Teacher I (SPET 1) while seven (7) or 25% are Teacher I who are not given the item for SPED yet teaching students with special needs. The data imply that teachers are still new because majority of them are still at the basic level.

Seminars Attended Related to SPED. It could be gleaned from the Table that most of the teachers have attended international seminars related to SPED as evidenced by the frequency of 15 or 53.57%. While there are 6 or 21.43 % who have attended national seminar, there are also six (6) of them or 21.43% have attendance in the regional level. Meanwhile, there is just only one (1) or 3.57% of them who has attended

a local-based seminar which is SPED-related. Felipe's (2013) [8] article entitled, "The Importance of Seminars and Trainings in Improving Teachers' Performance" revealed that it is the goal of the Department of Education that every teacher will become not only efficient but also effective. It is in this mission, a lot of **trainings and seminars** are being conducted to improve and develop the skill of each mentor in school. The Department fully understands that everything rises and falls on the teachers' capability to bring learning at the heart of every pupil.

Cooperative Learning Activities Utilized for Learners with ADHD

Cooperative Learning is a successful teaching strategy in which small teams, each with students of different ability levels, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible, not only for learning what is taught, but also for helping his or her teammates learn—thus creating an atmosphere of achievement. (www.teachervision.com/cooperative-learning)[9]. Moore (2013) [10] defined it as an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more about Cooperative Learning than merely arranging students into groups, and it has been described as "structuring positive interdependence". Students must work in groups to complete tasks collectively towards academic goals.

Multi-Sensory Activities

Corpuz (2013) [11] stressed in her book entitled, "*Principles of Teaching 1*" that the more senses that are involved, the more and the better the learning.

Table 2a **Cooperative Learning Activities Utilized for Children with ADHD Along Multi-Sensory Activities**

Multi-Sensory Activities	Mean Rank	Rank[a]
Blind Walk	3.7	1
Blind Crossing	3.8	2
Sensual Awareness Inventory	4.9	3
Life Map	5.1	4
Solo Hour in Nature	5.5	6
Get Lost	5.5	6
Empty Your Pockets	5.5	6
Perceptual Fallibility	6.6	8
Fear in a Hut	6.8	9
Write your Own Eulogy	7.4	10

Note: **Ranking** is based on their mean rank according to most utilized activity*: 1- most utilized and 10-least utilized*

The Table 2. a shows that among the activities under multi-sensory, the respondents utilized Blind Walking which is ranked as number 1 as evidenced by the frequency mean of 3.7. Blind Crossing is also utilized being the second rank with the mean of 3.8. In like manner, Sensual Awareness Inventory is utilized by SPED teachers which has been chosen as number 3 among all other activities. Life Map (5.1), Solo Hour in Nature (5.5), Get Lost (5.5) and Empty Your Pockets (5.5) are also utilized for children by SPED Teachers. However, of all the multi-sensory activities, Write Your Own Eulogy has been identified as rank number 10 as evidenced by the mean of 7.4.

The data imply that teachers utilized multi-sensory activities for ADHD students intended to address their hyperactivity because when these activities are given premium as part of the learning process, pupils with ADHD tend to behave and have their focus in the various activities. Coinciding with this result, Slavin (2002) [12] found that the use of multi-sensory activities can enhance any lesson for students with ADHD. These students are often kinesthetic learners and any hands-on activity using manipulatives, computers, or audio/visual materials can help these learners process information more effectively. Additionally, Cruz-Maru (2012) [13] stated that routine, structure, and consistency within the classroom are very important for ADHD students. They will perform much better if there are consistent practices and routines in place within the classroom.

Group Dynamics Activities

One of the advantages of teaching group dynamics is that the subject matter itself can be created and demonstrated within the confines of the classroom—both traditional ones as well as those that make use of distance learning technologies. Group-dynamics are experiential, educational and Cooperative Learning that helps students learn about themselves, interpersonal relationships, and how groups function from a group dynamics or social psychological point of view. (Rief, 2004) [14]. Group dynamics can be understood as complex from an interpersonal relationships point of view because it involves relationships between two people, relationships between a person and a group and relationships between groups.

Table 2b **Cooperative Learning Activities Utilized for Children with ADHD Along Group Dynamics Activities**

Group Dynamics Activities	Mean Rank	Rank
Video Scavenger Hunt	4.0	1
Build a Big Structure	4.1	2.5
Lights, Camera, Action	4.1	2.5
Tallest Tower	4.5	4
Flying Cotton Balls	5.3	5
All the News	5.8	6
Dragons Den	6.4	7
Scrapheap Challenge	6.7	8
Egg Escape Rocket	7.0	9
Marble Motion	7.1	10

Note: Ranking is based on their mean rank according to most utilized activity: *1- most utilized and 10-least utilized*

It could be gleaned from the Table 2.b that Video Scavenger Hunt has been identified as rank 1 as supported by the frequency (mean) of 4.0. Lights, Camera, Action (4.1) and Build a Big Structure (4.1) ranked as 2.5 while Tallest Tower ranked 4. However, Egg Escape Rocket (7.0) has been assessed as rank 9 while Marble Motion is utilized as last among all activities. The data imply that Cooperative Learning Activities are utilized to make the pupils stronger and to make weaker pupils to be given needed care and help to make themselves strong and to develop their self-esteem. It is also believed that when possible, learners with ADHD should be placed in groups with students who can be role models.

Game-Based Activities

Game-Based Activities use competitive exercises, either pitting the students against each other or getting them to challenge themselves, so as to motivate them to learn better. Games often have a fantasy element that engages players in a learning activity through a storyline. In order to create a truly educational game, the instructor needs to make sure that learning the material is essential to scoring and winning. (Corpuz, 2013) [15].

Table 2c **Cooperative Learning Activities Utilized for Children with ADHD Along Game-Based Activities**

Game-Based Activities	Frequency	Rank
Boat is Sinking	2.6	1
Match-it	4.8	2
Fact or Fiction	4.9	3
Number Draw	5.0	4
Four Corners	5.1	5
Write-n-Pass	5.8	6
Fix-it	6.0	7
Two-Slipper Jump-over	6.8	8
Ask-n-Switch	6.9	9
Synchronized Write-n-pass	7.3	10

Note: **Ranking** is based on their mean rank according to most utilized activity*: 1- most utilized and 10-least utilized*

The Table-2.c shows that the activity Boat is Sinking is ranked number one (1) in terms of utilization as indicated by the mean of 2.6. Match-it with a mean of 4.8 is second in rank, Fact or Fiction (4.9) as the third and Number Draw is assessed as fourth in rank with the mean of 5.0. However, of all the activities enumerated along game-based, Ask-n-switch has been assessed as ranked 9 as supported by the mean of 6.9 while Synchronized Write-n-Pass has been evaluated as the last, as indicated by the mean of 7.3.The data imply that teachers utilized game-based activities because these can regulate the hyperactivity of the pupils since the energy is used in various games conducted in the classroom.

Results of the studies by (Admiraal, et al., 2011) [16] affirmed the findings of this study that game-based learning increases attention, decreases disruptive behavior in the classroom, and leads to more meaningful academic engagement.

Level of Effectiveness of Cooperative Learning Activities Utilized for Learners with ADHD

Academic Instructions

Over-all, the Table shows that the Cooperative Learning Activities utilized for learners with ADHD along academic instructions are highly effective as evidenced by the average weighted mean of 4.52. In particular, the activities like Lights, Camera, Action, Write-n-Pass and Match-it prompt the child to be always on time, Egg Escape Rocket and Boat is Sinking give the signal when to start and end the activity that entails alertness and vigor, synchronized Write-n-Pass and Scrapheap Challenge teach the child how to use watch and be very aware on how to use the time wisely and appropriately, Build a Big Structure and Fix-it provide the child with supervised opportunities to break down into a sequence of short and interrelated activities and Life Map and Dragons' Den help the child create a daily activity schedule–all are deemed to be effective to be utilized for the learners with ADHD.

Table 3a Level of Effectiveness of Cooperative Learning Activities Utilized for Learners with ADHD along Academic Instructions

Academic Instructions		Level of Effectiveness									
		Frequency									
		VHE		HE		ME		SE		LE	
		f	%	f	%	f	%	f	%	f	%
Time Management Skills											
The activities like:											
1	Lights, Camera, Action, Write-n Pass and Match-it prompt the child to be always on time	15	53.6	13	46.4	0	0.00	0	0.00	0	0.00
2	Egg Escape Rocket and Boat is Sinking give the signal when to start and end the activity that entails alertness and vigor	21	75.0	7	25.0	0	0.00	0	0.00	0	0.00
3	Synchronized Write-pass and Scrapheap Challenge teach the child how to use watch and be very aware on how to use the time wisely and appropriately	21	75.0	6	21.4	1	3.6	0	0.00	0	0.00
4	Build a Big Structure and Fix-it provide the child with supervised opportunities to break down into a sequence of short and interrelated activities.	14	50.0	12	42.9	2	7.1	0	0.00	0	0.00

5	Life Map and Dragons' Den help the child create a daily activity schedule	18	64.3	8	28.6	2	7.1	0	0.00	0	0.00
Study skills necessary for academic success											
The activities like:											
6	Perceptual Fallibility and Four Corners give the awareness and instruct the child to organize books or other materials before beginning his or her task (uncluttered environment)	20	71.4	8	28.6	0	0.00	0	0.00	0	0.00
7	Write-n-Pass and Write Your Own Eulogy instruct the child how to use instructional worksheets	15	53.6	10	35.7	3	10.7	0	0.00	0	0.00
8	Write Your Own Eulogy and All the News help illustrate and organize key concepts in reading, mathematics and other academic subjects	13	46.4	12	42.9	3	10.7	0	0.00	0	0.00
9	Write-n Pass and Match- it teach the child how to take note when organizing key academic concepts that he or she has learnt	12	42.9	13	46.4	3	10.7	0	0.00	0	0.00
10	Tallest Tower and Flying Cotton Balls keep track of how well the child completes his/her assigned task	13	46.4	13	46.4	2	7.1	0	0.00	0	0.00
Average Weighted Mean (DE)		**4.52 (Highly Effective)**									

Note: Highest frequencies are in boldface; DE=Descriptive Equivalent

Legend:

4.21 – 5.00 **VHE –Very Highly Effective**
3.41 – 4.20 **HE – Highly Effective**
2.61 – 3.40 **ME – Moderately Effective**
1.81 – 2.60 **SE – Slightly Effective**
1.00 – 1.80 **LE – Least Effective**

The data imply that learners with ADHD need to be given instructions which instill in them the development of their time management skills and are very necessary for their academic success. Results of the study of Taylor (2014) [17] affirmed in this study that all students need the skills gained from active participation in Cooperative Learning Activities. Without developing these skills (such as, the ability to analyze and evaluate multiple perspectives, manage conflict, cope with change, and appreciate cross-cultural differences), students with ADHD are at serious risk of failing as adults in a global society. Furthermore, it is believed that time

management is not very difficult as a concept, but it is surprisingly hard to do in practice. It requires the investment of a little time upfront to prioritize and organize oneself. But once done, one will find that with minor tweaks, the day, and indeed the week and month, fall into place in an orderly fashion, with time for everything one needs to do. (www.skillsyouneed.com) [18]

Behavioral Interventions. It could be gleaned from the Table that Cooperative Learning Activities utilized for learners with ADHD along behavioral interventions are highly effective as indicated by the average weighted mean of 4.49. In particular, the Cooperative Learning Activities are highly effective like Lost and Solo Hour in Nature mitigate immaturity of learners with ADHD. Sensual Awareness Inventory and Blind Crossing alleviate difficulty of learning how to control impulsiveness and hyperactivity of the children. All the News and Fact or Fiction lessen difficulty thinking through the social consequences of their actions. Boat is Sinking and Synchronized Write-n-Pass form friendships with other children in the class. Blind Walk and Fear in a Hut assist children in showing the behaviors that most encourage good learning. Blind Walk and Blind Crossing encourage children not to engage in destructive activities. Flying Cotton Balls, Egg Escape Rocket and Two-Slipper Jump-over entail use of manipulatives that help children to focus on the activity. Blind Crossing, Blind Walk, Build a Big Structure and Tallest Tower permit children to concentrate better. Empty Your Pockets, Write Your Own Eulogy and Get Lost keep children always busy. Solo Hour in Nature, Get Lost, Life Map and Sensual Awareness Inventory Support and assist to prevent learners to continuously work independently. The data imply that activities are relevant for behavioral interventions because these develop the good characters of pupils.

Table 3b **Level of Effectiveness of Cooperative Learning Activities Utilized for Learners with ADHD along Behavioral Interventions**

	Behavioral Interventions	**Level of Effectiveness**									
		Frequency									
		VHE		**HE**		**ME**		**SE**		**LE**	
		f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
The activities like :											
1	Get Lost and Solo Hour in Nature mitigate immaturity of children with ADHD	15	53.6	13	46.4	0	0.00	0	0.00	0	0.00
2	Sensual Awareness Inventory and Blind Crossing alleviate difficulty on learning how to control impulsiveness and hyperactivity of the children	10	35.7	16	57.1	2	7.1	0	0.00	0	0.00
3	All the News and Fact or Fiction lessen difficulty thinking through the social consequences of their actions.	17	60.7	10	35.7	1	3.6	0	0.00	0	0.00

Behavioral Interventions		Level of Effectiveness									
		Frequency									
		VHE		HE		ME		SE		LE	
		f	%	f	%	f	%	f	%	f	%
4	Boat is Sinking and Synchronized Write-n-Pass form friendships with other children in the class	19	67.9	8	28.6	1	3.6	0	0.00	0	0.00
5	Blind Walk and Fear in a Hut assist learners in showing the behaviors that encourage good learning.	16	57.1	12	42.9	0	0.00	0	0.00	0	0.00
6	Blind Walk and Blind Crossing encourage children not to engage in destructive activities.	17	60.7	9	32.1	2	7.1	0	0.00	0	0.00
7	Flying Cotton Balls, Egg Escape Rocket and Two-Slipper Jump-over entail use of manipulatives that help children to focus on the activity.	19	67.9	8	28.6	1	3.6	0	0.00	0	0.00
8	Blind Crossing, Blind Walk, Build a Big Structure and Tallest Tower permit children to concentrate better.	10	35.7	16	57.1	2	7.1	0	0.00	0	0.00
9	Empty Your Pockets, Write Your Own Eulogy and Get Lost keep children always busy	14	50.0	11	39.3	3	10.7	0	0.00	0	0.00
10	Solo Hour in Nature, Get Lost, Life Map and Sensual Awareness Inventory Support and Assist to prevent children to continuously work independently.	13	46.4	15	53.6	0	0.00	0	0.00	0	0.00
Average Weighted Mean		**4.49 (Highly Effective)**									

Note: Highest frequencies are in boldface; DE=Descriptive Equivalent

Legend:

4.21 – 5.00 **VHE –Very Highly Effective**
3.41 – 4.20 **HE – Highly Effective**
2.61 – 3.40 **ME – Moderately Effective**
1.81 – 2.60 **SE – Slightly Effective**
1.00 – 1.80 **LE – Least Effective**

Homes (2014) [19] said that if a student is not responsive to behavioral strategies and interventions, more intensive interventions, such as functional behavior assessment and behavior intervention plans, should be considered. No one intervention is universally effective for all students with ADHD. A combination of research-based and promising practices are recommended.

Table 3c **Level of Effectiveness of Cooperative Learning Activities Utilized for Learners with ADHD along Classroom Accommodations**

Classroom Accommodations		Level of Effectiveness									
		Frequency									
		VHE		HE		ME		SE		LE	
		f	%	f	%	f	%	f	%	f	%
The activities like:											
1	Fear in a Hut, Solo Hour in Nature and Video Scavenger lessen the difficulty of adjusting to the structured environment	12	42.9	15	53.6	1	3.6	0	0.00	0	0.00
2	Marble Motion, Egg Escape Rocket, Four Corners reduce distractions in the classroom environment and help them stay on task and learn	10	35.7	17	60.7	1	3.6	0	0.00	0	0.00
3	Write Your Own Eulogy, Blind Crossing and Blind Walking demand praises and constructive criticisms that encourage the children	14	50.0	13	46.4	1	3.6	0	0.00	0	0.00
4	Match-it, The Boat is Sinking and Tallest Tower give more time to pair written instructions with oral instructions	11	39.3	17	60.7	0	0.00	0	0.00	0	0.00
5	Tallest Tower, Build a Big Structure and All the News help the child to concentrate to address inattention	13	46.4	13	46.4	2	7.1	0	0.00	0	0.00
6	Perceptual Fallibility and Fear in a Hut ease impulsiveness to lessen the condition of the child.	9	32.1	17	60.7	2	7.1	0	0.00	0	0.00
7	Blind Crossing, Perceptual Fallibility, Empty Your Pockets and Dragon's Den provide assurance for the children's safety	12	42.9	15	53.6	1	3.6	0	0.00	0	0.00
8	Life Map, Write Your Own Eulogy,Tallest Tower, Fix-it and Ask-n-Switch provide effective calming strategies of teachers	14	50.0	12	42.9	2	7.1	0	0.00	0	0.00
9	Boat is Sinking, Synchronized Write-n-Pass, Lights, Camera Action, All the News and Egg Escape Rocket strengthen leadership role in the class	15	53.6	10	35.7	3	10.7	0	0.00	0	0.00
10	Fact or Fiction, Number Draw, Fix-it and Video Scavenger Hunt give good rewards to ease bad moods and attain success of a child.	16	57.1	10	35.7	2	7.1	0	0.00	0	0.00
Average Weighted Mean		**4.40 (Very Highly Effective)**									

Highest frequencies are in boldface; DE=Descriptive Equivalent

Legend:

4.21 – 5.00 **VHE –Very Highly Effective**
3.41 – 4.20 **HE – Highly Effective**
2.61 – 3.40 **ME – Moderately Effective**
1.81 – 2.60 **SE – Slightly Effective**
1.00 – 1.80 **LE – Least Effective**

Classroom Accommodations. Over-all, it could be gleaned from the Table that Cooperative Learning Activities utilized for learners with ADHD along classroom accommodations are very highly effective (VHE) as evidenced by the mean of 4.40. In particular, the Cooperative Learning Activities are highly effective like Fear in a Hut, Solo Hour in Nature and Video Scavenger to lessen the difficulty of adjusting to the structured environment. Marble Motion, Egg Escape Rocket, Four Corners reduce distractions in the classroom environment and help them stay on task and learn. Write Your Own Eulogy, Blind Crossing and Blind Walking demand praises and constructive criticisms that encourage the child. Match-it, the Boat is Sinking and Tallest Tower give more time to pair written instructions with oral instructions. Tallest Tower, Build a Big Structure and All the News help the child to concentrate to address inattention, perceptual fallibility and Fear in a Hut help ease impulsiveness, provide assurance for the children's safety. Life Map, Write Your Own Eulogy, Tallest Tower, Fix-it and Ask-n-Switch provide effective calming strategies for teachers. Boat is Sinking, Synchronized Write-n-Pass, Lights, Camera Action, All the News and Egg Escape Rocket strengthen leadership role in the class and Fact or Fiction, Number Draw, Fix-it and Video Scavenger Hunt give good rewards to ease bad moods and attain success of a child.

Results of the study imply that Cooperative Learning Activities are best for accommodation services because these address inattention, impulsiveness, hyperactivity, disorganization, and other difficulties among pupils with ADHD because distractions are reduced, constructive criticisms are enhanced, safety is provided, rewards are offered and leadership roles are strengthened.

Parker (2013) [20] in his book entitled, "*Accommodations Help Students with Attention Deficit Disorders*", revealed that children and youth with Attention Deficit Hyperactivity Disorder (ADHD) often have serious problems in school. Inattention, impulsiveness, hyperactivity, disorganization, and other difficulties can lead to unfinished assignments, careless errors, and behavior which is disruptive to one's self and others. Through the implementation of relatively simple and straightforward accommodations to the classroom environment or teaching style, teachers can adapt to the strengths and weaknesses of students with ADHD. Small changes in how a teacher approaches the student with ADHD or in what the teacher expects, can turn a losing year into a winning one for the child.

Table 4 **Difference between the Level of Effectiveness of the Cooperative Learning Activities Utilized for Learners with ADHD across their Profile Variables**

Profile	Wilk's Λ	Sig.
Age	. 734[ns]	.127
Sex	.860[ns]	.424
Highest Educational Attainment	. .839[ns]	. .357
Specialization	—-	——
Position/ Rank	.773[ns]	.191
Seminars Attended Related to SPED[b]	.697[ns]	.334

Note: Not Significant; [a]not included due to minimum number of cases in one category; [b]Some categories collapsed due to minimum number of cases.

It could be gleaned from the Table that the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD has no significant difference across age category as indicated by the significance value of .127 which is higher than 0.05 level of significance. Further, since sex, highest educational attainment, position/rank and seminars attended by the SPED teachers have same trend as with the age having the significance values of .424, .357, .191 and .334, respectively, it could be deemed there is no significant difference to the level of effectiveness of the Cooperative Learning Activities across profile variables because these values are higher than the alpha value of 0.05. Overall, there is no significant difference in the level of effectiveness of the Cooperative Learning Activities utilized for children with ADHD across categories of profile variables based on the values of the multivariate Wilk Λ with corresponding significance values that are greater than the set level of significance of .05. Therefore, the hypothesis which states that there is no significant difference between the level of effectiveness of the Cooperative Learning Activities utilized for children with ADHD across profile variables is **accepted**.

Conclusion

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

1. Majority of the teachers are female, relative of their age, baccalaureate degree holders, SPET 1 and have participated in international SPED-related seminars.
2. SPED Teachers utilized various Cooperative Learning Activities like multi-sensory, group dynamics and game-based for learners with ADHD.
3. Cooperative Learning Activities utilized for learners with ADHD are highly effective to the academic instructions, behavioral interventions and classroom accommodations.
4. Profile variables of the SPED in the Division II of Pangasinan are not significantly different to the level of effectiveness of the Cooperative Learning Activities utilized for learners with ADHD.

Recommendations

Based on the conclusions drawn, the Researcher strongly recommends the following:

1. SPED teachers should pursue higher studies not only to have the higher rank and to be promoted but to have the personal growth and professional development.
2. Teachers should always employ various Collaborative Learning Activities for ADHD pupils to meet their educational needs and be able to perform well in the classroom.
3. Since Cooperative Learning Activities are highly effective in the teaching-learning process, teachers should sustain using these activities for more interactive, engaging and productive learning.
4. SPED Teachers should be attending seminars which are internationally organised to adapt new and effective strategies in managing learners with ADHD.
5. Teachers have a very important role to play in creating the learning environment that enable learners with ADHD to reach their potential. Therefore, teachers should respond effectively to the needs of children with special educational needs to enhance their educational opportunities to become better citizens of the country.

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The Impact of Guidance and Counselling Services on Occupational Aspirations of Adolescents of Secondary Schools

Dr. Ashok Kumar

Abstract

The present study has been conducted to find out the impact of 'Guidance & Counselling services' and 'Occupational Aspirations' of adolescents of secondary schools of Delhi. A self-made Occupational Aspirations questionnaire and a module for Guidance and Counseling services were used to find the impact. Reliability and validity of both the tools were calculated by the investigator. The result showed positive impact of Counselling and Guidance services on the Occupational Aspirations of the secondary school adolescents. For the sample for the study, the investigator selected 9th Class of a secondary school of Directorate of Education, Delhi. Investigator selected two sections of 9th Class. Each section has 45 students (both boys and girls). One section was selected as the 'experimental group' and another was selected as a 'control group'. Thus, 90 students were selected for the study. The procedure and treatment included conducting of seventeen sessions with an average of five sessions of 40–45 minutes per week.

Results and Discussions – Experiments that apply the same kind of treatment can apply a test or measurement in two places: before the treatment, which is a Pre-test and after the treatment, which is a Post-test.

Introduction

The modern academic era is very complex, technological advancement has also positively influenced the complications. The decision-making ability of the adolescents influence positively or adversely on the academic, vocational, personal as well as occupational aspects at school level. In the present scenario, it seems most of the school going adolescents are diffident and dissatisfied with the selection of their academic stream and the corresponding occupations. Guidance and Counselling play an effective role in helping the adolescents for making right selection and taking decision to overcome these types of problems. To deal with these types of problems there is need of Guidance and Counselling services at school level.

Conceptual Framework of Occupational Aspiration

The very concept of occupation came into picture with the introduction of formal employability of certified people as skilled work force. In the wise choice of any vocation, the following three factors play an important role:

(i) A clear understanding of self – aptitudes, abilities, interests, ambitions, resources, limitations and their causes.

(ii) Knowledge of the requirements, conditions of success, advantages, and disadvantages, compensation, opportunities and prospects in different lines of work.

(iii) True reasoning on the relations of these two groups of facts (Parsons, 1909)

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Parsons (1909) gave three components of career choice, which may be called:

1. **Self-knowledge –** It includes the inquiry related to the method for helping adolescents acquiring self-knowledge through the development of measures of traits and factors (Patterson & Darley, 1936; Williamson, 1939). It includes interest measures, such as the Kunder Preference Relord (1946) and the strong vocational interest (Strog, 1943); abilities' measures; such as the differential aptitude test .(Bennet, Seashore, & Wesman 1981)
2. **Occupational knowledge –** The second inquiry is about occupational classification system which was developed to facilitate the storage and retrieval of information about the nature and characteristics of occupation. Modern classification system includes: Standard Occupational Classification Manual (V.S. Department of Commerce, 1980). Dictionary of Titles (Vocational Standard. Department of Labour, Employment Services, 1977) and Dictionary of Hall and Occupational Codes. (Fredson & Holland, 1989).
3. **Career decision making –** According to this, self-knowledge and occupational knowledge, to arrive at an occupational choice which may be viewed as a third line of career development inquiry. Parsons identified this as "true reasoning from a cognitive perspective".

Early career decision theories included Janis & Mam (1977), Gelatt (1962, 1989), Kartz (1963, 1969), and Miller – Tiedman (1977) each of which formulated career decision model that may be described in overarching five steps

Sequence:

(i) Define the problem

(ii) Understand its causes

(iii) Formulate possible alternative

(iv) Prioritize the alternative and arrive at a first choice.

(v) Implement the solution and evaluate the outcomes. (Peterson, Sampson & Reardon, 1991)

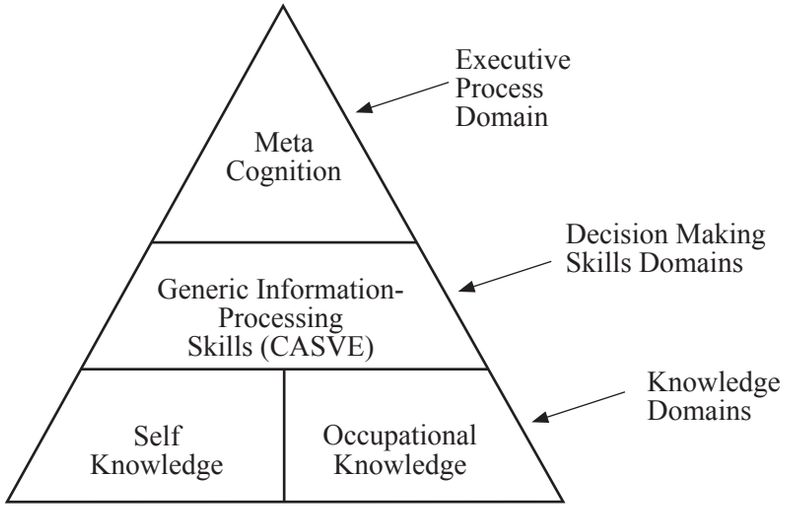

Figure 1. Pyramid of information processing domain in career decision making. (*Source:* From Career and Services: A cognition approach by G.W. Peterson, J.P. Sampson, and R.C. Reasdon.)

CASVE – Decision- making skills

C – Communication (Identifying a gap)

A – Analysis (Interrelating problem components)

S – Synthesis (Creating likely alternatives)

V – Valuing (Prioritizing alternatives)

E – Execution (forming means – ends strategies)

- The five stages of the CASVE cycle of Information processing skills are used in career decision making.

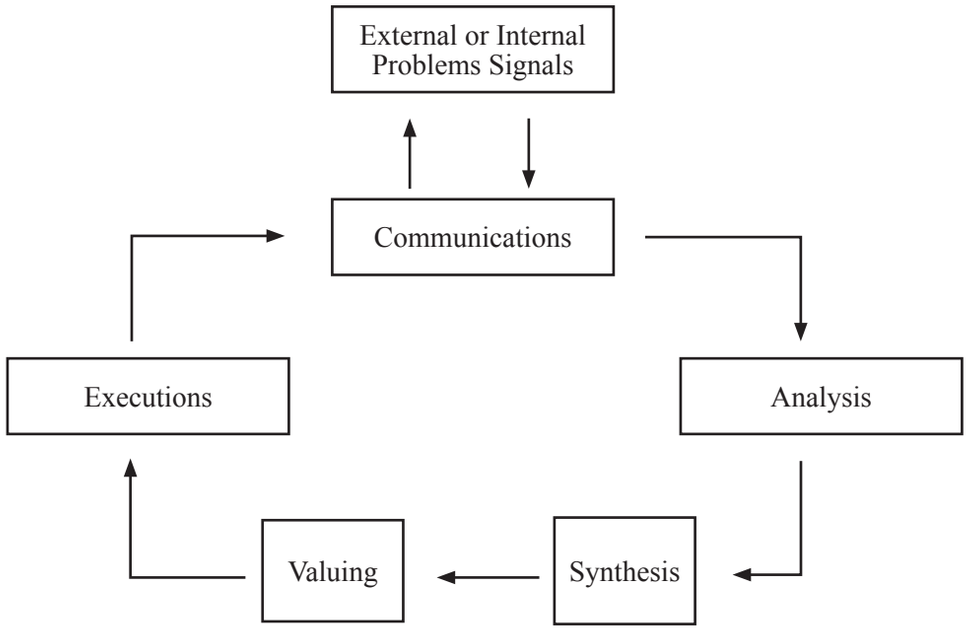

Figure 2. Five stages of the CASVE Cycle (*Source:* From Career Development and Services: A cognitive approach by G.W. Peterson, J.P. Sampson, and R.C. Readon)

Review of Related Literature

Letha & Najma (2012) in the study "Career Aspirations and Adolescents", the objectives were (i)To study the career aspirations of senior secondary students,(ii) To study the difference between boys and girls in their perception of career aspirations,(iii) To find if any difference exists in the career aspirations among students according to the type of school, and (iv) To study the perceived parental influence of senior secondary students. The findings were (i) The scores indicated that Class XI students belonging to Private, Government, Central and Government- Aided schools of New Delhi had high career aspirations. The mean score for career aspirations was highest in Private schools (89.18) closely followed by Central schools (89.00) and then by Aided schools (88.82). Among the four types of schools, the mean score was comparatively less in Government schools (84.48). The high scores show that Class XI students had thought about their future

and were very ambitious. They had strong vocational preferences and were optimistic about their future. The respondents had set high goals and they were confident of making wise decisions in subject selection. Career aspirations of students at senior secondary level differed with respect to the type of school. As indicated by the Chi-Square value of (19.13), the ambition of students regarding the career they would like to pursue in future, their anxieties, their expectations etc. varied depending on the type of schools where they studied, and the difference is not attributable to fluctuations of sampling. No Significant difference between boys and girls could be noticed with respect to career aspirations. Gender did not account for variations in career aspirations. Girls and boys studying in Class XI had similar views regarding their future career. Their eagerness to achieve a particular rank, fame or position was not distinct from one another. The differences in scores of boys and girls may be due to chance.

Kisilu, Kimani and Kombo (2012) studied **"**Factors influencing occupational aspirations among girls in secondary schools in Nairobi region – Kenya". The objectives were (i) To investigate the factors that influence occupational aspirations among girls in secondary schools in Nairobi region of Kenya, (ii) To investigate the factors which influence the occupational aspirations of girls in secondary schools, and (iii) To suggest strategies to enhance positive occupational aspirations among girls in secondary schools. Findings of the study: (i) There is need to engage on enhancing occupational aspirations for girls in secondary schools, (ii) The fact that the factors that affect the aspirations negatively lie mainly on schools, homes, and the students' personality, meaning that something not only can be done but that it needs to be done urgently, and (iii) The strategies that the study identified for remedy are practical, especially the provision of relevant information, role models, career advisors and deliberately encouraging the girls to take sciences and also to boost their self-esteem.

Josephine (2012) studied that occupational aspirations of girls were influenced by academic performance in, that the occupational success was associated with high academic performance. There is need for high academic achievement if one aspires to join the prestigious occupations.

Puhan et.al. (2014) conducted their study with an aim to explore the aggression, aspiration of adolescents studying in different types of high schools and to determine the relationship between aggression and aspiration of these adolescents. The study included 300 male and 300 female high school students as sample. They all were selected through stratified random sampling from Govt. and Private high schools. Results show that the adolescents studying in different school do not differ significantly in the matter of their aggression and aspiration. There is positive relationship between aggression and aspiration in adolescent girls of Government schools and adolescent boys of private schools.

Jennifer Gore et al (2015) in the paper, studied socio economic status and the career aspirations of Australian school students. Testing enduring assumption found that Australian Government, targets for higher education participation, had produced a flurry of activity focused on raising the aspirations of students from low SES background. In this paper researcher tested the key assumptions underpinning much of this activity that students from low SES backgrounds, hold lower career aspiration. Fewer differences were found by year level and by SES than expected,. 85 demonstrated that some conventional understanding about the relationship of age and SES to career aspiration is unfounded.

M Kaur (2012) , conducted a study on occupational aspiration as a variant of modernization and SES : A study of women professionals in Punjab -- and concluded that there exists a significant difference in

occupational aspiratiosn between male and female Secondary School teachers, working in various Govt schools. It is quite evident from the results that occupational aspiration is found more in case of urban women in comparison to rural women.

Nwachuku (2000): Career counselling is concerned with subject combination for career aspirations, career choice and career crystallization. It also helps towards knowing job requirement, and all other aspects concerned with the world of work, labour force and productivity while Ugbe, Undiandeye, Bisiong (2005) defined it as an aspect of counselling that is concerned with choice of subject in relation to aptitude, training and adjustment to occupation.

Denga (1990) agreed that career counselling, especially at the junior secondary school level, is an exploration stage where students are aware of occupational classification and explore key occupational areas as well as assess their abilities and interest in relation to occupational areas in question.

Research gap

The review of literature on the variables Counselling & Guidance and Occupational Aspiration, leads to conclude that:

- Research on Occupational Aspirations reveal that the factors like social background, intelligence, school achievement, peer group experiences, place of residence, race, sex, socio-economic status etc. have been observed as determiners of Occupational Aspiration of students. In some researches, parental education and mother's occupational status have also been observed as determining factors of Occupational Aspiration.
- While research on Counselling & Guidance and Occupational Aspirations over the last few decades have been undoubtedly prolific, it has been relatively shy of the impact study of Counselling & Guidance on Occupational Aspirations of secondary school students.

Though innumerable research have been conducted in the field of Occupational Aspirations and academic achievement, but the problem/ impact of Counselling & Guidance on Occupational Aspirations of secondary school adolescents is still unexplored. Thus, proper investigations are needed to throw light on this topic.

Relationship between Occupational Aspiration and Guidance and Counselling

Adolescence is considered as an ideal stage to study and aspirations towards aiming at occupational preferences begin at the secondary stage. Many changes occur during this stage that strongly influence the formation of occupational aspiration and preferences. Moreover, aspiration is a psychological factor, which operates and generates the feeling of success and failure.

Rojewski (2005) emphasized that "Aspirations represent individual goals given in ideal conditions, while interests reflect an individual's emotional disposition toward particular career options" (p. 132). At this stage, if adolescents could not take proper decision related to their occupational choices, then he/she would be unsuccessful or vice-versa. In this competitive era, adolescents are known as successful or unsuccessful, on the basis of the occupation selected by them, so the Guidance and Counselling help effectively in the decision making of choosing the right occupation at the right time, which is necessary to achieve success and better life.

The various factors affecting the occupational choice by the adolescents at school level have been concluded from various research studies in India as well as abroad. These factors include student factors, family factors, school factors and peer factors (Crosnoe, Johnson & Elder, 2004), socio-economic status (SES), parent's education level, parental profession, language, income and religious affiliations (Ballatine, 1993). These factors play an important role in choosing the occupation at school level. If adolescents select an occupation without considering these factors, it may create a problem or confusion for them in future. In this regard, Guidance and Counselling may become a milestone for the career of the adolescents. Therefore, Guidance and Counselling perform an effective role in selecting any occupation of secondary school adolescents.

Factors affecting of Occupational Aspiration of Students

Pennamma (1991) in her study titled **"**Patterns of Occupational Choices of Secondary School Pupils and School Leavers" aim at studying the patterns of occupational choice of secondary school pupils and school leavers. She found that the school pupils and school leavers differ in their choice of ideal, preferred and actual occupation for total sample as well as for different sub-samples such as boys-girls, urban-rural pupils, etc.

Rawat (1991) in his study titled **"**A Comparatively Study of General Mental Ability, Occupational Aspirations and Interest-Patterns of Non-Tribal and Tribal (Bhotia tribe) Secondary School Student of Pithoragarh District in Relation on their Educational Achievement" studied, the general mental ability, occupational aspirations, and interest-patterns of non-tribal and tribal (Bhotia tribe) secondary school student of Pithoragarh district in relation to their educational achievement. He found that there are no significant differences in general mental ability, occupational aspirations and educational achievements of tribal boys and girls, but tribal boys are better in mechanical and commercial interests and verbal, numerical and logical ability than tribal girls. The tribal high-occupational aspirants were found to be least interested in aesthetic senses and tribal low-occupational aspirants were found better in verbal and numerical ability.

Krishan Lal (2014) in his study titled "Career Maturity in Relation to Level of Aspiration in Adolescents" has formulated the objectives **(**i) To study career maturity in male adolescents. (ii)To study career maturity in female adolescents . (iii)To compare the career maturity between male and female adolescents. He found that (i) More of the female adolescents fall in the category of high-level vocational maturity, (ii) More of the male adolescents fall in a category of average level of vocational maturity, and (iii) More of the male adolescents fall in a category of low- level vocational maturity. Further analysis of diagram shows that most of the male adolescents had higher vocational understanding, decisiveness in vocational choices and high vocational aspirations. More of the students believe in altruism, i.e.- principle of helping other people. Male students showed more independence in job choices than girls.

Need of the Study

Individuals have to make serious choices of career or vocations for their lives. As the concerned stage (adolescence) brings to the fore different points of views, thinking and create various levels of perceptions which lead to broadening of the distances between the individuals. Mohanty (2003) emphasizes proper and effective counselling at this stage for the selections of right vocation otherwise it may lead to dissatisfaction and discomfort. Effective counselling ultimately results in behavioural changes of an individual. Fustu (2002)

agrees that counselling facilitates behavioural changes, enhancing coping skills, promoting decision-making ability and improving the relationship and facilitating one's potential.

Therefore, on the bases of above discussions the Guidance and Counselling services play an effective role for secondary school level adolescents. If the role of Guidance & Counselling services is denied at this stage, it may become a serious problem for the future of adolescents.

Objective of the Study

To study the impact of Guidance and Counselling on Occupational Aspiration of secondary school students

Hypothesis

There is no significant difference between the impact of (on the basis of pre and post test) Counselling & Guidance and Occupational Aspiration.

Research Methodology

Methods

Experimental method has been adopted for the study

Population

The population of the study is all the adolescents of secondary schools of Directorate of Education, Delhi.

Target population all the 9th Grade girls and the boys of secondary schools for the study. The sample of the study has been drawn from 9th Grade students/ adolescents. The researcher selected one school where the sample of both boys and girl students could be drawn.

Sampling

'A sample is a proportion or subset of a larger group called a population. A good sample is a miniature version of the population of which it is a part – just like it, only smaller' (Fink, 2003, p.1). The representative proportion of the population is called sample. To obtain a representative sample, the researcher selects each unit in a specified way under controlled conditions.

As this is an experimental study; the method requires small number of cases. The experimental study can be conducted on small sample, *as Borg and Gall (1983) suggested* that "in causal-comparative and experimental research, it is desirable to have a minimum of 15 cases in each group to be compared".

Procedure of the sampling

Investigator selected two sections of 9th Class. Each section has 45 students (including boys and girls) in which one section has been selected as the experimental group and another has been selected as a control group. Thus, 90 students were selected for the study. For each experimental and control group, all the students of two selected sections were taken. However, due to the absence of either pre-test or pre-test score of the sample students, the actual sample size was 54, with the response rate of 60 percent.

Tools

A Self- made questionnaire for Occupational Aspiration, a self-made module on counselling services were used.

Subjectivity of tools and literature available

The Researcher reviewed several standard tools in Indian and foreign literature on occupational aspirations such as Occupational Aspiration Scale developed by Grewal (1973), Haller, & Miller, (1971), Shah and Dhargawa (1972), Sinha (1972), Singh and Tiwari (1973), Bhargawa (1974), and Sharma and Gupta (1979), etc. For this purpose, the investigator visited various libraries and discussed with different experts in the concerned field. The Researcher could not find an updated tool for this purpose. So, on the basis of the review, the Researcher collected the items and developed the concepts towards the occupations at secondary level adolescents.

Items Writing and Vetting

After extensive reviewing of the literature and field visits, the Researcher wrote the 15 items for the first piloting.

Content validity

For the content validity of the items, the investigator consulted eight experts on the subject concerned, including a language expert with the raw items. On the basis of the feedback and suggestions of the subject experts and language experts, 5, items were deleted and 5 were edited. So, final tool has 10 items.

Piloting the tool

On the completion of the above procedure the investigator went to the field for the piloting of the tool.

Finalization of the tool

The point biserial correlation (item-total correlation) has been used for the item analysis. Depending upon the item analysis, the item which has point biserial correlation more than .2 has been selected for the final test. The final tool has selected ten items.

Table 1 Item analysis of Occupational Aspiration

Question	Corrected Item-Total Correlation	Status	Items selected
Q_1	.237	Accepted	Accepted
Q_2	.400	Accepted	Accepted
Q_3	.286	Accepted	Accepted
Q_4	.358	Accepted	Accepted
Q_5	.433	Accepted	Accepted
Q_6	.451	Accepted	Accepted
Q_7	.335	Accepted	Accepted
Q_8	.260	Accepted	Accepted
Q_9	.226	Accepted	Accepted
Q_10	.390	Accepted	Accepted

Researcher's Analysis

Reliability of the Tool

Table 2	Reliability of Occupational Aspiration		
Cronbach's Alpha	Part 1	Value	.747
		N of Items	5
	Part 2	Value	.710
		N of Items	5
	Total N of Items		10
Correlation Between Forms			.693
Spearman-Brown Coefficient	Equal Length		.683
	Unequal Length		.733
Guttman Split-Half Coefficient			.682

Researcher's Analysis

Data Analysis & Interpretation

Impact on pre and post scores of control group in their Occupational Aspiration

However, there is no significant change in pre and post test score of control group of Occupational Aspirations of secondary school adolescents.

Table 3	Pre and Post test of Occupational Aspiration of control group						
Control Group	**N**	**Mean**	**Std. Deviation**	**Df**	**Mean Difference**	**P Sig**	**T-value**
Pre- test	37	42.59	10.37	28	6.89	.036	–2.208
Post- test	37	49.48	10.64				

The Null Hypothesis was tested at the statistical significance level of 0.05 and the results showed that at df = 28, p = .036 which is greater than 0.05 without improvement in mean score 6.89. Therefore, the Null Hypothesis is accepted. This implies there is no significant difference between pre and post-test scores of the control group.

Table 4	Impact on pre and post scores of experimental group of Occupational aspiration.						
Experimental Group	**N**	**Mean**	**Std. Deviation**	**Df**	**Mean Difference**	**P Sig**	**T-value**
Pre- test	37	42.59	10.370	28	6.89	.036	–2.208
Post- test	37	49.48	10.642				

The Null Hypothesis was tested at the statistical significance level of 0.05 and the results showed that at df = 28, p = .036 which is less than 0.05 with improvement in mean score by 6.89. Therefore, the Null

Hypothesis is rejected. This implies there is a significant difference between pre and post group mean score of experimental group. Furthermore, it is evident from Table 1.4 that the experiment has positive effect on Occupational Aspirations of adolescents.

Finding

There is a significant improvement in Occupational Aspirations due to the experimental intervention for the students.

Conclusion and Recommendation

Without a proper direction, no boat can reach its destination. It is equally true for education. The students/ adolescents need a direction to shape their career and improve achievement. The Guidance and Counselling services can prepare the adolescents for this purpose. So, it is essential for every individual, especially at the age of adolescence, during which they are usually in secondary schools, to take these services. It is the responsibility of the school to provide these services with the help of parents. Hence, based on experimentally proven findings, it is recommended that the Guidance and Counselling has the positive impact on Occupational Aspirations of the students, so more frequent counselling sessions must be provided to the students.

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INNOVATIVE SCHOOL EXPERIMENTS

Smart Flushing: A Health Monitoring System

Sonakshi Verma

- **Problem Statement**
  - Certain studies are indicative of the fact that one in four kids has either pre-diabetes or diabetes. Nearly 1 million Indians die due to diabetes every year. Over 30 million have now been diagnosed with diabetes in India.
  - The CPR (Crude Prevalence Rate) in the urban areas of India is thought to be 9%. In rural areas, the prevalence is approximately 3% of the total population.
  - About 40% of women and 12% of men experience at least one symptomatic UTI (Urinary Tract Infection) during their lifetime. The prevalence of UTI in pregnant women in India is reported to range from 3% to 24%.

The situation can be tackled with proper medication and early detection. Therefore, the project aims to develop a device that will help in early detection of various problems.

- **How did I get the idea?**
  - I got this idea from my own class. One of my classmates is diabetic. She takes various medications during the lunch time. She told me that she got to know about the disease in Class 2. She even told me that many people, mainly poor, die due to diabetes every year. Therefore, I thought of taking up a project based on setting up such toilets in slum and rural areas.
  - To start with, in the school exhibition, I took up the same topic and had built a prototype with the help of my science teachers and the ATL (Atal Tinkering Lab) department. In the exhibition, I did a test with the help of reagent strips as the sensor was not available. I took the urine sample of one of my teacher's (age 52) and tested it. It showed a negative result which confirmed that she was not suffering with any of the diseases. If adequate support is provided, I will be able to design a sensor for installation.
- **Background**
  - Human waste contains lots of clues about their health. Many ailments leave their mark in urine and feces, including diabetes, infections, kidney disease and cancer.
  - Indicative of various pathological and normal physiological processes in humans:
    - For example, a detection of ketones in human urine is indicative of diabetes.
    - Detection of increased levels of estradiol in urine of a female human may be indicative of an incoming ovulation.
    - Detection of a combination of fourteen specific molecules is indicative of a prostate cancer in a male human.

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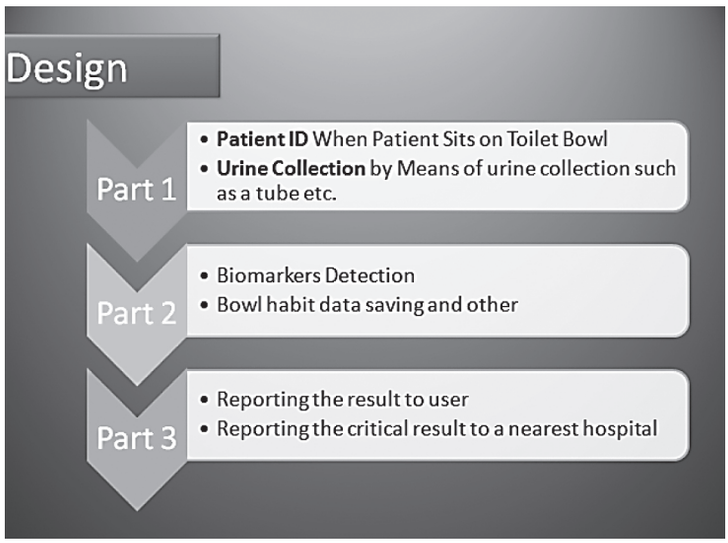
- Since urine is an important source of information that represents the health conditions of an individual, various dysfunction such as pancreatic disorders (typically, diabetes), hypohepatia, and kidney disorders can be detected advantageously in a non-invasive manner by performing quantitative analysis of certain urine constituents, such as glucose, protein, urobilinogen, occult blood and other substances.

- **What if a 'medical toilet bowl' that could perform…?**
  - Detection of pathological and normal physiological processes in humans on a daily basis and that too automatically via urine analysis.
  - Human waste analysis
  - Microbiome analysis
  - Biomarkers detection
  - Bowel frequency
  - Traces of blood in stool/urine

- **Biomedical System Design & Development**

  Integral Parts of the System
  - Urine collection structure design to be fitted into the toilet bowl.
  - Sensor to sense the biomolecule/marker, e.g. Ketones, Estradiol to be fixed into the smart toilet system.
  - Communication Module (To communicate through servers to various health facility, user mobile among others)
  - A data storing unit.



- **Challenges**
  - Optimization of system for reliability of data generated.
  - Toilet user identification (biometric based solution may be employed)
  - Making it simple & easy to use and affordable

- **Possible Outcome? Limitless**
  - Doctors ask patients questions about their bowel movements and other details (consistency, color, blood, and so on) where a patient may forget when ill and may be reluctant to give the correct information.
  - A boon for the elderly patients with dementia and other conditions.
  - Day-to-day health monitoring
  - Measuring hormone fluctuation with menstrual cycles for family planning

Use of Soil Moisture Sensors to Save Water

Harkriti Gangwani
Ms. Yamini Bisht

Details About the Submission Type

This project was an entry for **CBSE Regional Science Exhibition 2019-2020** held at New Delhi, India, in the category of **Sustainable Agricultural Practices**. Harkriti Gangwani of Grade XII, guided by her Biotechnology teacher, Ms. Yamini Bisht and under the leadership of Principal, Ms. Santosh Vyas from Sadhu Vaswani International School for Girls, worked on the project.

The project was a solution to solve the problem of having a green cover, over a nation, struggling to supply an adequate amount of water to all its farmer- citizens. An automated irrigation system with the help of soil moisture sensors which will help the plants to grow with minimum use of water, was created. A Super Absorbent Polymer in the soil bed was introduced to enhance the water holding capacity of the soil. Plant growth-promoting bacteria was used for priming of seeds that were being used for the project. Usage of such seeds will reduce the amount of pesticides and fertilizers used in the soil bed. Hence, this will help us to maintain the quality of soil and will help in healthy growth of plants. The project won in the Regional Science Exhibition 2019-2020 and qualified for **CBSE National Science Exhibition 2019-2020** .There were 500 different teams from across the nation who competed against one another in this exhibition. The project received great reviews from the Jury and a certificate of participation for the same.

Impact Story

It all started by the setting up of Atal Tinkering Labs in our school. It was a magical place for me, where all my ideas became true with the help of my mentors. I learnt coding and functioning of arduino and tried to integrate it with my ongoing research of super absorbent polymers. Soon I created my first working prototype and showcased in school Science Exhibition. My work was awarded the best exhibit that year. The same year I participated in the **Zonal Science, Mathematics and Environmental Exhibition** organised by **Directorate of Education, Delh** where again the project bagged the first position and a trophy for the same. The project also qualified for **Central Level Science Exhibition** organised by **Directorate of Education, Delhi** where it bagged a certificate of merit. I kept working on my project and integrated various other components in it to make it even more sustainable for the cities. During this time, I also showcased my project in a **Doordarshan News** series known as GENEXT which was aired on television. Then finally in 11th standard I participated in the **CBSE Regional Science Exhibition 2019-2020**, which was held at New Delhi. On the basis of my latest additions to my project, it won the ***Regional*** award and finally qualified for participating in **CBSE National Science Exhibition 2019-2020.** I received great reviews from the Jury and a certificate of participation at the National level as well.

Harkriti Gangwani, Student-XIIA, Sadhu Vaswani International School for Girls, New Delhi
Ms. Yamini Bisht, Mentor, Biothechnology Teacher, Sadhu Vaswani International School for Girls, New Delhi

Take Away From the Experience

It is an old saying,

"Try and try until you succeed...."

My teachers taught me to make this saying the motto of my life. There were times when I had to start everything from the scratch, and I was even about to give up at a particular point of my journey but my parents and my teachers encouraged me to keep working. I learnt that honesty and hard work always pay off. Getting the opportunity to participate in **CBSE National's** was the best moment of my life. Winning or losing did not matter to me at that time, just the fact that I was getting an opportunity to compete with the best projects from across the country, filled my heart with joy. These past few years have been a great learning experience for me. Through this project so many avenues opened for me. I learnt various skills which I could not even imagine that I was capable of doing them. Innovation and creativity gave wings to my ideas. There is still a long way to go. I hope to patent my idea and carry out a detailed research in real time scenario and this is the beauty of science -- the possibilities are endless.

Innovative Teaching Methods in English Language Classroom

Ms. Tusharika Grover

Abstract

This report casts light on the inputs of Teaching strategies used on the students of Class IX and thereby the improvement outcomes of teaching, taking Story Concoction as the base of the study. The inputs given to the students included Multimedia, Interpreting Characters, the Direct Method, the Grammar Translation Method, the Audio-Lingual Method, the Structural Approach, Suggestopedia, Communicative Language Teaching, and Drama Reading for Concocting Story. The teaching methodologies used were remodelled and altered to enhance the learning capacity of students and to improve their learning outcomes in the classroom.

Key Words: Teaching Methodology, Innovation, Developing Confidence, Finding Output, Assigning Questions

Introduction

Bloom's Taxonomy, created by Bloom (1956), has been widely accepted as a guideline in designing reasonable examination questions belonging to various cognitive levels. The hierarchical models of Bloom are widely used in education fields (Chang & Chung, 2009) for constructing questions (Lister & Leaney, 2003), to ensure balancing and student cognitive mastery (Oliver et al., 2004).

To improve the skills of the English language of the learners of Class IX, innovative teaching methodologies are used. Imagination plays an important role in developing student's lateral thinking.

Language shapes the way we think and determines what we can think about. – Benjamin Lee Whorf

Previous Knowledge

The students were asked to concoct a story based on the hints given to them as per the Instructional Objectives of Bloom's Taxonomy.

Inputs for Teaching

An interesting English learning environment was created to motivate and inspire students to weave the story with widened thoughts. Therefore, first and foremost it was necessary to understand the primary understanding level of the students.

The next step comes in the teacher's mind to infuse in the class the inputs that encourage students to create and apply, understanding with interest.

Ms. Tusharika Grover, Trained Graduate Teacher (English), Ramakrishna Senior Secondary School, Vikas Puri, New Delhi, India

Then comes the teacher's way of handling teaching materials, and calibre to teach by using innovative techniques to develop students' ability to solve questions effectively, using their lateral thinking skills. Innovative methodologies like role play, reading newspapers, referring to dictionaries etc., were used as tools in the classroom. Students were provided with ample opportunities to know, understand and explore the various teaching techniques to bring out the best.

The self-understanding approach and recognition ability of the concepts of the students were tested. The initial outcome of the students had a few loopholes. The errors were rectified by the teacher, using technological tools. Emphasis was laid on their mistakes and the students were inspired to widen their horizon of thoughts through various teaching methodologies.

They were given an opportunity to express their doubts freely to the teacher by encouraging them to have a good rapport, task performance, and virtual collaborative conversational interaction.

Activity Based Learning

Activities can mould students to be inventors and evaluators. They help them to analyse and judge their performance through the innovative methods used in the class which kindle the interest of the learners. They were assigned the activity of concocting a story.

Procedure of the Task

- First and foremost, the students were told what a story is. They were told that it is a creative piece shorter than a novel, normally consisting of a few characters that takes into account the unity of effect and focuses on the step- by-step creation of interest of the reader.
- The students were further given hints and then they were also given a specific drama to read and convert into story.
- The students were instructed to read about the characters, theme and timeline.
- They were acquainted with the elements of a short story: Character, Ambition of the character, Conflict, Complications and Obstruction, Payoff and Resolution, whether positive or negative.
- Outcome of the Task: Imagination and creativity was tested, understanding skills were improved, vocabulary was developed, pronunciation improved while narrating the story, providing catchy title, expressions of the story, construction of sentences– all were studied thus boosting students' confidence.
- Flip Classroom method was used. This pedagogical **approach** included direct instruction moves from the group **learning** space to the individual **learning** space, and the resulting group space was converted into an interactive studying environment which led to the students' engagement covering all parameters of story concoction.

Analysis

Where mean deviation of population size 10 in the former data is 12.4, it is 18 in the latter data. Standard deviation in the former and latter data is 1.2 and 1 respectively. The data, after the teacher gave inputs to the students for story concoction improved. The result of the t test of the above data in values is 4.56429E-07.

Conclusion

In conclusion, this clearly signifies that the students' performance improved significantly after the teaching methodologies inputs given by the teacher. This data of one- month study marks the study of understanding students' strengths and weaknesses, thereby working on them. It also stresses on the enhancement of various skills of students which include -- Communicative Skills, Creativity, Vocabulary, Understanding, which helped in evoking more interest in English Language.

ANNEXURE

The pre-experiment and post-experiment data of the students included the data of 10 students

		MARKS OBTAINED (out of 20)	
Sl. No.	**Student's Name**	**PRE EXPERIMENT**	**POST EXPERIMENT**
1	A	13	18
2	B	12	19
3	C	14	18
4	D	13	17
5	E	12	17
6	F	11	16
7	G	10	19
8	H	14	19
9	I	13	19
10	J	12	18

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Microscale Chemistry Laboratory

Science Faculty

Introduction

Microscale chemistry experiments use small quantities of chemicals and simple equipments. These have the advantages of reduced costs, reduced safety hazards and allowing many experiments to be done quickly. For the past ten years, we have been doing Microscale chemistry experiments at our school – using one or two drops of each reagent.

Advantages of Microscale Apparatus

Working at this scale has many advantages:

- Being able to handle small glassware and small quantities of chemicals.
- Having the opportunity to repeat the experiment when the reaction does not work well.
- Better control of organic syntheses when the amount of chemicals is small.
- Saving time and generating less waste.
- Encouraging students to be considerate about environment.
- Leading to a lot of cost reduction.
- Reducing the risks of fire hazards and acid burns to minimum.

Safety and Waste

We do not raise any particular safety precautions to be taken into consideration. Students should wear standard safety equipment, such as laboratory coat, safety glasses, and gloves.

Traditionally, experiments in organic chemistry are carried out on a **macroscale** level, employing quantities of chemicals approximately 5-100 g, using glassware designed to contain between 25 and 500 mL of liquids. For quantities of materials in the 0.005--0.5 gram range, one employs different, "**microscale**" techniques and equipments in order to carry out the various standard organic laboratory operations.

Basic Equipment

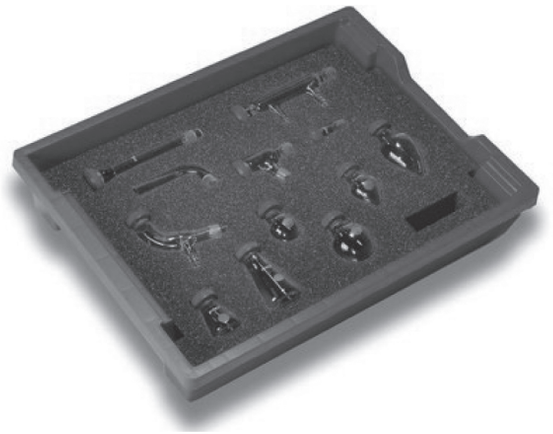
The glassware used for microscale experiments is contained in a Microscale Chemistry Laboratory (MCL) Kit

What is Microscale Chemistry Laboratory (MCL) Kit?

The Microscale Chemistry Laboratory Kit enables students to perform experiments in an environmentally safe and pollution-free atmosphere, using small quantities of chemicals without compromising with the quality and standard of experiments. The experiments can be performed easily and quickly. Some of the contents of the microscale kit are:

Science Faculty, Sadhu Vaswani International School for Girls, New Delhi.

1. Micro burette – 10 mL
2. Micro measuring cylinder – 10 mL
3. Micro beaker – 10 mL
4. Micro test tube – 2mL
5. Micro test tube wooden handle
6. Petri dish – 10 cm in diameter
7. Micro funnel
8. Micro conical flask – 25 mL



Aim

To determine the strength of $KMnO_4$ solution by titrating it against a standard solution of Ferrous Ammonium Sulphate (Mohr's salt) by Microscale Chemistry Laboratory Techniques as well as Conventional Chemistry Laboratory Techniques

Theory

In redox systems, the titration method can be adopted to determine the strength of a reductant/oxidant using a redox sensitive indicator. Redox titrations, involving potassium permanganate, are called permanganometric titrations. In these reactions, MnO_4^- ions act as the self indicator.

In this titration, potassium permanganate is the oxidizing agent and Mohr's salt is the reducing agent. Mohr's salt is a double salt of Ferrous Sulphate and Ammonium Sulphate and its composition is $FeSO_4.(NH_4)_2SO_4.6H_2O$.

In this titration, the MnO_4^- ion is reduced to Mn^{2+} in the presence of acid and Fe^{2+} ions of Mohr's salt are oxidized to Fe^{3+}

The chemical reaction that occurs in this titration can be represented by the following chemical equations.

Molecular Equation

$$2KMnO_4 + 3H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 3H_2O + 5[O]$$

$$2FeSO_4.(NH_4)_2SO_4.6H_2O + H_2SO_4 + [O] \rightarrow Fe_2(SO_4)_3 + 2(NH_4)_2SO_4 + 13H_2O] \times 5$$

$$\text{Overall reaction: } 2KMnO_4 + 8H_2SO_4 + 10FeSO_4.(NH_4)_2SO_4.6H_2O \rightarrow K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 10(NH_4)_2SO_4 + 48H_2O$$

Balanced Chemical Equation

From the overall balanced chemical equation, it is clear, that 2 moles of potassium permanganate react with 10 moles of Mohr's salt.

$$\text{Therefore, Molarity of } KMnO_4 = \frac{\text{Molarity of Mohr's salt} \times \text{Volume of Mohr's salt} \times 2}{\text{Volume of } KMnO_4 \times 10}$$

Conventional Method (For a batch of 20 students)

Apparatus Required: 50 mL burette, 250 mL volumetric flask, 20 mL pipette, funnel, weighing bottle, clamp stand, titration flask.

Chemicals Used: Potassium Permanganate solution ($KMnO_4$), Ferrous Ammonium Sulphate (Mohr's salt), diluted H_2SO_4 and Conc. H_2SO_4

A. To Prepare M/100 $KMnO_4$ Solution

Molecular weight of $KMnO_4$ = 158 g

In 1000 mL, we dissolve 1.58 g of $KMnO_4$ to prepare M/100 solution for titration.

Each student can use up to 50 mL of $KMnO_4$ for 3 to 4 titrations.

Volume to be used in Burette = 50 mL

B. To Prepare 250 ml of M/20 Mohr's Salt Solution

Volumetric flask used = 250 mL

1000 mL requires 392 g of Mohr's salt to prepare 1 M solution.

For 250 mL, Mohr's salt required $= \frac{392 \times 250}{1000}$

To prepare 100 mL of M/20 solution , we need $= \frac{392 \times 250}{1000 \times 20}$

$= 4.9$ g

Each student will weigh 4.9 g to make 250 mL of Mohr's salt solution.

20 students will use $20 \times 4.9 = 98$ g

10 mL of Sulphuric Acid added before titration to Mohr's salt solution.

Observation Table

		Burette reading/ml		
S. No	Volume of Mohr's salt used (mL)	Initial (V1)	Final (v2)	Volume of $KMnO_4$ solution used (V2- V1)/mL
1.	20	0.0	21.1	21.1
2.	20	21.1	42.2	21.1
3.	20	0.0	21.1	21.1

Calculation:

Volume of Mohr's salt = 20 mL

Molarity of Mohr's salt = M/20

Volume of $KMnO_4$ solution = 21.1 mL

Molarity Equation

$$\frac{(\text{Volume of } KMnO_4 \times \text{Molarity of } KMnO_4)}{(\text{Volume of Mohr's salt} \times \text{Molarity of Mohr's salt})} = \frac{(\text{Number of moles of } KMnO_4)}{(\text{Number of moles of Mohr's salt})}$$

$$= \frac{21.1 \times \text{Molarity of } KMnO_4}{20 \times 0.05}$$

$$= \frac{2}{10}$$

Therefore, molarity of the given $KMnO_4$ $\frac{20 \times 0.05 \times 2}{21.1 \times 10}$

$= 0.0095M$

Molar mass of $KMnO_4$ = 158g/mol

Therefore,

The strength of the given $KMnO_4$ = Molarity of $KMnO_4$ × Molar mass of $KMnO_4$

$= 0.0095 \times 158$

$= 1.501$ g/ litre

Result: The strength of the given $KMnO_4$ solution = 1.501 g/ litre

Using Microscale Apparatus

Apparatus: Two 5 mL burettes, 50 mL volumetric flask, funnel, weighing bottle, clamp stand, titration flask.

Chemicals Required: Potassium Permanganate solution ($KMnO_4$), Ferrous Ammonium Sulphate (Mohr's salt), diluted H_2SO_4 and Conc. H_2SO_4

A. To Prepare M/100 $KMnO_4$ Solution

Molecular weight of $KMnO_4$ = 158 g

In 1000 mL, we dissolve 1.58 g of $KMnO_4$to prepare M/100 solution for titration.

To prepare 250 mL of M/100 $KMnO_4$, we need 0.395 g of $KMnO_4$

Each student can use up to 10 mL of $KMnO_4$ for 3 to 4 titrations.

Volume to be used in Burette = 5 mL

B. To Prepare 50 ML OF M/20 Mohr's Salt Solution

1000 ml requires 392 g of Mohr's salt to prepare 1 M solution.

For 50 mL, Mohr's salt required $= \frac{392 \times 50}{1000}$

To prepare 50 ml of M/20 solution , we need $= \frac{392 \times 50}{1000 \times 20}$

$= 0.98$ g

Each student will weigh 0.98 g to make 50 ml of Mohr's salt solution.

20 students will use $20 \times 0.98 = 19.6$ g

2 ml of Sulphuric Acid added to solution of Mohr's Salt before titration.

Observation Table

		Burette reading/ml		
S. No	Volume of Mohr's salt solution used/ mL	Initial (V1)	Final (V2)	Volume of $KMnO_4$ solution used (V2- V1)/ mL
1.	2	0.0	2.1	2.1
2.	2	2.1	4.2	2.1
3.	2	4.2	6.3	2.1

Calculation:

Volume of Mohr's salt = 2 mL

Molarity of Mohr's salt = M/20

Volume of $KMnO_4$ solution = 2.0 mL

Molarity Equation

$$\frac{(\text{Volume of } KMnO_4 \times \text{Molarity of } KMnO_4)}{(\text{Volume of Mohr's salt} \times \text{Molarity of Mohr's salt})} = \frac{(\text{Number of moles of } KMnO_4)}{(\text{Number of moles of Mohr's salt})}$$

$$= \frac{2.0 \times \text{Molarity of } KMnO_4}{2 \times 0.05}$$

$$= \frac{2}{10}$$

Therefore, molarity of the given $KMnO_4$ $\frac{20 \times 0.05 \times 2}{21.1 \times 10}$

$= 0.0095M$

Molar mass of $KMnO_4$ = 158 g/mol

Therefore,

The strength of the given $KMnO_4$ = Molarity of $KMnO_4$ × Molar mass of $KMnO_4$

$= 0.0095 \times 158$

$= 1.501$ g/ litre

Result: The strength of the given $KMnO_4$ solution = 1.501 g/ litre

Conclusion

- From the Results, we can conclude that the strength of unknown $KMnO_4$ solution was determined by few grams of solid and few drops of solution in microscale chemistry laboratory compared to the conventional chemistry laboratory. Therefore, the amount of chemical used in microscale laboratory is minimal.
- A typical microscale experiment will consume only 1% of the required quantity of reagents used in a traditional macro scale experiment.
- There is lot of cost reduction and breakage is minimised in microscale chemistry laboratory
- The developed experiments are easy to implement and require equipment often available in organic chemistry labs with very low consumption of chemicals. By using small amounts of chemicals, the reactions proceed quickly and generate less waste, which is beneficial both financially and environmentally.

By adopting this teaching strategy, the laboratory becomes less consumer of chemicals, cleaner, more secure and less polluting while ensuring students' better adherence to the practical learning process.

Improving Students' Achievement through Innovative Online Mode

Priyanka Goel

Introduction

We all are aware that pandemic covid-19 has disrupted the normal life style of everyone. It also affected our education system but virtual teaching came to the rescue for us. It wasn't easy to get shifted to virtual teaching from traditional teaching especially in countries like India where most of the schools are following physical ways of imparting education.

It was challenging for teachers as well as for students to get shifted to virtual methods of teaching. Continuous efforts were put for a smooth transition from traditional to virtual teaching which brought good results too. It involved up-skilling of educators by mentors, interactions with students and their parents to resolve the issues and their constant counselling by experts.

Students were enthusiastic about this new methodology but some students, who are slow learners and have difficulty in understanding, faced lots of challenges in getting good and satisfactory results.

So our first challenge is to identify such students and then put inputs in our teaching methods to get good results from these students too.

For this purpose sample data of the marks of subject SCIENCE of CLASSES VIII and IX were collected before putting innovative inputs. The data of bottom 20 students was collected at both the stages, viz the pre and post-experimental stages and were analysed for measuring the impact of the inputs.

Pre-experimental stage data is given in APPENDIX-1 for both the Classes - VIII and IX.

Data Analysis of Sample Size 20- Appendix-1

From the two sets of data, it is clearly seen that some students of Class VIII (that is, C, I, M, O) and of Class IX (that is E, F, G)— still have scope of improvement which can be seen by involving innovative inputs of teaching. (Please refer to data mentioned in Appendix-1.)

Formulation of Hypotheses (H_0) mean value of the pre-experimental data is

μ(MEAN) VIII = 13.05
μ(MEAN) IX = 9.35

H_0: After implementing the innovative methods, the mean value of the scores of the students will be equal to the calculated value or less than that i.e., there won't be any significant rise in the value.

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Analysis of the Reasons of their Slow Learning Process

Characteristics of weak students need to be identified and should be worked on. Discussions were held with some teachers, teacher-educators and pedagogues. On the basis of these discussions, the following reasons of students' low achievements were identified:

Reasons for Unsatisfactory Results of Students who are Slow Learners:

1. Hesitate: Generally weak students are hesitant that is, they feel shy or have low confidence in asking doubts or their queries. The reasons could be family background, lack of understanding, language problems or fear of being mocked by other students in the class.

2. Lack of interest: Weak students generally do not show interest in the sessions and remain passive. The reason can be the lack of interaction with such students, medium of instruction, lack of interesting way of presentation and not being able to recall the content of the previous topics.

3. Distraction: Slow learners are generally distracted and do not participate in the online teaching actively. This is due to lack of concentration and disinterest in the topic or they find the topic very difficult to absorb within the limited time of period.

4. Health issues: The major reason of slow learning in students is poor health due to improper nutrition or same medical history in the past.

Keeping in mind the above areas in which as a teacher we can bring some improvisation in teaching - learning strategies and can get good results from the students who are slow learners too.

The Investigator, after discussing with experts, could list the following inputs for remedying the low scorers.

1. Positive Approach:

H_0: This will not improve the performance of the students as this input has nothing to do with the subject enhancement.

Teaching practices can be improved by keeping a positive approach towards the students. Each and every question should be welcomed and queries should be solved, this will help in developing confidence in slow learners and gradually they may overcome their difficulties and gain confidence and start showing interest in the session.

Teachers may also come to know the areas in which they (slow learners) need improvement.

H_a: By implementing positive approach it definitely improved the performances of students as this input helped them in enhancing their confidence and learning approach. This is clearly indicated in the result data collected after putting them to the test. Mentioned in APPENDIX-III. DATA OF TEST-2 (CLASSES VIII AND IX)

The null Hypothesis created is rejected and it is proved that keeping a positive approach in the class enhances the students result.

2. Improving Classroom Practices:

H_0: Implementing the input of improving classroom practices will not create much impact on slow learners as only top scorers would be benefitted by this method, so this will only create complexity in slow learners and this will reduce their scores.

In the present situation classroom teaching is not confined to blackboard teaching only but there is more emphasis on students' involvement and understanding. There are many ideas which can improvise the virtual teaching methods and can bring good results and better understanding too.

H_a: Implementing the improvised classroom practices created a much noticeable change in the performances of slow learners as it helped them to explore the subject, creates the interest in them to learn the subject and develops the urge to learn the subject with more enthusiasm. This definitely helped them to score good marks as proved by the data mentioned in APPENDIX-III

H_0: is rejected by analyzing the data after tests and implementing inputs creates significant enhancement in the performances of slow learners.

(i) Promoting critical and problem solving methods:

This may help learners to enhance their thinking skills which help them to learn certain topics critically. For instance students may know the facts and learn and understand the topic well, instead of cramming and mugging up. This helps in retaining and recalling the topic in students' mind for a longer time period.

(ii) Improving Questioning Skills:

Teachers may be expected to ask specific questions involving the students, keeping in mind their attitudes, aptitudes, their nature of being extroverts and introverts, etc.

(iii) Flipped classroom method:

Flipped classroom is a learner centred approach where a teacher and learners interact between/among themselves, without any inhibition and teaching-learning takes place smoothly.

This method is very helpful when we have ample time of teaching and learning the topic and this can be implemented during vacation or breaks.

(iv) Use of Multimedia and visual clues:

Certain topics in Science, like atomic structure, structure of cell or organelle and various systems in life processes can be well understood by providing visual description with animation. This helps students to retain the knowledge for a longer duration.

(v) Quoting Examples of Day to Day life:

In some subjects such as science, certain topics can be well explained by taking examples of day to day life. For example, laws of motion can be very well explained taking common examples which we experience in our daily life. Newton's second law can be explained by taking examples of sports such as cricket, karate and high jumping etc. Third law can be explained by example of rocket launching etc. This may help students in enhancing knowledge as well as better retaining abilities.

(vi) Story telling:

Many discoveries, inventions, facts and laws can be explained by telling the history and interesting story related to them.

For instance: How Benjamin Franklin kite flying led to the discovery of electric discharge and so on.

(vii) Computational thinking:

Difficult topics can be explained by solving them step by step. Very difficult or lengthy problems should be solved step by step. This may/shall help students to attack the problem systematically and effectively.

(viii) Encouraging students to ask questions in the class:

A feeling may be generated that the teacher is a friend and students should be encouraged to participate in healthy discussions.

(ix) Project based learning:

This method prevents memorisation and cramming and promotes knowledge enhancement, critical thinking, collaboration and communication skills among students.

(x) Increasing student participation in the class:

This can be achieved by providing students with the puzzle solving questions, asking them to recall the already taught topics, etc.

3. Remedial Classes/Improvement Classes:

H_0: Implementing the remedial classes will not create much impact on slow learners as this will only burden them with extra work.

Planned remedial classes can help the weak students to come together with other students of the class and help them to clear their doubts more effectively. So remedial classes are the desirable option for improving performance of students who are slow learners.

H_a: Implementing the remedial classes will help slow learners to clear their doubts which they cannot do otherwise with the top scorers. Remedial classes also help educators to know and interact in a better way with slow learners which definitely enhances their results and learning abilities. This definitely helped them to score good marks as proved by the data mentioned in APPENDIX-III.

H_0: is rejected by analyzing the data after tests and implementing inputs creates significant enhancement in the performances of slow learners.

4. Availability and Eagerness of Teachers to Attend to the Queries of Students

This is a very essential and effective way of creating interest in the topic. This also develops confidence and eagerness to learn among students

5. Giving Extra Time to Slow Learners and Discussing with Their Parents as well

By doing so we can understand the reason for slow learning and poor performance and can remedify them. In this duration we can also discuss with parents about the specific reasons of low scores. If there are any health issues or medical history or any family issue is there which is hampering their performance, that can be enquired and accordingly that student can be taught.

6. Professional Growth:

It is very essential for an educator to increase his/her effectiveness in teaching. This can be achieved by enhancing the pedagogical skills and subject-matter knowledge, being updated with the latest discoveries and inventions. Teachers should be positive in approach too towards students while teaching.

The above mentioned inputs may bring difference in the performance of weak/slow learners and can help them to attain knowledge in a better and effective way.

Hypothesis (H_0)

After putting above inputs we expect the mean to be improved by at least 2 units only, although predicted mean would be much higher than the actual mean we will get after tests.

The predicted mean values are mentioned as below. This is calculated from the sample data mentioned in APPENDIX-II

μ (mean) viii = 17.9 μ (mean) ix = 16

We assumed and predicted the data for the students of class 8 and 9 for science subject mentioned in APPENDIX-II.

Verification of Hypotheses

For Testing the above Hypotheses, tests of 25 marks each were conducted in classes 8 and 9 .Time allotted was 30 minutes.

Each question paper was set from 2 Units. The question papers were MCQ type and were verified by experts and investigators for the norms, authenticity and standard. The question papers were sent to expert pedagogists and investigators for verification and improvisation.

I . Question Paper for Class -8

(https://forms.gle/aeeUbjyj6NUi2KHYA)

II. Question Paper for Class -9

(https://forms.gle/YN5sz3pjwUAMBnVx6)

The Data Collected after Conduction of Tests in Both the Classes are Mentioned in Appendix-III:

μ (MEAN) VIII = 15.7 μ(MEAN)IX = 14.05

$\mathbf{H_a}$ = The actual mean we got after testing students is much higher as expected and is only little deviated and taking into consideration the mean value we can say that the inputs we added for the short duration of one month work effectively and they should be continued for the future also and will definitely cross the predicted scores.

The $\mathbf{H_0}$ created is rejected after seeing the results of the inputs implemented, hence we can say that continuous efforts and with implementation of inputs will definitely enhance the scores of slow learners.

Calculation of T-Value and P-Value

The data mentioned in APPENDIX-III were used for calculating the t-value and p-value for further analysis of the Hypotheses research and inputs were verified accordingly.

The p-value should be equal to or less than .005 for better results.

CLASS -8

T-value and P-value by taking data of PT-1 AND TEST-2

(A)

CLASS-8, SUBJECT-SCIENCE VERIFICATION WITH ACTUAL DATA				
S.No.	**Names**	**PT-1**	**TEST-2**	**Difference**
1	A	17	19	2
2	B	16	13	-3
3	C	0	11	11
4	D	12	15	3
5	E	12	14	2
6	F	11	16	5
7	G	13	16	3
8	H	22	25	3
9	I	0	7	7
10	J	21	23	2
11	K	8	16	8
12	L	18	16	-2
13	M	0	8	8
14	N	13	11	-2
15	O	8	12	4
16	P	23	24	1
17	Q	19	15	-4
18	R	18	22	4
19	S	16	17	1
20	T	14	14	0
	t Stat	-3.04		
	P(T <= t) one-tail	0.003		
	P(T <= t) two-tail	0.007		

(B)

CLASS-VIII, SUBJECT-SCIENCE VERIFICATION WITH ACTUAL DATA				
S.No.	**Names**	**Hypothesis**	**TEST-2**	**Difference**
1	A	20	19	1
2	B	20	13	7
3	C	15	11	4
4	D	15	15	0
5	E	15	14	1
6	F	20	16	4
7	G	15	16	-1
8	H	24	25	-1
9	I	10	7	3
10	J	24	23	1
11	K	15	16	-1
12	L	20	16	4
13	M	10	8	2
14	N	15	11	4
15	O	15	12	3
16	P	25	24	1
17	Q	20	15	5
18	R	20	22	-2
19	S	20	17	3
20	T	20	14	6
	t Stat	3.92804407		
	P(T<=t) one-tail	0.00045154		
	P(T<=t) two-tail	0.00090307		

Analysis and Methodology Used:

T-value and P-value were calculated by using the "Data analysis" tab and by choosing the option of t-test for paired data in Excel sheet.

If the P-value is <= 0.05, then the data is significant, and if the P-value is <0.05, then the data is highly significant.

Result of above data is highly significant.

CLASS-9

T-value and P-value by taking Data of PT-1 AND TEST-2

(A)

CLASS-9, SUBJECT-SCIENCE VERIFICATION WITH ACTUAL DATA				
S.No.	**Names**	**PT-1 MM.25**	**TEST-2**	**Difference**
1	a	1	13	12
2	b	12	7	-5
3	c	16	19	3
4	d	13	11	-2
5	e	8	9	1
6	f	3	9	6
7	g	4	12	8
8	h	12	17	5
9	i	14	12	-2
10	j	2	14	12
11	k	5	12	7
12	l	16	18	2
13	m	9	16	7
14	n	8	14	6
15	o	2	15	13
16	p	12	14	2
17	q	12	16	4
18	r	10	17	7
19	s	10	17	7
20	t	18	19	1
	t Stat	-4.366813		
	P(T<=t) one-tail	0.0001659		
	P(T<=t) two-tail	0.0003319		

(B)

CLASS-9, SUBJECT-SCIENCE VERIFICATION WITH PREDICTED DATA				
S.No.	**Names**	**Hypothesis**	**TEST-2**	**Difference**
1	a	15	13	2
2	b	15	7	8
3	c	20	19	1
4	d	15	11	4
5	e	10	9	1
6	f	10	9	1
7	g	15	12	3
8	h	20	17	3
9	i	15	12	3
10	j	15	14	1
11	k	15	12	3
12	l	20	18	2
13	m	20	16	4
14	n	15	14	1
15	o	15	15	0
16	p	15	14	1
17	q	15	16	-1
18	r	15	17	-2
19	s	20	17	3
20	t	20	19	1
	t Stat	4.12424748		
	P(T<=t) one-tail	0.00028845		
	P(T<=t) two-tail	0.00057691		

Analysis and Methodology Used:

T-value and P-value were calculated by using "Data analysis" tab and by choosing the option of t-test for paired data in the Excel sheet.

If the P-value is <= 0.05, then the data is significant, and if the P-value is <0.05, then the data is highly significant.

Result of above data is highly significant.

APPENDICES

Data of Bottom 20 Students of Classes VIII and IX at Various Stages

Appendix-I

1. Data of Bottom 20 Students (before Testing) Subject: Science :: Class: VIII No. of Students Considered: 100		
PERIODIC TEST-1		
S.No.	Names	PT-1 MM :25
1	A	17
2	B	16
3	C	0
4	D	12
5	E	12
6	F	11
7	G	13
8	H	22
9	I	0
10	J	21
11.	K	8
12.	L	18
13.	M	0
14.	N	13
15.	O	8
16.	P	23
17.	Q	19
18.	R	18
19.	S	16
20	T	14

2. Data of Bottom 20 Students (before Testing) Subject: Science :: Class: IX No. of Students Considered : 150		
PERIODIC TEST-1		
S.No.	Names	PT-1 MM.25
1	a	1
2	b	12
3	c	16
4	d	13
5	e	8
6	f	3
7	g	4
8	h	12
9	i	14
10	j	2
11	k	5
12	l	16
13	m	9
14	n	8
15	o	2
16	p	12
17	q	12
18	r	10
19	s	10
20	t	18

Appendix-II

1. CLASS-8 Subject-Science Hypothetical Sample Data of Bottom 20 Students Out of 100 Students		
S.No.	**Name**	**Marks Pedicted Out of 25**
1	A	20
2	B	20
3	C	15
4	D	15
5	E	15
6	F	20
7	G	15
8	H	24
9	I	10
10	J	24
11.	K	15
12.	L	20
13.	M	10
14.	N	15
15.	O	15
16.	P	25
17.	Q	20
18.	R	20
19.	S	20
20	T	20

2. CLASS-9 Subject-Science Hypothetical Sample Data of Bottom 20 Students Out of 150 Students		
S.No.	**Name**	**Marks Pedicted Out of 25**
1	a	15
2	b	15
3	c	20
4	d	15
5	e	10
6	f	10
7	g	15
8	h	20
9	i	15
10	j	15
11	k	15
12	l	20
13	m	20
14	n	15
15	o	15
16	p	15
17	q	15
18	r	15
19	s	20
20	t	20

Appendix-III

1. CLASS-8 Subject-Science Verification Data of Bottom 20 Students Out of 100 Students		
S.No.	**Names**	**TEST-2 (MM:25)**
1	A	19
2	B	13
3	C	11
4	D	15
5	E	14
6	F	16
7	G	16
8	H	25
9	I	7
10	J	23
11.	K	16
12.	L	16
13.	M	8
14.	N	11
15.	O	12
16.	P	24
17.	Q	15
18.	R	22
19.	S	17
20	T	14

2. CLASS-9 Subject-Science Verification Data of Bottom 20 Students Out of 150 Students		
S.No.	**Name**	**TEST-2 (MM:25)**
1	a	13
2	b	7
3	c	19
4	d	11
5	e	9
6	f	9
7	g	12
8	h	17
9	i	12
10	j	14
11	k	12
12	l	18
13	m	16
14	n	14
15	o	15
16	p	14
17	q	16
18	r	17
19	s	17
20	t	19

The efforts which were put in online teaching methods to improve the students' performance were very fruitful and showed in most of the cases the positive results as can be clearly seen in the data mentioned in the APPENDICES- I, II AND III.

Some of the results are shown by the negative value of the difference calculated in the data obtained, which needs improvement. As these inputs were implemented for only one month and results were verified and showed drastic changes in the scores so with the regular and continuous inputs for longer duration will show much improvised results.

Some of the new projects implemented in the sector of education by the government of India are:

a) Subject wise learning - amendment in the learning outcomes of all the subject.

b) Conducting periodic surveys of learning outcomes.

c) Programme for International Students Assessment (PISA) conducted by the organization for economic cooperation and development (OECD)

d) E-Learning materials for teachers and students

e) Rashtriya Avishkar Abhiyan - students are motivated through experimentation and observation method to learn subjects like mathematics and science.

f) Massive Open Online courses (MOOCs)

Webpages and Websites

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3. https://www.scribbr.com/research-process/hypotheses/

4. https://www.public.asu.edu/~kroel/www500/hypothesis.pdf

5. Erich Leo Lehmann (2005), Testing statistical hypotheses, Springer-Verlag, New York

Book

"Testing statistical hypotheses" - Author: Erich Leo Lehmann

Innovative Techniques of Teaching

Preeti Anand

Abstract

Advance pedagogy is the way to enhance the outcome of teaching and learning process. In the current scenario when everything came to halt and restarted in an entirely new way where learning through the use of technology, multimedia and smart gadgets has come into play but the role of teachers is more important now as they are not face to face with learners but have to communicate effectively. Teachers should apply themselves in utilising innovative methods so that the students' learning process is as free-flowing as possible and the methodology they adopt is conducive to learning. Innovative teaching methodologies such as play way approach, teaching through gadgets, teaching through collaborative learning, etc. is the need of the hour. Studies have shown that this can result in substantial progress in learners' performance when evaluated after implementing innovative methods over the traditional methods.

Introduction

This research was conducted on a group of 20 students of Ramakrishna Senior Secondary School in Vikaspuri, New Delhi in the subject of Mathematics on the learners of 10th grade. This school caters to the needs of its surrounding areas where a diverse group of learners study together. This group of twenty learners were the bottom scorers/low achievers when a written exam was conducted, and belong to four different categories.

In the first category there are first generation learners implying that there is no one to look after their studies as parents are uneducated; they can't give their inputs to help them out.

In the second category there are truant learners i.e. those learners who are missing online classes. The third category learners are low academic achievers with less IQ; these learners do not show interest in studies so they are least bothered with what the teacher is teaching in the class. In the fourth category there are learners who lack prerequisite knowledge necessary to understand the concept being taught.

In this research paper, the Researcher who is also a '**Mathematics teacher'** of 10th grade in the same school, was deeply moved by the performance of these 20 learners. The Researcher worked on the weaknesses of these four types of learners and planned innovative teaching strategies so that these weaknesses can be overcome. To evaluate the same, a written test was conducted and the performance was recorded and learners' progress was judged through their improved scores as shown by the calculated t value. .

Research finding is that Creativity can be developed and innovation benefits both students as well as teachers. Innovation is actually creation of better or more effective products or results, it is not invention rather a substantial positive change in teaching strategies. So any method that serves the purpose of sending the knowledge that teachers have to the learners without destroying the objective, could be considered as an innovative method of teaching. This paper actually highlights some of the innovative techniques used by the

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Researcher. In the current situation when teachers are not face to face with students these teaching strategies can turn out to be a miracle in teaching- learning process.

Hypotheses:

Null Hypotheses:

H_{01} : The input of enhancing students previous knowledge can't improve scores remarkably.

H_{02} : The inputs given for motivation and reinforcement will not help in increasing scores in Mathematics.

H_{03}: Creativity in teaching cannot be associated with intellectual ability of learners.

H_{04} : Concepts of Secondary level Mathematics can't be cleared at higher secondary.

Alternative Hypothesis:

H_A: There is a direct relation between the teaching strategies' and the academic results of learners.

Methodology

• Learning Mathematics with tools

Engaging learners with various Mathematics lab tools like construction tools, models, derivational tools, pure mathematics pads for teaching geometry. Using these tools will make learning of abstract concepts easy.

Mathematics lab systems on-line can scale back barriers to participation and learners performance can undoubtedly be improved through this. It can facilitate in increasing their understanding of various Mathematical constructs. For ex: the concept of Surface Areas and Volumes, Trigonometry, Constructions may be best educated to the Mathematics learners of grade 10.

• Flexible Teaching

All learners are unique. But teachers use the same methodologies for a diverse group of learners. This creates a learning problem, by putting unnecessary burden on some learners. A teacher should first understand the needs, experiences and the previous knowledge. For optimal learning of each individual from a group, teacher should plan his instructions accordingly. Project based learning materials, classroom discussions, group learning

Adaptive teaching systems recommend the best places to start new content and tells a teacher when to recapitulate old knowledge. They also provide various tools for monitoring one's progress. The researcher utilised this strategy by observing, analysing and identifying the key areas through a test conducted through online settings on a specific group of learners so as to identify their weak areas and plan lectures accordingly so that their performance can be improved. This is possible if certain abstract concepts are taught to the learners in different ways. For ex. Teacher is using multimedia, audio- visual (ppt), experimentation for teaching one single concept.

• Learning through real life examples

Learning in informal settings, such as in the playground, market, in cooking and baking, travelling, sitting in the room and looking at objects which surround us all involve Mathematics. These real life examples can link educational content and issues that are important to students in their lives; Informal reading can be enhanced

by adding questions and information from the classroom. Moreover the ideas learned in this way will never be forgotten. This connected experience stimulates more interest and motivation to learn.

An effective way for a teacher to raise and discuss a question in class, and then have students explore the same in the outside world to produce individual or group answers. Integrated learning of various subjects can also produce good results.

This crossover experience can be very helpful for teachers, where they simply give small explanations to students as a facilitator or as a guide but the results are outstanding. As learning takes place over a lifetime, from experiences in many ways, it is a great opportunity to support students in recording, connecting, remembering and sharing their various learning events.

● Learning Through Disputation and creating a Collaborative learning environment.

Students can further improve their understanding of mathematics by arguing in ways similar to trained mathematicians. It can be used after the explanation of a certain concept by the teacher while solving applications. Controversy helps students to enter into conflicting ideas, which can enhance their learning. This type of learning can give amazing results specially in a group learning. Teacher act as a facilitator and learners creative arguments lead them to arrive at complex results which would otherwise be difficult. It also allows students to filter ideas with others, so they learn how experts think. In mathematics this technique can be used to teach learners 'how to solve word problems based on linear equations, Quadratic Equations ,Arithmetic Progressions and many others.

Teachers can stimulate meaningful discussion in the classroom by encouraging students to participate in Mathematical Quizzes, Role Play, Using models to form explanations. Collaborative learning can give better results than teacher imparting direct knowledge to the students.

● Play way Approach

Play way approach can be very helpful in teaching mathematics because it provides a conducive learning environment to the students. In this approach teacher plans small activities to teach simple to complex concepts. If we see in real sense all the progressive methods of education has an element of play in them. Here, the researcher tried to make the tough part of mathematical concepts easy by the induction of elements of interest and motivation. Topics that can be taught using this approach was Polynomials, Trigonometry, Linear Equations and many others to students of grade 10.

Data Based Study

Researcher conducted a standardized paper (by getting it thoroughly checked through a panel of subject experts) of 25 marks on a group of 20 students chosen for research which was based on certain important concepts like polynomials, trigonometry and linear equations. The data the researcher got in terms of marks was recorded. For one-and-a-half-month-long period, Researcher tried these innovative teaching strategies with these 20 students and then conducted a retest for the same topics. Even the level of the examination was kept difficult than before and this was also a standardized test.

For the results that the researcher collected, refer to the Annexure attached at the end of the paper.

Data Analysis:

Calculation of Mean, Standard Deviation for both the samples and T value (paired) reflecting the outcome of the research:

Statistical Measure	Old Data (before the application of innovative techniques)	New Data (after implementation of innovative techniques)
Mean	11.4	18.65
Standard Deviation	3.084767329	3.468277
T value (paired) As both are related data samples	5.54063E-11	

Findings of the Study

- Data-based results reflected that the two samples taken for a group of 20 learners at different time are much variated and also the **t value is very significant** which showed that the strategies adopted with this group of learners actually worked out and can be repeated for the whole population.
- **Mean value has also increased much in new sample** which also indicates a positive hypothesis.
- Innovative teaching strategies can help students' progress.
- Students' grades have gone up when the teacher used some innovative strategies to teach rather than using a regular lecture method.
- Learners were seen to be **more enthusiastic, more participative and more confident** when the teacher shifted her role as a facilitator.
- The most important is that the **performance of all the four categories of learners improved** which showed that these approaches catered to the need of diverse group of learners.

Conclusion

As we saw significant improvement in the scores of learners after adopting innovative techniques, so, the null hypothesis has been rejected and the alternative hypothesis has been accepted.

The strategies can be used for whole group or population as a repetitive measure. It has great scope.

Hence forth we conclude that, In present time when education is totally dependent on online setup as there is no face to face interaction with the students. Whether we talk about school education or University education interactive teaching methods is the need of the hour as it can improve and make teaching learning process more effective when the pupils are sitting at home and they have everything handy with them through internet whether it's subject matter or any project. They have access to more resources than teachers. Its time to prove that if a teacher is passionate and flexible enough to modify his teaching strategies then he can definitely make significant improvement in his or her learners.

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- www.academia.org.in

Annexure:

The following is the table showing the scores of a group of 20 learners in a standardized paper of Mathematics during an evaluation process by the researcher.

S. NO.	Name of student	Marks(25)
1	A	5
2	B	6
3	C	8
4	D	8
5	E	9
6	F	9
7	G	9
8	H	11
9	I	12
10	J	13
11	K	13
12	L	13
13	M	13
14	N	13
15	O	13
16	P	13
17	Q	15
18	R	15
19	S	15
20	T	15

A table showing comparison between the scores of the learners before the research' and scores obtained after adopting some innovative techniques by the researcher.

S.No.	Name of student	Old Marks(25)	New Marks(25)
1	A	5	15
2	B	6	15
3	C	8	14
4	D	8	15
5	E	9	15
6	F	9	16
7	G	9	15
8	H	11	20
9	I	12	20
10	J	13	18
11	K	13	18
12	L	13	22
13	M	13	20
14	N	13	22
15	O	13	23
16	P	13	23
17	Q	15	15
18	R	15	22
19	S	15	20
20	T	15	25

Link for the standardized paper conducted through Google forms:

https://docs.google.com/forms/d/1MrqaSHVRfR-Z2DLMlDCFxeCT-H2GWV1R8Cd7YELGh5A/edit?usp=sharing

Some Sample questions from the standardized tests conducted for the study (Research):

Q1. Given that one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is

(A) –c/a

(B) c/a

(C) 0

(D) 3

Q2. A point P divides the line segment joining the points A(3, -5) and B(-4, 8) such AP/PB = k/1. If P lies on the line x + y = 0, then find the value of k

Q3. The line segment AB joining the points A(3, – 4), and B (l, 2) is trisected at the points P (p, – 2) and Q (5/3, q). Find the values of p and q.

Q4. A cubic polynomial is given below

$S(x) = x^3 - 3x^2 + x + 1$

The zeroes of the polynomial are given as (p-q) ,p and (p+q). What is the value p and q

Q5. A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45°. The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30°. Find the speed of flying of the bird.

Q6. Prove that:

$$\frac{\cos A}{1-\tan A} - \frac{1-\cos^2 A}{\cos A - \sin A} = \sin A + \cos A$$

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