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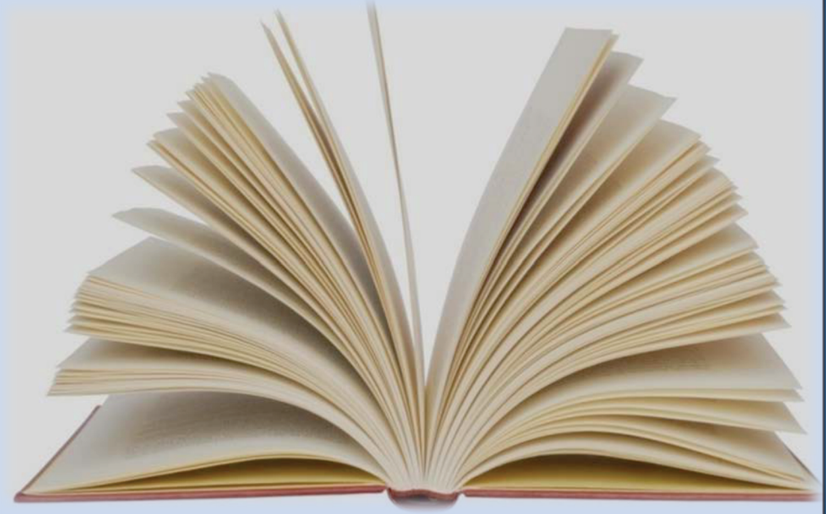

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प्रोफेसर नजमा अख़्तर
कुलपति

Professor Najma Akhtar
Vice Chancellor

پروفیسر نجمہ اختر
شیخ الجامعہ



Vice Chancellor's Message

I always consider it an opportunity for those associated with the field of teacher-education to have Jamia Journal of Education in their hands. The fact is that each volume of new Jamia Journal of Education provides the space for readers to come across with the innovations taking place in the field round the globe.

The strength of the Jamia Journal of Education is that it is always theme specific and covers almost all the aspects related to it. In doing so, the members of editorial board painstakingly initiate the process of reviewing, selecting and editing the articles received. I congratulate them for taking care of such a mammoth task judiciously.

The Jamia Journal of Education is widely disseminated in order that it can reach every inquisitive and curious reader willing to keep their academic interest alive by scanning through the text or contributing to it as writers.

I wish Jamia Journal of Education to be a significant addition to the list of top class educational journals.

Najma Akhtar

(Prof. Najma Akhtar)

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शिक्षा संकाय **Faculty of Education** فیکلٹی برائے تعلیم

جامعہ ملیہ اسلامیہ

Prof. Aejaz Masih
Dean



From the Desk of Editor in Chief

It is almost a year since the COVID-19 Pandemic situation. The world has experienced its toughest time in human history as it engulfed the whole world together, very different from the past experiences of plague outbreaks, World War-I (1914-18) and World War-II(1939-45) and such other difficult times which captured some parts of the world; not the whole world together. The lockdown broke the backbone of all sections of society and all sectors of economy; the most affected were the laborers and lower rung of society. Education has been hardly hit by the pandemic, the after affects will appear in near future; in fact, being sensed through interacting with students. Unemployment and joblessness have become a common phenomenon.

It is almost a year since the implementation of NEP-2020, which promises to bring revolution in all aspects of school education, higher education, and vocational education. Education is the focal point of all developments. Unless we improve our education system and its quality, we can not excel in other fields; from agriculture to industry, from land-based services and economy to space-based services and economy. We need to contribute with full dedication and efficiency at our own levels of functioning.

The nation has already started the process of developing curriculum framework with the formation of a high-power steering committee for the same. Curriculum framework for school education, early childhood care and education, teacher education and adult education are being framed in the light of NEP-2020. Hope the new curriculum frameworks will be in shaping and defining the new India and Indian Education at large. They are likely to set the stage for better future of our young ones and at the same time preserves our indigenous and diverse culture having secular fabrics and act as white light despite having seven colours in it. The curriculum framework for school education needs much focus as it acts as the foundation of all educations and the country as a whole. It needs to be framed with such a vision and mission that ensures country's progress through all-round development of our children at school. The new generation should be nurtured in such a way that they become a productive global citizen with nationalism in their heart and skills to preserve and enrich national values of secular, socialist, and democratic India.

This issue comprises papers on diverse topics which are highly relevant with reference to the teaching, learning and research. I hope that these papers will help to develop an insight among readers about various pertinent issue related to pedagogy, rehabilitation, information and communication technology, inclusive education, and many more areas covered in this volume.

I congratulate the authors by virtue of whose contribution, the present Journal seems to have been a valuable treatise. I also express my deep gratitude to all the members of editorial board who put in their maximize efforts in order to get the journal published in its present form.

(Prof. Aejaz Masih)
Dean & Editor in Chief

EDITORIAL

Access, whether physical orconceptual, lies at the heart of an educational endeavour and an overarching sense of concern for community puts soul into it. The act of reaching out is important for facilitating a close interaction and exchange between learners and teachers but what is even more important is that this exchange is responsive andsensitive to the needs, aspirations and well-being of all of the peoplearound. The exchange and interaction process having come to be closely tied to technological reach, new kinds of inequalities have emerged which need to be urgently negotiated and immediately addressed. Access and community concerns have therefore emerged as key issues in education and these can be thought of as the ideational underpinnings of this issue.Education that is people-centric and that responds to multicultural, multi lingual and multi- ethnic contexts will necessarily have to include and inbuild a minute understanding of and a deep sensitivity to diverse lived realities. Education that is trying to obtain access to education for the students will have to explore multiple ways of reaching out and develop fresh ways of approaching the subject matter. Concepts have to be therefore linked to varied contexts, connections have to be built between school knowledge and the real world, newer mechanisms of bringing the teachers and learners together need to be devised and different abilities have to be catered to. This has significant implications for research directions which will be geared towards exploring the lived situations of learners, gauging the nature of difficulties and barriers faced by them and bettering physical and cognitive access, technologically or otherwise. As we shall see, these are the central threads running through the papers of the present issue of the journal.

This edition carries thirteen papers that are centred around wide-ranging themes. A sociological analysis ofthe phenomenon of educated unemployability figures as a subject as also a deliberation on the potential of madrasas in empowering Muslim girls and women. Some papers have clear subject-specific emphasis. One of the papers provides empirical evidence to support the effectiveness of Project Based Learning in enhancing and enriching mathematics teaching and learning and there is another which explores class IX and class X students' perceptions towards science by means of a close analysis of their responses on an open-ended questionnaire. Additionally, there is an article which draws upon live classroom interactions and discourse to trace the trajectories of classroom learning in Mathematics. The concept and practices associated with Green ICTalso find a place . There is one submission from Bangladesh which is based on a study which incorporates the community's learning on drought risk reduction. Incidentally, six articles in this compendium are from Nigeria which deal with the following subjects : effective teaching of Physical Education, ICT in open and distance Education, study of students' attitude and achievement motivation as correlates of

performance in Arabic, study of phenomenon of drug abuse amongsecondary school students, government involvement in organisation of sports for physically challenged athletes and a study of teachers' awareness and views on inclusive education in Nigeria Basic Education . Together they are helpful in opening up a window to the educational issues and concerns of the region.

Taken together this collection attempts to flag the idea that access to education is an idea that is much bigger than merely the provisioning of a mode of communication between the stakeholders which of course is necessary but not sufficient. As we have been doing in the past, we strive through this compilation as well to keep alive the contemporary debates and deliberations in the field of education and contribute actively to these.

Education and Joblessness in India: A Sociological Explanation

Ehsanul Haq

Abstract

This paper focuses on a simple and known issue of education and joblessness. It is generally believed that education is a potential source of processing and converting human beings into efficient human capital to avail opportunities better, particularly the job opportunities. Thus, education is expected to play a positive role, not only in processing the human beings well, but also in raising their efficiency, capability, employability and prospects higher for getting better employment opportunities. However, the facts provided in this paper contradict this argument. The relationship between education and employment is found to be negative instead of positive. Firstly, it is believed that the negative relationship exists because of limited availability of jobs which are not increasing according to the increase in the number of educated persons. Secondly, it is believed that jobs are available and remain vacant but the availability of efficient and employable human capital is limited. Thirdly, it is also believed that educated persons produced are in surplus to be absorbed. However, producing job opportunities through various sources and producing educated work force through educational institution are the factors external to the individual work force. The job opportunity as an external factor is far from the individuals. The educational institution as the source of producing educated human capital is the immediate source external to the individual. This source as the immediate source externally shapes human beings into human capital with the expectation to make them efficient and employable work force. In addition to this factor, there are factors internal to the individuals. They also perform the same role of shaping and making the individuals efficient and employable human capital. The external, as well as, the internal factors play vital roles in shaping human beings into efficient and employable human capital. This paper explores the roles of these factors to answer as to why the problem of job is more among certain category of the work force as compared to the categories of work force at the top and at the bottom of occupational hierarchy. The work force of these two categories does not suffer the problem of job as much as the educated work force of the middle of these two categories. Therefore, the paper focuses mainly on them who suffer relatively more with the problem of job availability. It is based on secondary sources of facts but the qualitative sociological explanations given in the paper are *based on own interpretations of facts.*

Keywords: Education, joblessness, efficient & deficient human capital, system of human processing, internal & external factors, poverty of culture, poverty of learning, learning-poor, learning-rich, salaried workers, vulnerable workers.

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Introduction

Along with numerous problems which confront the Indian society, the problem of joblessness is one of them. It may be acceptable if this problem is more among those who are not educated or barely educated persons. Although unemployment crisis exists among all the sections of the society but it is surprising that this problem is relatively more among the educated persons in certain categories of the work force. Among major economies, India ranks at the bottom and more than 75 % of its workforce belong to the vulnerable category of employment. Such workers are less likely to have formal work status, decent work conditions and social security. In a crisis situation, such workers are rendered jobless. Most of the educated persons up to higher secondary and above can also be included in the vulnerable category of employment and more than 10 % of them are jobless with female educated unemployment being more than men. This type of joblessness has consistently increased. The limited job opportunity is considered to be a reason for this, but more important reason seems to be the deficient qualities of the work force. This paper tries to address this issue.

Education, Efficient and Deficient Human Capital

Education plays a vital role in human resource development. It is a potential source of making human beings capable of availing job opportunities better. In making them capable, formal education is a necessary condition, but this condition depends on the interest and the ability of the persons to invest their personal resources in education to fulfil the condition. However, even if the persons fulfil the condition of being educated, they may remain jobless, firstly, because of limited job opportunities and secondly, because the persons may be deficient in the qualities of their education and of their human capital. There are three interrelated factors which are at work in relation to the problem of job among the educated persons. Firstly, education is a necessary condition to convert oneself into efficient human capital to better avail the job opportunities. Secondly, the investment of personal resources in education to make oneself efficient human capital to be absorbed. Thirdly, the availability of job opportunities to absorb available human capital. These factors are internal, as well as, external to the individuals. Education as a process and as a system of human processing and the job opportunity are external and the personal resources are internal to the individuals. The focus of the paper is mainly on the roles of education and personal resources in examining the issue of joblessness among educated persons. However, education becomes a necessary condition only when job requires formal education, but there are job/work opportunities where formal education is not a necessary condition likes the work including the vendors, self-employed persons, shop keepers, daily wagers, helpers, construction and agricultural workers, domestic help and similar other workers are engaged in to earn their livelihoods. Although, these days even the persons with formal education may also be found in these areas of work if they are unable to be absorbed in better job opportunities in the formal sector. Generally, those engaged in such activities are mostly illiterate, barely literate, unskilled and semi-skilled persons who are

vulnerable work force at the bottom of occupational structure, but the unemployment rate among them is lower than educated persons. As compared to them as shown in the Tables given below:

Table-1: Education Level and the Percent of Unemployed Labour Force During 2017-18

Education Level	Rural		Urban	
	Male	Female	Male	Female
No Education	**1.7**	**0.1**	**2.1**	**0.8**
Primary Level	3.1	0.6	3.6	1.3
Middle Level	5.7	3.7	6.0	5.1
Secondary & above	**10.5**	**17.3**	**9.2**	**19.8**
All	5.7	3.8	6.9	10.8

Source: Periodic Labour Force Survey released by the National Statistics Office, 2017-18, reproduced in *The Times of India*, June 2, 2019, P.1 & 10. The unemployment rates over time from 2004-05 to 1917-18 shown in the Periodic Survey has also been reported as shown in Table-2.

a substantial number of undergraduates and graduates (secondary and above) are unemployed and the rate of unemployment among them has increased with education and over time. Since, a bulk of them remain jobless, it is necessary to explore the reasons and assess the qualities of this educated work force. There are reasons external, as well as, internal to the individual work force for the problem of joblessness among them. The external factors consist of issue related to social, economic, educational and job opportunities. The internal factors consist of values, attitude, behaviour, desires, motives, perception, aspiration, preferences, choices, time, energy, efforts and cognitive ability. These internal factors can be clubbed into 'personal resources' of the individual work force. The paper focuses mainly on education as a system of human processing as an external factor and on 'personal resources' as the internal factor. The system of education and personal resources together play vital roles in producing human capital which can be both 'efficient', as well as, 'deficient' human capital, depending on how these factors together perform their roles. The 'educated and efficient human capital' has the presentable qualities of education and of human capital like the capability, knowledgeability, employability, skills and productive values. The 'educated, but deficient human capital' lacks these presentable qualities of human capital. These forms and the qualities of human capital are the products of the interplay of the external (education) and the internal (personal resources) factors. The 'efficient' and 'deficient' are not dichotomous forms of human capital. They overlap with each other. It is assumed that the degree of 'efficient' and 'deficient' human capital among the educated would respectively accelerate and decelerate the problem of job among them. Thus, the basic issue to raise here is**,** whether the educated human capital is 'efficient' enough to be easily picked up to fill up the available vacant jobs, and if not, then what may be the reasons, and how this problem can be resolved?

Reasons and Categories of the work force

It is generally believed that it is not education, but the lack of job opportunity is a reason for the problem of unemployment. It has also been pointed out that many jobs at different levels remain vacant due to lack of efficient human capital, appropriate to the job. The factor of job shortage accounts for the problem to an extent. It is assumed here that the main reasons for the problem exist into two spheres. Firstly, they exist within the system of education itself because it is education which affects the qualities of human capital processed and produced. Secondly, they also exist within the individuals themselves because it is their personal resources of time, energy and efforts invested in education which affect the qualities of their human capital**.** The problem of job is more among the educated and skilled, but it is relatively less among uneducated and barely educated persons. Table-1 shows that only 1.7 % rural and 2.1 % urban illiterate men, and 0.1 % rural and 0.8 % urban illiterate women were unemployed in 2017-18. As compare to this, the proportion of educated and skilled unemployed work force (secondary and above) is relatively much higher in both rural and urban areas. It is 10.5 % rural and 9.2 % urban men, and 17.3 % rural and 19.8 % urban women were unemployed in 2017-18. This means that uneducated or barely educated work force, considered to be deficient and vulnerable, is engaged in work activities more than the educated, considered to be efficient work force. Therefore, it becomes important to address the issue of educated unemployed work force.

There are three major categories of the work force. One is a small elite category at the top of occupational hierarchy. It comprises of the professionals, technocrats, bureaucrats, administrators, directors, business managers, elites in areas of culture, business and politics, propertied class and similar other categories of the work force. They are educated, efficient, capable, knowledgeable, employed and employable work force. There is no job problem, either for those of this category who are already employed and settled, or for those younger persons of this category of the work force who are currently educated in elite professional and standard institutions. This is the superordinate category of the work force engaged in mental, intellectual & specialised work activities with power, position & prestige, and high status, high paying jobs with job security, social security and decent working conditions. They have positive values and attitude towards education, work and society. There is no problem of job for currently educated young persons of this category, and if there is any, it is taken care of by the class to which they belong. The second is a very large category of subordinate work force. It comprises of middle level petty officials, different groups of clerical staff and technicians, persons engaged in petty business activities, middle level propertied class, agriculturists, petty traders, small factory owners, contractors and similar other categories of the work force. They are also educated, but they lack qualities of education and of human capital because they are educated, neither in standard professional and educational institutions, nor they have values and attitude very conducive towards education, work and society. They are engaged in relatively low status, low prestige, low paying jobs and work activities. Only a fraction of them

consists of salaried persons, working in the formal sector and the rest engaged in the informal sector and vulnerable employment. The current generation of educated young persons of this category are mostly the first generation learners in public education. After completion of their public education, they are either waiting for the job or employed. Since, they are deficient in family resources and in the qualities of education, human capital and in their values and attitude towards education, work and society; a very large proportion of them remains jobless as mentioned in Table-1. The unemployed educated men and women mostly belong to the second category of the work force. The third category of the work force is also very large. It is at the bottom of the occupational hierarchy. It comprises of casual and temporary staff, daily wagers, vendors, petty shop keepers, cleaning and sanitation staff, construction workers, domestic help, slum dwellers and similar other workers. They are mostly illiterate or barely literate whose lives and livelihoods reinforce each other. They are educationally deficient, but mostly engaged in manual type vulnerable work activities in the informal sector. They have no formal work status. They are in low status and low paying, less clean and less respectful jobs with no work security, assured income and social security. The younger generation of this category is also engaged in the similar manual type work activities. They are deficient and vulnerable in every respect, but they are engaged in work activities more than the educated work force of the second category which is in between the top and the bottom categories of the work force.

Among these three broad categories of the work force, the majority of the first and part of the second, belong to the salaried class of the work force. This is a small fraction of about 22 % of the total work force in India. About 78 % of the work force (majority of the second and total of the third category of the work force) is in the middle and the vulnerable employment because they are on mostly employment contracts with lack of assured income, job security, social security and decent working conditions. Among the major economies of the world, more than 80 % are the salaried workers and less than 13 % are in the vulnerable employment (*The Times of India*, April 8, 2020, P.1 & P.10). It is just reverse in India where large sections of the young generation of educated work force of the second and the third categories are on employment contracts. Most of those who suffer from the problem of unemployment belong to the second or middle category of the work force. The paper focuses mainly on them to examine as to why they suffer relatively more. Although, it is among them that the craze for education is relatively more to make their future prospects brighter. The phenomenal rise in their enrolments at different levels and in different types of education is an example of their desire and demand for education, considered to be a potential source of making educated persons efficient human capital. The draft education policy (2019) states that education is 'the single greatest tool to achieve better job opportunities and to equalize educational and job opportunities across social categories'. It is with this expectation in mind, the rising demand for education and willingness to invest personal resources in education manifests into the phenomenal rise in educational literacy among them. The growth in job opportunities is in-built into the forces of modernization. These forces have created, not only different types of job opportunities but have also created the

demand for educated and skilled work force. They have also pushed drastic shift all over the world from the primary to the secondary and tertiary sectors of job opportunities. As a result, not only the demand for educated and skilled work force has increased, but also the expansion in educational infrastructure has taken place in order to process and produce the technical know-how and productive work force.

Educational infrastructure, factors reinforcing unemployment and education as a means to an end

The expansion of educational infrastructure has taken place in India, but it has taken a hierarchical pattern, corresponding to the hierarchical structure of Indian society (Haq, 2018). We find a wide gap between a small group of efficient, standard and financially well-fed technical, professional and university structures on the one hand, and on the other hand, we have a very large group of deficient and ill-managed institutions, starved by financial and infrastructural facilities. The first group of institutions is mainly attended by the learners of the first category of the work force whose family background and the institutions they attend reinforce each other in processing them and making them mentally and intellectually capable, efficient and employable work force. They would naturally be selected and placed well into high ranking technical, professional, managerial and administrative positions because of their quality education received in a small group of elite and standard professional institutions. The second group of a very large number of educational institutions is not as standard and efficient as the first group of institutions. They are relatively starved by financial and infrastructural facilities. They are deficient public institutions which are mainly attended by a very large section of the learners of the second category of the work force. They mostly discontinue their education after secondary, higher secondary, technical education and graduation. Thereafter, they start searching for job opportunities, but a large number of them remain unemployed (1) for being deficient in qualities, (2) for not being properly processed in the educational institutions attended, (3) for improper investment of their personal resources in education, (4) for being produced in surplus to be absorbed, and (5) for being adversely affected by the scarcity of job opportunities. The main focus of the paper is on the first four interrelated points, related to the problem of unemployment which is relatively more among the educated persons of the second category of the work force. They are mostly the first generation educated aspirants of jobs. Their values and attitude towards education, work and society; their perception of education and job aspiration; their family backgrounds and the type of institutions attended are quite different than the top category of the work force. They are educated, but roughly 10-20 % of the total educated male and female work force remained unemployed during the year 2017-18. The unemployment rate among them increased with education and over time along with persistent gender-based gap in unemployment rate among them (Table-1 & 2).

Table-2: Unemployment Status of Educated Persons by Year, Male, Female, Rural & Urban Factors

	R U R A L							
	2004-05		2009-10		2011-12		2017-18	
Education Level	Male	Female	Male	Female	Male	Female	Male	Female
No education	**0.3**	**0.2**	**0.3**	**0**	**0.5**	**0.2**	**1.7**	**0.1**
Primary Level	1	1.1	1	0.5	1	0.3	3.1	0.6
Middle Level	1.6	3.4	1.8	2.3	1.8	2.5	5.7	3.7
Secondary & above	**4.4**	**15.2**	**3.5**	**11.8**	**3.6**	**9.7**	**10.5**	**17.3**
All	**1.6**	**1.5**	**1.6**	**1.6**	**1.7**	**1.6**	**5.7**	**3.8**
	U R B A N							
No education	**1**	**0.3**	**1**	**0.9**	**0.7**	**0.4**	**2.1**	**0.8**
Primary Level	2.1	2.9	1.6	0.5	1.9	1.3	3.6	1.3
Middle level	4.2	8	2.6	3.7	2.2	3	6	5.1
Secondary & above	**5.1**	**15.6**	**3.6**	**12.2**	**4**	**10.3**	**9.2**	**19.8**
All	**3.7**	**6.9**	**2.8**	**5.7**	**3**	**5.3**	**6.9**	**10.8**

Source: same as Table 1

The factors attributed to the problem of unemployment are external, as well as internal, and it is their interplay, as assumed, is greatly responsible for the rise in unemployment rate with education and over time. As stated earlier, the young generation of the work force, mostly educated and unemployed, comes from the second category of the parental background where their parents are neither well educated, nor professionally well qualified. They work mostly in subordinate positions. They are neither educated in quality educational institutions, nor well placed in the occupational/professional hierarchy, they neither occupy high ranking and high paying occupational status, nor can afford quality and expensive professional education of their young grown up children who are mostly the first generation educated work force whose values and attitude towards education, work and society are entirely different. They want to be educated more, but they have gone to an extent to get education to take up job at an early age to settle in their social life. Their perception of education is encouraging and the increase in enrolment among them for education shows their desire for education. As mostly being the first generation learners, they have come to realise that education is a potential source of making them capable of using numerous opportunities open to them as educated persons. They feel very enthusiastic in taking decisions to invest their personal resources in their education. They are influenced by the positive role of education in career-building opportunities, but at the same time, they are also greatly influenced by the rising materialistic values around them. As a result, the value of education perceived by them is also materially perceived. This is a kind of mind-set which has grown in the current generation of young educated persons. There is demand

for education among them, not as a source of learning, accumulation of knowledge, enlightenment and civilised behavior, but as a source of certification of knowledge, helpful to them in getting the job at an early age to earn to settle in life early and start accumulating material assets. Since, education is considered by them as a means to an end, education achieved has made them deficient because the material end is the motive and not the pursuit of knowledge, understanding, competence, skills, employability and civility. The forces of modernization have created numerous job opportunities and the demand for education among them has increased, but this demand is more job-oriented for which certification of knowledge has become a condition needed with or without deeper understanding of the basic foundations of knowledge. As a result, the poverty of learning among them is phenomenal. The World Bank in its report on *Ending Learning Poverty,* 2018 says that the 'poverty of learning is a major problem and the inability of the system in sufficiently tackling this problem is a contributory factor of human capital deficit which would adversely affect the future prosperity'. The middle category of the work force, including the working parents and their educated and unemployed grown up children suffer from the psychology of being ambitious to become rich overnight to compete with the rich and affluent. They have their own mind-set of grabbing opportunities including parental properties, if any, and collecting the material assets at the minimum cost of investing their personal resources in education to enrich their human capital. This is the typical psychology of this group of the work force where education is not taken as a source of enriching their knowledge and civilised behavior, but as a means to fulfil their immediate material needs. The public education is mostly attended by them because it is inexpensive, mostly Hindi medium and the public funded and managed education imparted from lower to higher levels of learning. We have wide range of such institutions of public education (Kumar, 2019, P.14). They are ill-equipped with resources and teaching-learning facilities. They are financially starved and sub-standard institutions, catering to the needs of a larger section of the society. Since, the young generation of the middle category of the work force has been processed in and produced by such institutions, they are deficient in the qualities of education and of human capital. They are also deficient in their mind-set and in their thinking, values and attitude towards education, work and society. The institutional and the individual factors tend to contextualize the processes of their formal and informal upbringing and the manner in which they have been shaped by those processes. The deficient familial, educational and value parameters would certainly have the degenerating effect on the qualities of human capital, leading to the problem of job among the educated work force.

Internal and external determinants of the qualities of human capital and job opportunity

One dominant view is that the factors internal to the individuals are greatly conditioned by the factors external to them. The parental background factors including their mind-set greatly determine, not only the personality attributes including the cognitive ability of the younger generation, but also their education, career and future prospects. This

view of external conditioning is contested by the other view on the ground that the internal factors, independent of the external factors, determine education, career and the future prospects of the individuals. If the persons lack productive values, positive attitude and ability to properly invest their personal resources of time, energy and efforts in education, they may lack behind in the race for upward social mobility in spite of their external support base. Such persons may remain deficient and can be channelled to low status job, low earnings and lower access to opportunities. According to the theory of culture of poverty (Levis, 1968) education is the key to success and the lack of education is the main cause of failure, and that success or failure in education determines the distribution of work opportunities to a great extent, but that success or failure in education is greatly determined by the attributes internal to the individual. They determine their initiatives and their investment making behaviour towards education. For example, the proper use of time, doing hard work, taking initiatives and making useful personal investment in education determine the success of the persons in the field of education. Since, these determinants of success differ by individuals, their success in education differs even if everyone has furnished the same education without class consideration (Royce, 2015, Becker, 1975). The human capital theory of education (Royce, 2015) contests this argument and says that the theory of culture of poverty undermines the role of inborn cognitive power which is the primary determinant of success or failure in education. This factor is also internal to the individual like rest of the factors, but the human capital theory gives primacy to only one of the factors internal to the individual, that is, the inborn cognitive power of an individual, and the rest of the factors, whether, internal or external to the individual, are only secondary to the primary factor of cognitive power which differentiates the individual learners and the potential work force into efficient and employable or deficient and unemployable work force. The human capital theory of education claims that the people are poor and unemployable because they are deficient in their cognitive power, and therefore, they are unable to excel well in education and succeed well in availing job opportunities. It is the lack of cognitive power, intelligence, ability and competence which makes the persons deficient and they are unable to take appropriate initiatives and make meaningful decisions to effectively invest personal resources in education to raise their occupational status. This is the classic viewpoint of the theory of human capital, although it is subjected to controversies (Becker, 1975) but the theory remains influential because it claims that the cognitive ability and education are the key factors of success or failure in availing educational and job opportunities. The cognitive power has the most profound effect on the life prospects. This power is genetic, inborn, heritable and immutable. This is like the bio-genetic theory of education that educational success or failure lies in the genes of the individual, as if, the fate lies in the heritable genes. The cognitive power, being a matter of genes, is the key to success or failure in educational and job opportunities. The social class-division in the society and the efficient-deficient division in the human capital is, in fact, the cognitive-division in the society and in the individual human capital because the employees and workers, students and teachers are sorted out on the basis of their cognitive ability which

manifests into their academic credentials. The points being raised by the culture of poverty theory, human capital theory and the bio-genetic theory are justifiable, although consistently in their arguments, they ignore the role of the factors external to the individuals in regulating educational and job opportunities or the life prospects.

However, the role of the external factor in determining the life prospects cannot be ruled out because they are so powerful that they can shape the factors internal to individuals and can differentially distribute educational and job opportunities, irrespective of the factors internal to them, but it is equally important that the factors internal, independent of the external, might regulate the life prospects of the individual work force. One of the basic differences between Marx and Weber (Morrison, 2006) is their focus respectively on the external (economic) and the internal (value parameters) factors in regulating the life prospects, but whether it is the economic or the non-economic, the fact is that majority of the work force belongs to a large section in between the top and the bottom categories of the work force. They are deficient in their social, economic and educational backgrounds; in their thinking, values and attitude; and in their initiatives and ability to take appropriate decisions to invest their personal resources in quality education. They suffer from multiple deficiencies. The younger generation of this background inherits these characteristics. After their education, they are now available in the employment market as the future potential work force. They are mostly undergraduates and graduates (secondary and above) and mostly the products of public education which is mostly dilapidated and ill-equipped. They are not properly educated, processed and trained as potential work force to compete with others, not only for available job opportunities, but also for further education to enhance their educational status to improve the quality of their human capital. They lack initiatives, work habits, constructive thinking and respect for others. The worklessness and attitudinal indifference towards education, work and society are very high among them. They are educated up to higher secondary and graduation, but they do not look like educated persons due to lack of civilised behaviour among them. They are constrained by their own life style to achieve higher professional and specialised education to get high status job opportunities. The quality of their education and their job aspirations/preferences do not match with each other. Although, the gap between them is not acceptable to the job seekers because they think they are educated, qualified and deserve to get the job they aspire for, but their own perception does not matter because it is externally decided who deserves for the job. The external decision believably is based on the objective assessment of the qualities of the aspirants demonstrated before the experts. Since, the qualities are found deficient, the problem of job follows among the educated persons. It is due to this that the unemployment is relatively higher among them and the rate has increased with education and over time, making the pattern of relationship inverse between education and employment. This shows as if the qualities of education and of human capital exist only on paper in the certificate of marks obtained in different areas of knowledge. This raises figure against the type of education received and the manner in which the aspirants of jobs have been processed and produced. In fact, they are so deficient that the illiterates and barely

literate parsons avail of work opportunities more than the educated and skilled persons. The type of public education and the life style which the educated persons have would certainly have the adverse impact on their employability (*The Times of India*, Sept. 5, 2018, P.2).

The data-base of the arguments for job and joblessness

The data produced by the Periodic Labour force Survey released by the National Statistics Office as given inTable-1 shows that the joblessness (work force without job) rises with education. It is much higher among both the men and women educated up to secondary and above in both the rural and urban areas as compared to those who are not educated or barely educated. Among the educated rural and urban women, the problem of job is more than educated rural and urban men, but among the women who are illiterate or barely literate, the unemployment is much lower than men in both the rural and urban areas. This means that the problem of job is more when education is more and the gap in availing job opportunities between men and women is more when education is more. Table-1 shows, 10.5 % educated men and 17.3 % educated women in rural areas and 9.2 % educated men and 19.8 % educated women in urban areas are jobless. At the higher level of education, women are relatively more jobless than men. In general, the pattern of inverse relationship between education and employment has increased over time. In this pattern, the disparity by rural, urban and gender exists. This disparity is more in urban than in rural areas and it is more among the educated than among the illiterates or barely literate persons. This disparity may hurt urban men and women more than the rural men and women. It may also hurt educated rural and urban women more than educated rural and urban men. Further, it may also hurt educated men and women more than illiterate and barely literate men and women. However, the pattern of relationship shows that the illiterate and barely literate vulnerable work force is engaged in work opportunities more than the educated work force. Since, the vulnerable work force knows that education is unable to economically empower the educated, they do not feel interested to invest their personal resources in education for being less relevant for them from monetary point of view and economic prosperity of their family. The trend of educated unemployment hampers the educational interest of the vulnerable work force. This may be a reason why there is not much craze for education among the vulnerable work force of the third category. However, even if they want to educate themselves and their children they cannot or can go to an extent in achieving education. The reasons attributed to the lack of interest in education among them are the following:

Firstly, because education is perceived by the vulnerable work fore differently as compared to the educated work force. They find no or very little economic relevance of education for themselves and for their children. This perception is conditioned and constructed by both the internal and the external factors which exert pressures on their perception of education. They can, neither afford education by their ability, time, energy and efforts; nor by their socio-economic background or by the amount of money

which they earn for themselves and for the family. Secondly, because education is a time consuming process which they can, neither easily afford by investing their personal resources, nor by whatever amount of money they may have. As soon as, the children become adults, the working parents engaged in vulnerable jobs after giving them necessary education, want them to work and earn their living to support themselves and the family. Thus, the young vulnerable work force tends to move within their vulnerable social conditions for generations and it takes generations for them to move upward to have better education and work opportunities to change their social vulnerability. Thirdly, as per the trend shown in Table-1, since education is creating joblessness among the educated, the social and economic relevance of education is reduced in the perception of education of the vulnerable work force, and this again, hampers their interest to advance in the field of education to make their human capital efficient and employable. Table-1 shows that the deficient and vulnerable work force does not suffer the problem of job as much as the educated and skilled suffer because they are engaged in work activities for which education is not a necessary condition, but the jobs the educated persons aspire for, need education but they are deficient by the qualities of their education and their human capital to qualify for the job desired. Among the vulnerable work force, the nature of work (mostly manual, less clean, less respectful, low status and low paying jobs with no assured income and security) desired to be engaged in, is consistent with their illiterate or barely literate educational status, but this is not the case with the educated work force because the nature of job (mostly mental, clean, while collar official jobs, desk work, more respectful and more paying jobs with assured income and better working conditions) desired to be engaged in and the qualities of their human capital are inconsistent with each other. The aspirants of job possess the desired level of education to qualify for the job as per their own perception, but in fact they lack the qualities of their education and of their human capital needed for the job desired. The educated may have their own self-perceived notion of their qualities which may be their own self-created illusion for landing themselves up in a frustrated and in a jobless situation. This can be attributed to the following: Firstly, they are jobless because of their own misconceived notion of competence that they are educated and skilled, and hence, deserve to get the job desired. They in fact hide their own objective assessment of their deficient qualities. As a result, they are shorted out for the job desired, although this may not be acceptable to them. Secondly, they are shorted out because of the inconsistent relationship between knowledge and skills acquired and the actual presentation of the same at the time of selection. Thirdly, they are jobless because the system of human processing has not done its job of properly processing them as efficient human capital. Fourthly, the educated may have used various ways of acquiring high academic credentials without making concerted efforts and proper use of their personal resources in education in order to make themselves efficient to qualify for the job desired. These are the possible reasons for relatively higher unemployment rate among the educated. The possible reasons are justifiable with evidences and illustrations given herewith.

Evidences and Illustrations in support of the argument for joblessness

The public institutions of formal learning from the foundation to the higher levels are facing numerous problems. The system of public schooling as one of them is far from imparting meaningful learning. As a result, about 55 % of school children suffer from learning poverty (World Bank, 2018). They are deficient in learning. The process of admission at any level of education is not purely based on ability and competence, objective and fair principles. The system of teaching and learning, evaluation and grading is unable to short out properly the efficient and competent out of deficient and incompetent seekers of education. Even if the objective principles are taken into account, then one may ask for the reasons as to why those admitted to be processed well to be efficient in qualities of human capital are mostly found to be deficient in those qualities, as if, they are not being educated, processed, trained and evaluated well. The problem very often raised is that the knowledge and skills acquired in various ways by educated young generation is certified without their power of ability, understanding, comprehension and employability. This is firstly because the institutional mechanism of processing them has become almost ineffective and dysfunctional. The manifestation of this is the inconsistency between the knowledge certified and the knowledge presented. For example, at the school level, the school certificates are awarded, but the awardees can, neither have the basic understanding of that level of the text of knowledge, nor can properly read and comprehend the texts prescribed below their standard. A large number of school children suffer from learning poverty. As pointed out by Annual Status of Education Report (ASER), 2018, 56 % students of class-8 cannot divide a 3-digit number with a single-digit one, 72 % students of class-5 cannot do division at all and 70 % students of class-3 are unable to do any subtraction (*The Times of India*, Jan. 16, 2019, P.1 & P. 6). Their learning proficiency is much lower in the public than in the private schools (*The Times of India*, 15 Nov. 2019, P.1). The deficient knowledge and understanding is an indication of learning crisis. This is a serious problem as pointed out by the ASER and the National Achievement Survey report. The report of the United States Agency for International Development (USAID, 2020) has pointed out that all over the Indian states, there is serious learning and knowledge crisis. This is supported by the World Bank and the ASER reports on learning poverty and deficiency in work performance. The surprising fact is that we have achieved universalization in education and phenomenal rise in enrolment at all the levels of learning, but the gainful learning outcome tends to be dismal and the very foundation of learning remains poor across the Indian states. It is surprising to learn that the deficiency in knowledge gets worse as one goes up in educational ladder (*The Times of India*, Jan.16, 2019, P.1 and Feb.23, 2020, P.15). The Education Commission Report (1964-66) long back had shown its serious concern for declining interest in the pursuit of knowledge and work efficiency, but we have not been able to sufficiently tackle the problem. As pointed out by the World Bank (2018) the shortcoming in the quality of learning is the major contributory factor of deficient human capital, leading to the problem of job. The report has also pointed out that the efficient human capital is an important component of production and prosperity and about 60 % development is due to the productive role performed by the efficient human capital. This component of

production needs to be properly processed and trained to become efficient, productive and knowledgeable but it is this component which remains deficient, least productive and employable because of poor quality of formal teaching, learning and upbringing.

The quality of formal teaching-learning process is a contributory factor of decline in school results. It is due to this factor that the CBSE results declined in the performance of problem-solving assessment of the students of class-IX from 28.5 % in 2013 to 25.5 % in 2014 and for class-XI students, it declined from 40.1 % to 24.4 % during the same years (*The Times of India*, 21 May, 2014, P.4). These evidences indicate that the foundation of learning is shaky. This will have the carry over effect on the human capital being processed in and produced by the superstructure of knowledge built on the shaky foundation. For example, at the higher level of learning, the teaching certificate is awarded to the trained graduates of education to teach English language but when the awardees as aspirants for the post of language teacher is asked by the selection committee to spell and write the words*, lieutenant and formative-assessment*, the aspirant for the post spells and writes *lieutenant* as *leftinent* and *formative- assessment* as *formulative asesment* with no conceptual clarity of what the formative- assessment stands for. Further, when the aspirant is asked about John Dewey's 'project method' of teaching school children and its application in the classroom, the aspirant is found almost ignorant (Haq, 2019). The learning deficiency at the higher level and at the lower level goes together. Similarly, at a much higher level of learning, the search expertise is certified by the award of research degree to the research scholars for undertaking interdisciplinary research in fact, the scholar does not know conceptually what exactly the interdisciplinary research stands for and how a theory can be used as a tool of research. It is very often said that the standard of learning has declined at every stage of learning. This is because of the lack of quality teaching and the interest in reading, learning and understanding. It is also said that the standard of research has declined because the degree is awarded without basic conceptual clarity and adequate reading and learning of the fundamentals of research. Although, the decline in the standard of research is accompanied by the phenomenal rise in the number of holders of research degree. The decline in the virtues of reading and learning habits and in the ability of original and innovative thinking is ultimately the result of the lack of interest in the pursuit of knowledge and the lack of efforts to invest personal resources to cultivate these virtues**.** However, along with the phenomenal decline in reading and learning habits in the learners in general and the research scholar in particular, there is phenomenal rise in the habit of mechanical reproduction of knowledge among the learners and the producers of knowledge. These days, the theses written and produced are mostly virtual theses because they are mostly based on reproduction of knowledge where the basic conceptual understanding is not needed. Only one thing needed is to learn the art of how a research degree or any degree or any certificate can be managed. One has to learn and follow only the procedures of management. However, the lack of interest in reading, learning and accumulation of knowledge would definitely make the person, not only deficient in education, but also deficient in the qualities of human capital and employability. Those who are deficient, in spite of being educated become,

in fact, labourers and daily wagers in a crisis situation of unemployment. These days, many holders of degrees of M. Phil, MBA, B. Ed, and many private school teachers working on employment contracts have now become daily wagers due to lockdown. It is quite possible that most of such degree holders are actually deficient in understanding, knowledge, competence, skills, productivity, civility and employability because their qualifications may be only virtual and not actual (T*he Times of India*, May 19, 2020, P.8). This becomes the main reason why many educated awardees of certificates and degrees become jobless, particularly in a situation of job crisis. They may remain unemployed, underemployed and employed only on employment contracts. They have to wait for longer time to become part of regular salaried class of employees. The evidences of deficient learning at different levels of learning in support of the possible reasons as stated above, not only provide answer to the problem of joblessness among the educated, but also expose the institutional mechanism of how the learners at different levels are being processed and produced? The institutions of education has to share the responsibility of the situation of alarming learning crisis and job crisis among their own educated products. Such a situation originates within the institutional framework and within the educated individuals themselves.

Perception of education, inconsistency between virtual and actual knowledge and skills, and joblessness

The job crisis among the educated depends on how they perceive the value of education, how seriously they take education as a valuable source of employment and what amount of their ability, time, energy and efforts they want to invest in their education in order to make themselves efficient work force. These issues can be seen through the materialistic lens of the educated themselves as they are greatly influenced by the materialistic values around them. It is through that lens that the certification of knowledge is valued more than the value of knowledge itself. It is that certificate of knowledge (virtual) has to be acquired at any cost and by any means in order to show that they are educated, qualified and efficient work force. It is with the help of that kind of managed certificates, degrees and the constructed academic credentials, CVs & APIs (Academic Point Index) that they and many others want to prove their efficiency, capability, employability and their claim for promotion and job opportunity, but in reality they are found deficient in the presentation of knowledge and conceptual clarity (actual) because they have, neither been properly processed, nor have actually invested properly their personal resources in education. Securing impressive certificate of marks can easily be managed through sources other than objective and fair. The system of internal assessment is very helpful in this regard. It looks as if there is the crisis of getting jobs after seeking education, but in fact there is a greater crisis of getting suitable educated persons for available jobs. The shortage of getting properly processed and trained, professionally competent and technically efficient human capital is a bigger problem. There is no job problem for the quality human capital which is very small in number. The problem of job is a problem of a very large section of the middle category of the work force. This problem among them is rising over time in spite of the serious

concern shown by various survey reports and the commissions. The gap between the virtual and the actual knowledge and skills is not only inconsistent but has widened over time. The widening gap can be seen in the Periodic Labour Force Survey released by the National Statistics Office and shown in Table-2. The survey provides unemployment data for the years 2004-05, 2009-10, 2011-12 and 2017-18 showing broad trend of rising unemployment with education across time. According to the Centre for Monitoring the Indian Economy, a generation ago, it was not possible to get a job in the organised sector without a graduation degree, but now the minimum qualification to get a job in this sector is changing (*Sunday Times*, June 2,2019, P.1). If we look at the unemployment status of educated persons given in Table-2, we find that the unemployment status has slightly declined over time from 2004-05 to 2011-12 in both rural and urban areas but it has significantly increased in both rural and urban areas during 2017-18 as compared to 2004-05**.** Secondly, the unemployment rate among both male and female educated persons has increased much faster than the rate among uneducated and barely educated persons. Thirdly**,** among the educated male and female in both rural and urban areas, the unemployment rate has increased among women at a faster rate than men over time. For example, in rural areas, the unemployment rate among men has increased from 4.4 % in 2004-05 to 10. 5 % in 2017-18 while this rate increased among women from 15.2 % to 17.3 % during the same year. The rate among the educated rural women was already higher than men in 2004-05, but the rate sent up further to 17.3 % among them in 2017-18. Similarly in urban areas, the unemployment rate among the educated men increased from 5.1 % in 2004-05 to 9.2% in 2017-18 while this rate increased among the educated women from 15.6 % in 2004-05 to 19.8 % in 2017-18. The rate among women was already high but it went up further to 19.8 % .This shows relatively a consistent increase in joblessness among educated rural, as well as, urban women than men. Fourthly, the gender concept tends to have a role in making the rates consistently different over time between men and women. The increase in the rate of unemployment tends to correspond with the rise in public education. Although, public education is neglected because a considerable amount of funds remained unutilised during the year 2017-18. We are under investing in education as compared to other countries. We have to make substantial improvement in quality, quantity, access and expansion of education (Vaghul, 2020) along with resolving the problem of educated unemployment. The system of public education as the main source of catering to the needs of middle category of the work force is starved of funds, facilities and the quality as it is unable to tackle the problem of poor quality of human processing, poor quality of teaching-learning and the poor quality of human capital produced. The evidences given here that the mature learners need proper formal upbringing to counteract the undesirable values informally inculcated to them through socialization. Their interest in undesirable activities is on the rise and this trend needs to be counteracted through proper schooling but the deficient schooling would not only have adverse impact on them, but also have the carry over effect on their further learning and employability. Table-2 shows that at the horizontal level, in both rural and urban areas and among both male and female educated persons, the unemployment rate has consistently

increased from one year to another year. The vertical pattern of relationship between different levels of education within the year shows that the problem of job increases with education within the year and rises as one goes up in educational ladders. This may be attributed, mainly to poor learning imparted through the poor quality of teaching-learning as pointed out by the CBSE. The system of internal assessment is a contributory factor as it makes the promotion and the certification of knowledge easier. It tends to discourage critical thinking and promotes factors other than merit, hard work and extensive reading. Thus, the efficient learning and employability is adversely affected.

Gender factor and Unemployment

In addition to the factors attributed to the problem of unemployment, the gender factor is an additional socially constructed factor of the problem. The data given in Tables 1&2 show that the unemployment rate among the educated women is consistently higher than men in both rural and urban areas across time, although their educational level is a constant variable as all of them are equally educated, but gender differs which tends to create the gap in the employment rate which is more than double in urban areas and a little less than double in rural areas among the educated women than men during the year 2017-18. The unemployment rate differs, not only by education, but also by gender when the educational level is the same. This means education perpetuates, not only the social basis of gender, but also promotes the gender-based gap in the unemployment rate. We know it well that the discriminatory practices based on gender, caste, class and religion continue. The social construction of gender is deeply rooted into the organic structure of our society. The main source of the social basis of gender lies in our cultural and structural traditions, including the patriarchal structure and patriarchal values, although the structure has declined, but the values persist. The gender is so deep rooted that it begins differentiating and discriminating right from the beginning of an unborn male and female conceptions to the end of male and female lives, and thus, the entire male-female life cycle is affected by the gender factor. Education is not independent of the social structure of which education, as well as, gender are integral pacts. As pointed out by Durkheim (1956) education performs the subservient role in the society. It functions according to social needs. The maintenance of the idea of social construction of gender is a social need. Education is required to maintain it. If it is not done by education, it will be done by the family which is already reinforcing the idea of gender and making it difficult for education to counteract it. It seems that like the family, education is also reinforcing gender because the gender-based gap in the unemployment rate widens with education. As the Table-1 shows this rate is much higher among the women than men. At the level secondary and above, 10.5 % rural men and 17.3 % rural women, and 9.2 % urban men and 19.8 % urban women are unemployed during the year 2017-19. The social, economic and educational backgrounds of educated men and women in both rural and urban areas are almost the same. They have been processed in and produced by the same system of public education. They are deficient in the qualities of education, human capital and in their values and attitude towards education, work and society. They are almost uniform in

every respect, but the gender factor has put fuel to the fire by making educated women relatively more unemployed. Table-2 shows that the gender gap increases with education and also over time. The work status of educated women should be better compared to the work status of illiterate and barely literate women, although the nature of work and social conditions of living differ.

Concluding observations

In short, the unemployment rate among both men and women has increased with education and it has increased over time. This rate is highest among the educated persons during the year 2017-18 as compared to earlier years. *The State of Working India 2019* released by Bengaluru-based Azim Premji University has pointed out that around 5 million men lost their jobs between 2016 and 2018. This loss coincided with demonetization in November 2016. The report has also pointed out that in addition to rising unemployment among educated persons, the less educated workers have also suffered from job losses and reduced work opportunities since 2016 (*The Times of India*, 17 April, 2019, P.10). The Consumer Pyramids Survey of the Centre for Monitoring the Indian Economy says that large number of graduate men and women are unemployed in varying degree. The age-group 20-24 is most affected by unemployment. Among the urban women, graduate women are around 10 % of the working age-group, but about 34 % of them are unemployed. Among the urban men, graduate men are around 13.5 % but 60 % of them are unemployed. The labour force participation rate of both men and women has drastically declined. The State of Working India 2019 has also pointed out that the loss in job opportunity which coincided with demonetization in Nov. 2016 is now coinciding with the spread of virus in March 2020 when the joblessness increased from about 9 % to about 31 % in urban areas and from about 5 % to about 20 % in rural areas (*The Times of India*, April 9, 2020, P.10). A large number of deficient and vulnerable work force, including the migrant workers are affected by the crisis situation. Most of them are out of job. Many of them left the work place and moved to their native places. The vulnerable work force suffers most during the crisis situation. They are rendered jobless as compared to the salaried class. The employment status of the educated middle category of the work force already in a miserable condition is also affected during the crisis situation because the overall unemployment rate increased from 8.4 % to 23.8 % in March 22, 2020. The recent survey conducted between 1-9 May 2020 by the Centre for Sustainable Employable at the Azim Premji University shows that the crisis situation has created job losses up to 80 % in urban and 57 % in rural areas and the most affected are vulnerable workers like the sellers of different items of daily consumption, daily wagers, casual wage workers, vendors, etc. (*The Times of India*, May 13, 2020, P.6) but even more educated persons like M.Phil, MBA, B.Ed. and private school teachers on employment contracts have become jobless or daily wagers but mostly those who are educationally deficient are affected more.

The system of human processing and the value parameters of the work force are socially constructed. The social hierarchy constructs them according to its own principles. It is so

constructed that we are unable to easily eliminate social, economic and educational inequities (Haq, 1989). The hierarchical system of human processing is almost parallel to the social hierarchy. The quality of education goes by the principle of social hierarchy (Maniar, 2019, P.19). As explain earlier, those who belong to the rich families go to attend English medium, expensive and socially exclusive, standard and efficient elite private institutions of learning. They pursue thereafter higher studies of equal standard and go to equally good and efficient professional and technical institutions where they are processed in mental, intellectual, administrative and professional skills to take up high-status and high paying jobs in the hierarchy of occupational and professional categories. On the other hand, the bulk of those learners are from relatively lower social backgrounds go to attend largely the Hindi medium, inexpensive, sub-standard and deficient public institutions of learning, catering to their needs. They mostly drop out after schooling and graduation. They are unlikely to continue for higher, profession and technical studies because of their own temperament, mind-set and life style. They are poorly processed and trained into skills manual in nature to take up low-status and low paying jobs in the occupational hierarchy. The educational divides into a small group of efficient and a large group of deficient educational institutions of human processing are socially constructed divisions. The majority of those who suffer from the problem of jobs are the products of socially constructed deficient institutions of public education where they are processed poorly to remain deficient human capital (Raina, 2019, P.16). The hierarchical educational institutions of human processing with in-built hierarchy in the quality of education imparted produce hierarchy in the quality of human capital, and thus, consolidate the existing divisions in the familial and in the occupational structures of the society. The occupational structures and the type of education that exist reinforce each other and in this process, the quality of human capital of much larger middle category of the work force and the poorer sections of the society continue to suffer. The World Bank report has pointed out that the poor quality of human capital processed in and produced by the public institutions of education is a major contributory factor to human capital deficit, and hence, the problem of employability among them. To a great extent, it is the social structure, more specifically the stratified familial and occupational structures of the society and the corresponding system of human processing are responsible for processing and producing deficient and unemployable human capital, and to an extent, the individual workers are also responsible for their own act of making themselves deficient in availing existing job opportunities. Then, what is the alternative in resolving the problem of educated unemployment? Firstly, since the system of human processing and the values of the individual work force are greatly responsible for producing deficient human capital and creating the problem of job among the educated, they have to be drastically changed in order to produce efficient human capital. This is easier to change than changing the broader hierarchical social structure of the society. Secondly, the efficient-deficient divide in education and in human capital is useful, provided the divide is objectively taken into account along with the objective basis of the process of recruitment of educated persons. The entire selection procedures need to be changed in order to make it value-free and neutral. Thirdly, uniform service

condition and more job opportunities are needed, and enormous diversities in occupational groups need to be minimised, particularly the gap between a small group of the work force with permanent employment, job security, assured income and social security on the one hand, and on the other, a large group of the work force, mostly on employment contracts with no job security, assured income and social security. Although, the third alterative tends to be an utopian view, but the first two are viable alternatives to solve the problem of education and joblessness, provided there is the will to bring about constructive changes in the system of human processing, in the value parameters of the individual work force, in the objective basis of the use of the 'efficient-deficient' divide and in making value-free procedures of selection of the work force. These changes are also difficult to achieve in a given social context of Indian society. If the necessary changes are not going to be brought about, then the divide in education and in human capital would continue and a much larger section of the work force would continue to be adversely affected by the problem of unemployment.

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Context to Concepts: Exploring Project Based Learning in Mathematics Classroom

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Abstract

Project Based Learning (PBL) is a learner centric, exploratory approach which is based on the premise that learners as active agents,when engaged in authentic tasks, solving real problems,generate knowledge and skills in dynamic interaction with their physical and social environment. NCF (2005) recommends connecting mathematical concepts with the real-life experiences of the learner and design alternate, authentic assessment strategies.This study is conducted in an action research mode in a government school of Delhi. The sample size of the study was 35 students of class 5. An intervention module based on the premise of PBL was designed.to know the effect of project-based learning on the learners' mathematical skills and competencies. The major tools for data collection were learner generated responses, participant observation and rubrics. Learner generated responses were analyzed using a rubric containing the various competencies and skills. The analysisshowed enhancement not only in the mathematical concepts but also healthier group dynamics and social skills. The results show that the PBL is beneficial in motivating students in positivemanner in learning mathematics.

Introduction

Project Based Learning (PBL) is apedagogical approach which is based on active engagement of learners in an exploration and problem solving.It is rooted in the constructivist framework of experiential learning and contextualizes the learning by providing opportunities to solve real world problems. Cognitive theorists and social constructivists have advocated for this type of active engagement of learners in problem solving tasks which are hallmark of PBL. Active construction of knowledge, situated learning, social interaction and cognitive tools are major aspects which form the curricular and pedagogical foundation of PBL (Krajcik, Blumenfield, 2006). Cognitive tools like visual aids, graphic organizers, manipulatives, computer technology etc. help learner to understand conceptual ideas and expand range of theirinvestigations. There is fundamental difference between 'Doing Projects' and PBL. 'Doing projects' typically happens after the instruction where the teacher or facilitator gives the project task and learners demonstrate their understanding after the completion of topic or unit, whereas PBL is based on the premise of engaging learners in an extended inquiry process during the instruction i.e., simultaneously along the process of teaching learning. Hence

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assessment of PBL is 'for learning' (AfL) not 'of learning' (AoL). "Some of the important features of PBL are -Significant content, need to know, a driving question, a student voice and choice, 21st century competencies, in-depth inquiry, critique and revision, public audience" (Larmer and Margenoller, 2012). An exemplary PBL based unit is characterised by 6 A's namely-Authenticity, Academic rigour, Applied learning, Active exploration, Adult connection and Assessment (Marker, Larmer, Ravitz2003).

Research Focus and Context

PBL in mathematics has been found as effective in enhancing content knowledge (Boaler2002, Uyagar2012, Kahn 2012), interest (Muschal 2006), motivation (Filsciketal 2012). It is also found that, students in PBL class environment get more opportunities to explore mathematical processes like communication, representation, modelling, and reasoning (Smith, 1998; Erickson, 1999; Lubienski, 1999). In the context of Indian curricular reforms NCF (2005) also emphasizes contextualizing Mathematics curriculum at primary level and make connections with everyday life of the child. NCF (2005) also suggests to adopt alternate assessment strategies and assessprocedural as well as conceptual knowledge in mathematics along with skills. One of the very effective ways to establish linkages between the concepts of mathematics and child's everyday life is engaging the learners in integrated projects. PBL also provides opportunity not only to develop various skills and competencies but also assess various aspects. In order to solve complex problems in curriculum as well as real life, students need not only fundamental skills of 3R's (reading, writing, and arthematic) but also digital-age skills like teamwork, problem solving, research gathering, time management, information synthesizing, IT tools). These are often referred as 21st Century competencies (Marker, Larmer, Ravitz2003).Although PBL is not any new pedagogy, it hasn't been used or explored much in the Government schools owing to many reasons like lack of resources, high student -teacher ratio, dominance of paper -pen exam and rote learning to name a few. Also,rubrics are not usually used in schools for assessing learners. As part of the internship practicum in the final year of the teacher education program, teacher educators of the department had opportunity to interact with many government run, resource poor schools and observe the teaching learning in these schools. Duringthis interaction with the primary school students and teachers in the last few years, it was observed that alternate assessment strategies like projects, rubrics were not used by teachers due to variety of reasons. The learners of these schools are hardly exposed to use of any innovative pedagogy. Mathematics learning in these schools is dominated by chalk -talk method and covering of textbooks and assessment by term end exams only.Hence, we,i.e.the teacher educator and the intern who was assigned grade V in a government school decided to develop an intervention module based on PBL and explore the effectiveness of this on the mathematics learning of the students. This paper reports the findings of this PBL approach in a mathematics learning done in an action researchmode. The objectives of the study were:

1) *To design Project Based Learning (PBL) as a strategy in mathematics in primary classroom.*

2) *To explore the impact of Project based learning on the learner's mathematical skills and competencies.*
3) *To explore the effect of Project based learning on the learner's attitude and interest in mathematics.*

Methodology

The sample of this study consists of 35 students of fifth class studying in a Government run school in the New Delhi area. All the students were in the age group of 9-11 years and belonged to lower middle class and economically weaker sections. Learner generated responses and participant observations were used for data collection. The data was collected and analysed by various rubrics which were constructed keeping in mind the competencies and skills to be developed. In this study 4 rubrics were prepared to assess learning tasks given to learners as part of PBL. Some parameters of each rubric were similar for every task however there were some distinct parameters for tasks also.The parameters used to assess the PBL tasks in this intervention are—'Expression', 'Questioning', 'Cooperation', 'Connections', 'Connection with real life', 'Assistance required', 'Problem solving',' Engagement in tasks','subtraction of four digit numbers', 'describes data in ascending and descending order', 'describes data using averages','tabulates data and makes bar graphs','addition of four digit numbers,'multiplication of numbers'. Each criteria was assessed by 4 level rubric. The parameters chosen to assess the PBL task are were the basis of competencies expected in the particular mathematical concept as well as some competencies expected as part of 21st Century skills mentioned in the introduction. Each Parameter was subdivided into four levels of rubrics in the decreasing order of competencies within each parameter. Table No 1 depicts the exemplar format of rubric used

Table No 1- Example of rubric for assessment of Tasks in PBL

PARAMETERS	Level 4	Level 3	Level 2	Level 1
Expression	Learner is able to express his/her own ideas and thoughts through creative writing.	Learner is able to express his/her ideas and thoughts through creative writing with teacher and peer assistance.	Learner has difficulty in expressing his/her ideas and thoughts through creative writing.	Learner is not able to express thoughts and ideas through creative writing.

In this intervention, a module based on the premise of PBL was designed ***"To investigate the consumption of electricity in the neighbourhood"***. Four (4) tasks were selected to integrate mathematics with the project-basedlearning.Each task required learners to enquire about different aspects of consumption of electricity (Table No-2).In each task facilitator guided the learners about how they have to carry on the tasks, and in each task, mathematics was integrated in such a way that facilitator could understand as well as facilitate learners understanding and conceptual knowledge in mathematics.

Each task also aimed to develop among learners the various 21st century skills like problem solving, expression, cooperation, questioning and connecting with the real life. The tasks were then analyzed using a self-developed rubric.Each rubric had 6 common parameters that were expression, questioning, cooperation, connection and linkage with the real world, assistance required and engagement in task. However, there were additions of parameters in each task depending on the type of task given to learners. Both learner generated responses and learners' explanation of their responses, were considered while filling the rubric. Classroom observations also played an important role in identifying the various parameters during the tasks.The entire intervention spanned over 3 weeks

Table No 2- PBL based Intervention module

S.No	Concepts	Objectives of the Task	Activities for the Learner
Task 1	Reading and writing of three digit and above numbers Ascending and descending order of numbers Operations on numbers Money Data representation .	1) To enable learners to read an electricity bill. 2) Toenable learners to know the cost of electricity being charged and the various slabs on which the electricity is charged to us. 3) To enable learners to know about the unit of electricity. 4) To enable the learners to express mathematical understanding of the concepts ofascending and descending, subtraction, averages, data collection and show casing it in form of a bar graph. 5) To develop the various 21st century skills among learnerslike cooperation, communication, graphic representation, IT based skills etc.	1) Learners are asked to: 2) Collect at least 10 electricity bills from their neighbourhood 3) Make a list of the total cost of monthly electricity used as written on the bill. 4) Calculate the minimum, maximum and average of the electricity bill. 5) Make a Bar graphs to represent data 6) Write the reasons they think that are responsible for some bills being higher than the other.
Task 2	Reading of four-digit numbers Place value Operations of four-digit number Data representation, bar	1) To enable learners to read an electricity meter.2) To know the learners mathematical understanding of the concepts of place value, subtraction, tabulation and bar graph.	Learners were asked to 1) observe and note down readings electric meters, 2) To calculate the weekly consumption of electricity.

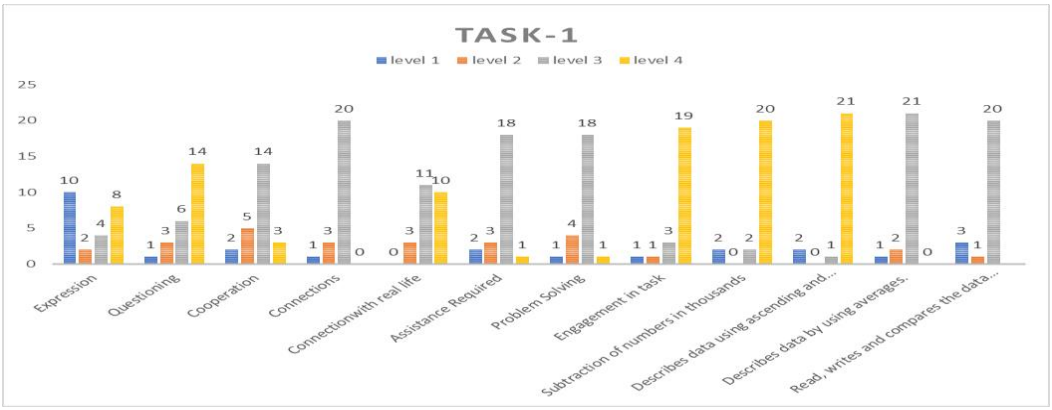
	graphs	2) To develop the various 21st century skills among learners.	
Task 3	Estimation Conversion of units Money Multiplication Money	1) To enable learners to calculate the approximate unit of consumption of electricity in their homes and neighborhood. 2) To know the learners mathematical understanding of the concepts of addition and multiplication. 3) To develop the various 21st century skills among learners.	The learners were asked make a list of all of the electricity using appliances in their homes and neighbourhood and how often they are used per month. 1) Calculate the total units usedby formula. 2) Identify the consumption patterns and speculatereason for the same.
Task 4	Conservation of Energy Money Multiplication Conversion of units	1) To enable learners to suggest as well as take measures to reduce the energy consumption and hence saving the electricity. 2) To develop the various 21st century skills among learners.	The learners were asked to: 1) Suggest ways to reduce the energy usage. 2) Apply the strategy suggested at your home.

Discussion

In the first task, the learners were first introduced to the fact that electricity is an important part of our modern lives and that how it is used for lighting rooms, working of fans and functioning of domestic appliances like television, refrigerator and more and discussing howthis electricity is provided to us at a cost and the concept of billing. Then the facilitator presented learners with an electricity bill and conducted a discussion on it in which learners participated and a variety of responses came like not seeing it as some live in a rented house or seeing a different type or similar bill etc. Then the facilitator discussed with learners' various aspects of the electricity bill like, details of connection and consumer particulars, meter details, bill calculation, payable bill amount, security deposit, last payment details, important message, category wise existing tariff structure, details of last six bills, consumer grievance redressal mechanism, multiple payment options and contact details. After discussing about the bill, facilitator came to know that many learners go in their own or with their parents to pay the electricity bill. Even some of the learners knew some aspects of the electricity bill like where the amount of electricity bill to be paid is written, details of connection and consumer particulars and multiple payment options. Also, learners told that how now a days they are getting no electricity bill or say the amount of electricity is zero, due to the initiative of the government of having no bill for people having electricity consumption below 200 units. After having understood the various aspects of the electricity bill, the facilitator

discussed with learners about the unit of electricity and how essential it is to calculate electricity consumption using the units. For learners this was a new concept to grasp upon, however they could build the understanding that for expressing the electricity bill amount one has to use the unit of watt and kilowatt. After giving an introduction of all these concepts and having a discussion around them,learners were asked to collect at least 10 electricity bills from their neighbourhood and make a list of the total cost of monthly electricity used as written on the bill, then calculate the minimum, maximum and average of the electricity bill and then make a Bar graphs of the number of bills using various class intervals of money and also think about reasons that are responsible for some bills being higher than the other. Learners' understanding and concepts of ascending and descending order, subtraction, averages, data collection, showcasing it in form of a bar graph and the 21st century skills were being assessed using the rubric. Classroom observations played a major role in the analysis. The responses of the learners were analysed after they had completed task using the rubric discussed in methodology and Figure 1 representsAnalysis.

Fig 1 Analysis of Task 1



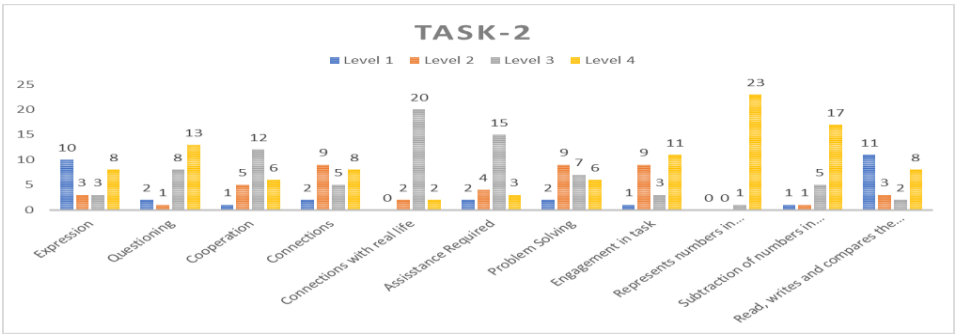
Task 2

In the second task learners were introduced to an electricity meter, Then, the facilitator took the class to a place where the school had its electricity meter situated and showed learners that how an electricity meter looks like. Then, they had a discussion that what is the purpose of an electricity meter and why do we have them in our houses. Then, the teacher after discussing the purpose and relevance of the electricity meter, showed learners a video on how to read an electricity meter, where learners got to know about the various aspects of the electricity meter and how to read it properly. Learners also got to know that how to calculate the electricity meter consumption of a day using the electricity meter. Some learners shared their experience that how people in their neighbourhood do some sort of tampering with the electricity meter due to which the meter reading does not increases or increases with a very minimal rate. This shows that

if in classrooms we do something which is related to the learners' life, then how they bring out the varied experiences from their lives and we can discuss and talk about them from different standpoints.

After having understood the working of an electricity meter and its functioning, facilitator asked learners to record the readings for a week of their home's electricity meter along with the help of some elders and then make tables and graphs of their daily usage (by subtracting successive days' meter readings). Also,to compare the reading to the electricity meter reading on the bill. Learners understanding and concepts of place value, subtraction, tabulation, show casing it in form of a bar graph and the 21st century skills are being assessed using the rubric. Classroom observations played a major role in the analysis.

The figure 2-depicts the analysis.

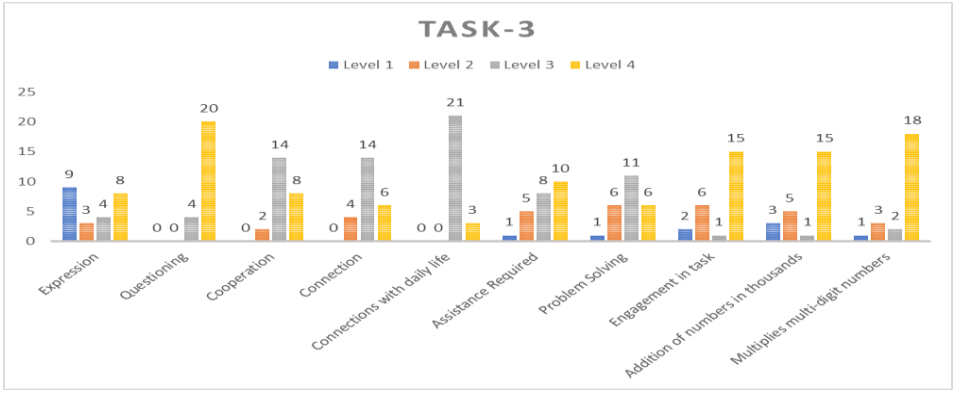


Task 3-

In the third task learners were first asked to make a list of all the electrical appliances they have at their home or observed in their daily lives. Then after making the list of all the electrical appliances teacher discussed how each electrical appliance consumes some amount of electricity and the concept of power of the appliance and ISI mark. Teacher then showed learners the pictures of some electrical appliances with ISI mark on them and the amount of energy they use. Then learners were asked to observe the ISI mark and energy consumption of each device they have at their home. Some learners said that they could not see the energy consumption of devices like fan and tube light because of the place they were situated in. However, one learner said that his father is an electrician and he has given him the approximate units that a device consumes, so he said he has a list of the appliances along with the approximate units of consumption of energy of these appliances. Then the learners who could not find the unit of consumption of energy of some devices took the help of that list. The concepts of conversion of units and unit consumption per day and month were discussed which was followed by calculation of the unit consumption of the day and then the month for their homes. After doing the task for their home teacher asked the learners to do the same for 10 houses in their neighbourhood and then calculate the monthly consumption of electricity of these houses. Learners' understanding and concepts of addition,

multiplication, conversion of units and the 21st century skills were being assessed using the rubric. Classroom observations played a major role in the analysis. The analysis is depicted Figure 3

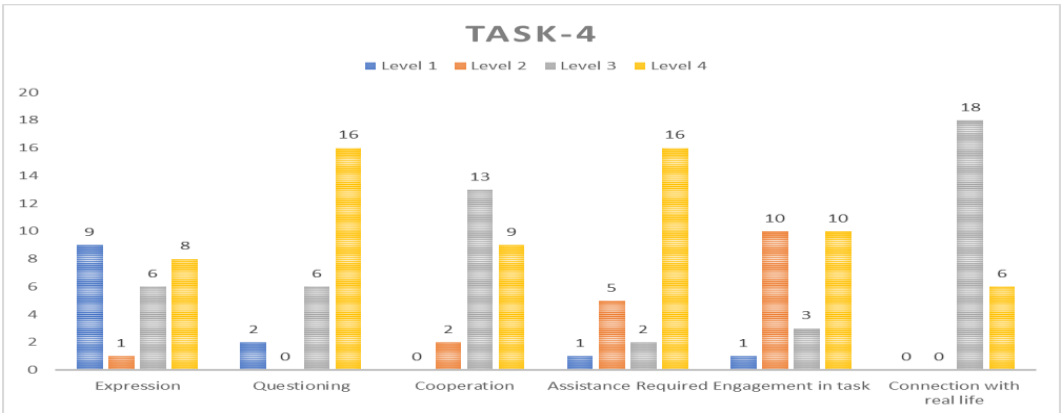
Figure 3- Analysis of Task 3



Task 4-

In the fourth task, learners were first asked the ways in which they think that electricity could be saved. After listening to their suggestions, to enhance their views teacher showed them some newspaper articles and videos on how to save the electricity consumption in their homes and neighbourhood. Then the teacher invited responses from learners and could see that how learners were able to think upon this from economical, geographical, political and historical viewpoints. The concepts of equity and access and role of citizens in conservation of electricity was discussed in the class and learners' viewpoints and suggestions were noted. The discussion concluded with understanding of applying these strategies in their personal life. Learners understanding of the concept of energy consumption and 21st century skills are being assessed using the rubric. Classroom observations played a major role in the analysis. The analysis is depicted in Fig 4.

Figure 4 -Analysis of Task 4



To analyze the overall process of using learner generated responses to check learners' attitude and interest in mathematics using project-based learning, analysis is done according to the parameters of the developed rubric. Overall progress analysis is done for only those learners who were present in all the tasks that is 24 learners out of 35. Each parameter of the rubric is analyzed separately to check the development of the process at every stage. The table 3 shows the analysis.

Table 3—Rubric depicting analysis of various aspects of PBL

Criteria	Level 1	Level 2	Level 3	Level 4
Expression	38%	12%	29%	21%
Questioning	-	12%	50%	38%
Cooperation	13%			
Connections	-	45%	55%	-
Connection and linkage with the real world	-	12%	84%	
Assistance Required	8%	25%	63%	4%
Problem Solving	4%	53%	43%	
Subtraction of numbers in thousands	-	12%	21%	-67%
Describes data using ascending and descending order.	8.34%	-	4.16%	87.5%
Describes data by using averages.	4.16%	8.34%	87.5%	-
Read, writes and compares the data collected i.e. does tabulation of the data collected and represents it by making bar graphs.	17%	42%	41%	-
Represents numbers in accordance with the place value system.	-	-	4.16%	95.87%
Addition of numbers in thousands	12.5%	20.8%	4.2%	62.5%
Multiplies multi-digit numbers	4.16%	12.5%	8.34%	75%

Findings and Conclusion

It is found that Project based learning help in improving learners' attitude towards Mathematics as PBLcreates intrinsic motivation because it focuses on student learning around ameaningful and contextual problem.Hence Project-based learning helps in connecting students with their context and prepare to face challenges in the real world. Following are the major findings of this intervention i.e., PBL in Mathematics classroom.

1) Enhanced student performance-

In this project the whole experience of using project base learning to know the learners' interest and attitude towards mathematics helped in enhancing learners' performance. Doing the various tasks not only improved the learners' mathematical skills but also helped in developing the various other 21st century skills among learners.It was observed that learners became more confident after doing each task, more confident about their skills and felt that they could do the tasks independently. It is also realised that when students develop methods for constructing their own procedures, they are able to integrate their conceptual knowledge and procedural skills.

2) Increased student motivation and engagement.

It was observed during the classroom transaction of the tasks that learners showed a great level of intrinsic motivation while doing the tasks and discussions about them. While doing the tasks, learners' conversations and dialogue with other peers and teacher showed that they were very interested and motivated to do the task. As students are involved in the tasks of their choice in project-based learning, it leads to increased levels of motivation (Blumenfeld et al., 1991; Kahn and O'Rourke, 2004), and the use of problems which are contextual and have relevance to the students' lifeleads to intrinsic motivation (Kahn & O'Rourke, 2004; Graaf&Kolmos, 2007).Alsothe classroom interaction between the teacher and the learner were held in such a manner that it encouraged and praised learners for their effort and also at the same time help them reflect on their work in a constructive manner.

3) Improved peer interaction.

In a PBL classroom learners worked with each other either to complete a task given or to help each other. During the class interaction, learners showed great cooperation with each other while working on their tasks.The collaborative groupwork,which is inherent feature of PBLleads to better conceptuallinkages between new information and prior knowledge by sharing, challenging, ideas of others (Blumenfeld et al. 1996). Learners also get hands on opportunity of being a part of neighbourhood and community. This has been observed during the entire intervention module to the extent that shy and less vocal learners also started participating proactively.

4) Increased development of Creativity, critical thinking, collaboration, and communication.

Students become more skilled in problem solving, creative thinking, and critical thinking. It is also noted that PBL in mathematics provided students with opportunities to think critically, represent their ideas, and communicate with their peers to a large extent PBL continues in the classroom then they will definitely develop these skills completely.

5) Assessment

This PBL based intervention also helped to assess the learning levels of learners for various mathematical concepts. Also, here the assessment was used as ongoing process and rubrics helped to track the growth of students in various skill areas. Also,it proved to be good way of assessing the attainment of the Learning objectives(LO's) prescribed by NCERT for grade 5.

Finally ,the project base learning also helped to put in practise some of the recommendations or guidelines which the NCF 2005 has proposed for Mathematics teaching learning in primary classes ie connecting knowledge to life outside the school, namely ensuring that learning is shifted away from rote methods, enriching the curriculum to provide for overall development of children rather than remain textbook centric and making examinations more flexible and integrated into classroom life .Overall, the PBL based intervention proved be successful and the entire experience had been enriching not only for the learners but for us also

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MADRASAs AS NEIGHBOURHOOD SCHOOLS FOR MUSLIM GIRLS

Ramiz Khan Sherwani

Abstract

The article focuses on the current educational status of Muslims which is highlighted as 'deplorable' in various studies. To mend the same, it is pertinent that the key stakeholders of theese institutes realize the huge potential that these institutes have in bringing about a change in the current condition of Muslims in terms of their educational status that causes poverty and other constraints. This can be done through incorporating and expanding the scope of Madrasa education to include 'moderncontemporary' education and using them resources in the communities as neighborhood schools to provide free or subsidized education to populations who would otherwise not have an opportunity to access quality education.

To substantiate the argument, a case study has been used that portray potentials of Madrasa as an institute in empowering Muslim Girls and Women who are particularly in need of an intervention due to being at the bottom among all groups in terms of educational attainment through incorporating a dual approach while designing curriculum in the Madrasas.

Keywords: Madrasa, Curriculum, Muslim girls, Education, empowerment.

Introduction

There is no denying to the importance of education in transforming the socio-economic status of an individual, group, community. The importance of education is explained by Mr. Nelson Mandela in the following words: "Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of a mineworker can become the head of a mine, that the child of a farmworker can become president of a great nation. It is what we make out of what we have, not what we are given, that separates one person from another."

Despite such importance given to education, Muslims who constitute 14.23 percent of the population lag far behind in the educational sector. Women and girls belonging to Muslim community are even worse than their male counterparts in terms of educational attainment.

As a result of such deplorable educational status, they suffer from illiteracy which then becomes one of the main reasons for the low socio-economic status of Muslim men and majorly for the Muslim women.Due to illiteracy, Muslim women are not able to achieve systematic growth in societal and economic spheres that hampers their capabilities.

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Education is one of thesignificant social indicators and is perceived to be highly suitable for providing employment, and thereby, improving the quality of life and access to basic services (Misra, 2007). However, all this seems to be missing in case of Muslims, especiallyMuslim women because they have been discriminated against for ages and doubly marginalized, i.e.being a woman and a woman from the Muslim minority.Hence, there is a dire need of involving them in the development activities, because not doing so will not only obstruct their development, but will also undermine the progress of the nation.

Apart from the general belief that Muslim parents feel education as being less important for girls, there are other factors as well leading to identified discrimination such as non-availability of schools within easy reach for girls at lower levels of education, absence of girl's hostels, absence of female teachers and non-availability of scholarships as they move up the social ladder (Sachar, 2006). The low literacy rate results in poor socio-economic conditions of the Muslim minorities which is evident from their low rate of participation in salaried jobs, both in public and the private sectors. The presence of the Muslims was found to be only 3 percent in the IAS, 1.8 percent in the IFS and 4 percent in the IPS. Many of them are involved in self-employment activities because they lack in skills of getting salaried jobs (Sachar, 2006). Despite constitutional guarantees of equality and social justice, large number of Muslims either remain unemployed or are associated with manual low paid occupations both in villages as well as the cities (Waheed, 2006).

Talking specifically about the socio-economic conditions of Muslim women, they have the lowest Work Participation Rate (WPR) among the three religious' categories (Hindus, Muslims and Christians). 60 percent of them are self-employed which is the highest amongst all the three categories. Their employment as regular workers in urban areas is 15.7 percent as compared to 27.7 percent for Hindu women and 51.5 percent for Christian women. This figure highlights their marginal presence in salaried jobs (Kazi, 1999).

Muslim women workers who were overwhelmingly self-employed are engaged in home-based work and also suffered a loss in several states after liberalization. This left out Muslim women spiraling downwards to penury. Ghettoization is another problem that has led poor Muslim women being secluded to home-based work that has resulted in their isolation from channels of communications which have hindered their ability to organize into collectives. In part, it is due to the vicious cycle of poverty, lack of education and technical skills, leading to low skilled, low paid economic work, that again leads them back to poverty (Dalit and minority empowerment, 2008 by Manmohan Singh, et.al.).

Madrasas Potential Neighbourhood Schools

In contemporary times a Madrasa is often seen as an institution that breeds religious fundamentalism because of which it is often ignored and not considered as an

institution which if reformed can bring out significant positive results in educational sector. Sachar committee has highlighted the fact that in almost every three Muslim dominated villages, one does not have a school. Given the generally low access to schools in the vicinity, parents are left with unaffordable options of private schooling, or Madrasa education. There is also a general perception that religious conservation amongst Muslims somehow militates against educating girls. However, current researchindicates poverty and financial constraints as major causes that prevent Muslim girls from accessing modernsecular education (Laxmi, 2014)

It is in this context that Madrasa should beperceived as a probable resource for educating Muslim girls because they are economically viable for people who cannot afford to send them to private schools and can also act as alternative neighborhood schools in case of unavailability of government schools. Another important add on of Madrasaeducation will be the fact that parents who are otherwise hesitant in sending their girls to private schools due to the fear of cultural contamination will readily agree to send their girls to a Madrasa as it is operated from within their cultural boundaries, and it is also in sync with their Islamic identities.

Madrasa has been criticized for following the rigid curriculum which fulfills the spiritual purpose of education. No doubt the basis of Madrasa education is its focus on Islamic education because of which Madrasa tries to fulfill the philosophy of Islamic education, but it needs to take into account the other aspects of education as well which can be described as a set of aims, objectives and principles towards teaching and learning processes. In terms of Husain "Madrasa teaches no new subjects, eschew science and modern philosophy and a centered on Islamic religious texts, the Quran and the Hadith, turning graduates who find it difficult to adapt to modern institutions (Husain, 1996 as quoted in article on dualism by Tahir Abdur Rehman Abu Bakar et. al. 2016). Hence madrasato become an important neighborhood resource for the girls must come out of their traditional attire and incorporate subjects that help women functioning appropriately in modern operative structures along with fulfilling the spiritual needs. Madrasa education in India should strive to follow the recommendation of the first world conference on Muslim education, 1997 that mentioned the following:

"The education should aim at the balance growth of the total personality of man through the training of man's spirit, intellect, the rational self-feeling and bodily senses, education should therefore cater for the growth of man in all aspects; spiritual, intellectual imaginative, physical, scientific, linguistic both individually and collectively and motivate all these aspects towards goodness and the attainment of perfection, the ultimate goal of Muslim education is the realization of complete submission to Allah on the level of individual community and the humanity at large".

Implications of Educational Dualism in Madrasa Curriculum

Dualism is a process of being 'double' or 'two', but regarding education it means bringing together two distinct philosophies of education. The concept of educational

dualism incorporates and accommodates two system which are Islamic and western or modern education. It is often understood that both the systems follow approaches which is in direct contradiction to each other as one develops an individual spiritually and the other concentrates highly on physical and material wellbeing.

Due to the different approaches that both follow, it is often assumed that modern and Islamic system of education undermines each other because the religious education which has spiritual education at its divine peak, is blocked with many secular ideas and thought that indirectly contradict to the true sources, and technically weaken the system in its root. The secular education on the other hand considers education as a business venture where education is considered as a stepping stone for fulfillment of material desires and other leisure. As a result of these differences, modern education has been separated from religious education and vice versa, as both saw no relevance in coming together or connecting to each other.

It has been furthered that the diarchy or dualism in the Madrasa curriculum is characterized by corruption as things are not placed in their right order because of which the system is producing only the confused that neither belong truly to Islam nor to the west. This implies that the system has the chances to succeed if things are placed in the right order and managed appropriately. Hence, it is important to strike a right balance in the curriculum of the madrasa for girls. The perspective of the key stakeholders of the Madrasa ought to change to incorporate contemporary subjects in the Institute to make it more relevant as per modern times. The change in the curriculum to involve Modern subjects will help poor Muslim girls (who otherwise do not have access to education due to various socio – economic factors) to have access to quality education which is subsidized and free in most cases.

To further my argument of how the curriculum inspired by two worldviews can come together, I will be presenting a case study of one such madrasa located in New Delhi.

Case Study: Madrasa located in New Delhi.

Profile of the Madrasa

Motive behind its Establishment

The madrasa Jamiatul – Binat – Ul – Islamia was established by Maulana Ilyas from Barabunki in 1998. The madrasa follows the Deobandi ideology. The madrasa houses 700 students along with 100 students who are day scholars. Most of these students are from different part of India such as Bihar, UP, Chattisgarh, Rajasthan and Punjab.

The main motive of the madrasa is to cater to the needs of Muslim Women through motivating them to take up higher studies along with making students stay connected with Islamic culture. This is also mentioned in the prospectus of the Madrasa. The madrasa believes that education is important for all, irrespective of their sex. This has been justified through mentioning verses from the Quran. The madrasa strongly

believes that the current culture based on Islamic practices in which the Muslim youth is engaging in, is dangerous and hence another motive of the madrasa is to make Muslim youth aware of the dangers of such n -Islamic culture through providing them with knowledge of Islam.

Curriculum and various practices

The principal of the madrasa explained that 'the focus is to provide students with Deeni (Islamic) as well as dunyawi (wordly) taleem'. She further explained that one needs to change with time and also criticized the orthodox nature of the Ulema who does not want to incorporate the modern subjects. This then becomes the framework within which education of Muslim women is perceived. The thrust of the curriculum in on imparting Islamic knowledge. However, they also teach English, Mathematics, Computers, Home science along with Islamic subjects such as Hadees, Tafseer (Explanation of Quran), Ilmefarais (Importance of Islamic education), and life after death. Apart from this, great importance is given to teaching Arabic language as most of the Islamic Taleem is provided in Arabic. The madrasa will soon be introducing science in order to understand Islam in the light of scientific.

The madrasa has a special computer program for the girls. It is believed by the principal that computer education today has become important for self-development and the same facility is used for propagating Islamic education through research. It also helps students to get information about Islamic education and hence further the motive of the madrasa to impart DeeniTaleem to the students. Excel, Word, use of internet along with various other software are taught to the students. For this purpose, a qualified teacher in computer education has been hired who helps students learn various technicalities. This center is authorized by the government and hence acts as a vocational training institute for the girls studying in the madrasa.

There are various extracurricular activities that take place to motivate and enhance girls' confidence. These activities include poetry recitation, badminton competition, Kho–kho competition, Dars of Quran, Recitation of Quran, Math Olympiad, etc. On every Thursday, a seminar is organized where girls gather to discuss about Quran and various facets of Islam.

The Madrasa has a tie–up with Jamia Millia Islamia and Aligarh Muslim University. The graduates of this Madrasa can pursue higher studies from either of the two universities as a graduate of this madrasa is considered equivalent to a 12th pass student. Following the same line, various other universities are approached so they can consider their graduate students as qualified for pursuing higher studies.

Profile of the students

The students of the madrasa belonged to various strata of the society. It had a mix of children from affluent backgrounds as well as kids from economically weaker sections.

Also, not all of them started their educational journey from the madrasa. Various girls had previously studied in private schools affiliated to state boards. Such students explained that for them the choices of shifting from Private school to Madrasa was made by their parents and initially they faced adjustment issues due to cultural difference and its mode of functioning. However, gradually they understood the importance of dualism in the curriculum. Now, they are equipped with modern education while staying rooted in the Islamic ethos, culture, and traditions.

Key points from the Case Study:

Traditional vs Modern Education

The contemporary debate of academicians revolves around the fact whether Madrasa education has utility or not? While answering this question, people who are in favour of change in the Madrasa's structure and syllabus through incorporating modern subjects need to understand the real motive behind these institutions. They exist primarily to incorporate religious education and impart Islamic knowledge to the Muslims. However, this does not mean that the utility or credibility of such education is less. The study of this madrasa has revealed that one can earn a livelihood even after graduating from madrasas. On the other hand, Jamiat-ul-binat-ul-Islamia makes sure that the students are also exposed to modern subjects, so they are in touch with contemporary aspects of education. This madrasa is an example of striking a fine balance between *dunyawi* education along with *deeni* education to ensure dualism in the curriculum the helps students gain control over their lives through enhancing their choices, both at the personal front as well as to the professional front.

A Distorted Image of Madrasa

Post 9/11 credibility of the madrasa has been questioned. Also, what is taught within the madrasa is monitored closely as often the madrasas are considered to be breeding grounds of terrorism where minds of young children are brainwashed through teaching 'Jihad' and making them staunch rebels against the state. However, as seen in this setting the institute teaches Islamic education not to create fundamentalists, but scholars in Arabic and Islamic studies who can earn a livelihood along with spreading the message of Islam based on mercy. Similarly, it gives Muslim minority a platform to preserve their culture amidst the culture of the dominating class.

Empowering Muslim Girls

The gamut of empowerment is huge and encompasses various aspects such as economic independence, political participation, decision making, etc. Islam has often been viewed a religion which does not provide rights to women and hence, hampers the process of empowerment. Many academicians further by explaining that madrasa which deals with Islamic teachings triy to reinforce the same idea within young girls so that they can be mentally enslaved and accept the status quo. This may be true if one

interprets Quran based on patriarchal notions; however, Islam within itself does not differentiate between men and women and considers them equal in every aspect. This is the line of thought which Jamiat-ul-binat-ul-Islamia tries to uphold through providing its students with knowledge of their various rights laid down in Quran.

Conclusion

Contribution of madrasas in educational sector for Muslims has been immense and this contribution goes back to the time when 'Islam' had started spreading across the planet. However, In Indian context the madrasa as an institution have faced criticism regarding its credibility in generating ideal citizens along with doubts on its usage in contemporary society. The said debate on whether madrasas empower Individuals or merely act as means to reproduce fundamental ideologies is never ending. In context of the Muslim women's madrasas, the debate is even more fierce as very often the madrasas are considered as the 'den' of patriarchy where women are subjugated through use of 'shariah' which in turn is represented by patriarchal notions.

However, one need to understand that these institutes need to focus on dualism to have relevance in the contemporary society. Dualism is not only to dilute the purpose of establishing the madrasa, but also to substantiate the same and empower their students through acting not only as guardians of their religious identity, but also as neighborhood schools functioning to fulfill the rights to education of the Muslim children specially those who do not have access to other educational institutes and equip them with sound knowledge to function in the modern operative structures.

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"I don't think I can do that much study": Students' Perceptions and aspirations in science

Neha Yadav

Abstract

This study attempts to understand the students' perception towards science in general and towards their school science in particular and its influence on students' career aspirations in science. 70 participants of classes IX and X were given an open-ended questionnaire to elicit their responses to the questions. The study was done in two government schools in New Delhi - Kendriya Vidyalaya and Sarvodaya Vidyalaya. The data was then qualitatively analysed. It discusses several points like the perception of students towards the subject of science, application of science by the students in their real life, characters students associate with science, students' perception of self ability to be a scientist, what topics do students' liking/disliking while studying the subject science, what are the reasons of students for choosing a particular stream in class XI.

Keywords: Students, Perception, Science Subject, Scientists**,** Science Aspirations

1. Introduction

Science is an actively expanding framework of knowledge encompassing novel domains of experience. It comprises of multiple interwoven steps: observation, finding inconsistencies, hypotheses building, framing qualitative models, working out the results, verification or falsification of theories through observations and controlled experiments, and thus arriving at the principles, theories and laws governing the physical world (NCF position paper on science education, 2005). Many national documents on science education programs focus on transforming science education for the greater good of the students, to make it more inclusive of the individual needs of the students. It is important to know the perspective of students regarding science especially for the teachers of science. According to Kumar &Sampath (2010), perception gives momentum to the learning process and recall. It encapsulates the identification and sensory information of a subject. Kardash and Wallace (2001) conducted a study to assess students' perception by obtaining quantitative data. Their study revealed one of the perceptions pertaining to teaching problems in science classes is the student interest and their perceived ability in science. According to Brown et al. (2016) too student interests is instrumental in persistence in STEM as compared to self-efficacy. Many factors can contribute to students' perceptions toward their science classes: The clear goals and organizations, passive learning, faculty interest in teaching, the appropriateness between class materials, homework and tests, laboratory experience,

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inappropriate assessment to represent students' performance, the social relationships between students and their instructors, increasing competition among students, focus on memorizing facts instead of conceptual understanding, classroom discussions (Kaya et.al, 2004).

Many studies have focussed on various influences on students' career aspirations in science. These studies point out that aspirations are influenced by structural factors such as gender, ethnicity and social class complicating the relationships between these structural factors and aspirations. Many studies have also found out that science aspirations are fostered by positive experiences associated with school science like cordial relationships with the teachers and the pedagogy accentuate the relevance of science (Bennett & Hogarth, 2009, Aschbacher, Li, & Roth, 2010; Lyons & Quinn, 2010). According to Lyons et al., (2012), students enjoy science when their positive experiences in school science advocate the relevance of science which further exerts a worthwhile impact on students' decisions to pursue science in future. There is a close relationship between aspirations in science and attitudes to school science (DeWitt et al., 2011, 2013). Interest and positive experiences in school science may have a greater influence on aspirations than structural factors alone (Maltese & Tai, 2011; Riegle-Crumb et al., 2011). Although many authors have recognised an explicit relationship between attitudes to science and aspirations in science, there is still inconsistency between positive attitudes and science aspirations (Archer et al., 2010; DeWitt et al., 2013) as many students hold the perspective that science is 'important, but not for me' (Jenkins & Nelson, 2005). Archer et al., 2010 called this the 'being-doing divide' in which many students although enjoy doing science, but do not aspire to be a scientist. DeWitt & Archer (2015) argued that the students begin developing ideas about 'who does science' in their formative years itself and these are firmly determined by their families and experiences of school science which then govern the students' ability to imagine themselves in a science-related career. Also whether students pursue science or not is also influenced by their perception of scientists and the scope they perceive that working in science would be as they might want to follow (Buck et.al, 2009; Bennett & Hogarth, 2009).

Purpose

The aim of this study was to investigate the secondary class students' perceptions of science as well as scientists and its influence on students' career aspirations in science.

Research questions

Following research questions were framed to conduct the study:

1) How do students view science as a field and as a schoolsubject?

2) What image of the scientists do the students have?

3) Is the students' perception of science and scientists connected to their future science aspirations?

2. Methodology

2.1 Research Design

This study was an exploratory study aimed to understand the perceptions of science as a field and as a school subject and its influence on students' career aspirations in science.

2.2 Research Sample

The participants in the study were randomly selected students of classes 9th and 10th studying in two government schools of New Delhi. In the two schools chosen in this study for the data collection, one was Kendriya Vidyalaya and the other one was a Sarvodaya Vidyalaya. Kendriya Vidyalaya as part of Kendriya Vidyalaya Sangathan is an autonomous organisation under the central government of India while Sarvodaya Vidyalaya is under the Directorate of Education of Delhi. A total of 70 students participated in this study, out of which 27 were from a Kendriya Vidyalaya while 43 belonged to Sarvodaya Vidyalaya. The sample consisted of a total of 42 male students and 28 female students.

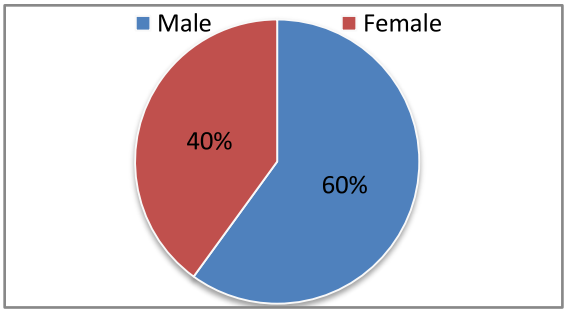

Figure 1: Gender distribution of participants

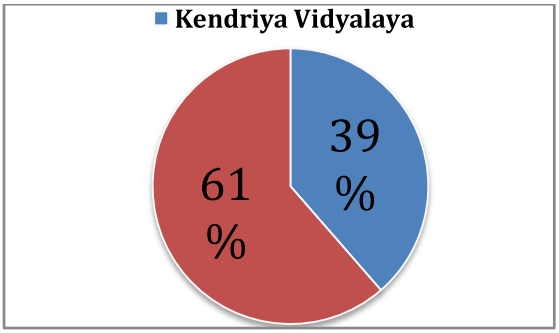

Figure 2: School wise percentage distribution of participants

2.3 Data Collection

To explore the perception of the students' the data was collected using a structured questionnaire. As the purpose of this study was to discern the perspective of the students towards science and scientists along with their science aspirations, open-ended items were used so that it provides an opportunity for the students to express their opinions freely and write authentic responses. The questionnaire consisted of seven questions pertaining to characters associated with doing science, topics students like/dislike, the applicability of science, their perception of scientists, aspirations in science etc. A pilot study was done to know whether the questions were clear to the respondents or not and whether the objectives of the study were gettingfulfilled or not. For the present study pilot study was conducted on 10 randomly selected students. The language of the questions was simplified to help students comprehend what is being asked.

2.4 Data Analysis

The data was then collected with thehelp of these finalized tools. After this analysis of the questionnaire was done through qualitative analysis in which the answers were organised into relevant themes. The responses of the in-service teachers under a specific theme were further divided into sub-themes. Using the interpretable category of responses under sub-themes, students' responses were analyzed.

3. Results & Discussion

3.1 Students' view of science

3.1.1 Science vsOther fields

Students gave different responses to describe the nature of science and how they think it is different from other fields. These responses were grouped under four themes:

Theme 1: Science as a body of knowledge

This shows that students associated words like experiment, formula, knowledge, logic, invention, imagination with science. Some of the examples include: *"Science is a body of knowledge which focus exclusively on natural world", "Its ideas are severely tested by means of experiment", "Science has formulas", "Sciencemeans invention which gives lot of new information ", "Its a discipline that requires a degree of evidence to build knowledge around phenomena", "It's a subject where we think about new things and do new things", " It blends logic with imagination", " It's all about inventing new ideas", "It contains equations and all".*

Theme 2: Science as a subject with practical applications

Students were of the view that science is a subject that can be applied in real life. Although it is not the case that other subjects cannot be applied in real life but the thing is that they are aware that they can apply science in real life by means of lab experiments and also by applying it to their own body. It is something that relates to living beings and hence successful in explaining the cause of a particular action. Some of the examples include "*Most of the things in science we can apply in daily life", " It is based on a real life and human activity inside the body", " It totally relates with real life", "This is a study about what is happening and why it is happening", "It involves lab experiments".*

Theme 3: Science as a subject which is much interesting than other subjects

Some students instead of explaining the nature of science chose to focus on the experiential part of the science as to what they feel about the subject some thought that it's a very interesting subject and that's how it is different from other subjects but others were of the view that because the subject is boring which makes it different from all other kinds of subjects. Some of the examples include: *"Science is interesting and amazing", "Because it is so interesting", "Science and maths are my favourite subjects", "It provides us a lot of possibilities that makes it interesting", "I don't want to study because I like other subject, "I am not interested in science at all", I find it more interesting than other subjects".*

Theme 4: Science as a subject which is difficult than other subjects

Few students understood science in terms of its perceived difficulty level, for many students they were of the view that they think of science as a different subject because they find it very hard to understand. Some of the examples include: *"It is very hard", "It needs a lot of effort and hard work to learn chapters, equations, diagrams", "Science is difficult to understand for an average student", "Science is more difficult than other subjects", "Its very hard, other subjects according to me do not need much effort".*

As cited above the responses of students categorised under themes 1 and 2 showed that these students considered science by taking a larger picture of the science and they try to explain what is science and compare it with other subjects. This shows that they have a broader understanding of science beyond their school science. On the other hand, the responses of students categorised under themes 3 and 4 showed that some of the participants on being asked about science stick to their subjective interpretations of school science and define it in terms of their understanding.

3.1.2 Characters students associate with doing science

When students were asked this question some mentioned personality traits needed in a person for doing science and while some answered the behavioural traits one need to develop to do science.

Table 1: Some characters as quoted by the students that they associate with science

Personality traits	Behavioural traits
Intelligence, Smartness, Concentration, Interest, Adaptation, Confidence, Iron determination, Power to never give up, Sharp mindedness, Scientifically minded, Good understanding power, Good brain to solve equation and numericals, Problem-solving ability, Good concept understanding, Creativity, Patience, Self- belief	Works hard, apply science in his life, connects data, asks doubt and clear her or his concepts, Memorise science formulas, practice self -study, shows excitement to do practicals

This shows students try to associate science with intelligence and also some more of the view that to excel in science requires hard work and perseverance. This gives a picture of a very elitist view of science as a subject meant only for those students who are good in studies, who are intelligent or are those who are ready to toil hard. This can be problematic as students who are average in studies or rather perceive themselves as not capable enough might not be able to identify with the subject.

3.1.3 Topics in school science liked or disliked by the students

Table 2:Examples of some topics cited by the students that they like studying in science.

Physics	Chemistry	Biology
Light, Reflection Astronomy related things, outer space, motion, particles, sound	Chemical reaction, chemistry experiments and reactions, matter, about chemicals	Cell, human parts, microorganisms, farming, human diseases, topics about nature, human ,animals, bones of the human body, environment

Table 3: Examples of some topics cited by the students that they dislike studying in science.

Physics	Chemistry	Biology
Motion, Force, portions with numericals, Sound, Formulas, Technical concepts	The whole of Chemistry, processes like sublimation and distillation, chemical equations	Topics which are related to geography, complicated parts

While students cited many examples of topics that they like or they don't like, the majority were of the view that they do not like the numerical or the technical portion of the physics and they want it to be deleted Some also found that chemistry part which is

very technical should be deleted from the syllabus. Majority of the topics cited by the students which they like fall under the category of biology. This could also be because of the fact that students are able to associate or apply Biology more in their daily lives as compared to Physics and Chemistry. The perception of many students regarding deleting the technical portion of chemistry or formulas, equations, derivations also shows that students find it hard to accept that studying these concepts hold any relevance to them or in science.

3.1.4 Application of school science concepts in their daily lives

Almost all students agreed that science is indeed applicable in their daily lives. Many students quoted examples of concepts they have studied in their daily life that finds relevance in real life like force, motion, friction, digestion, boiling etc. Many students also cited examples from things they do in their homes that involves applying science. Some of the examples quoted by the students are listed as follows:

"Our daily life is unimaginable without science, our life processes like breathing and many more are part of science", "Conductors of electricity can be very harmful to our life so its dangerous to touch if current is passing through it","while preparing the electrical instruments in my house", " The process of acid-base reaction tells us which matter should be kept in which type of metal for storing", "Electric repair work can be carried by applying science", "Formation of curd is due to chemical process", "Daily routine can be maintained if we have knowledge about our body systems like digestion","Process of rusting and its prevention", "We are able to walk by friction", "The buoyant force and the Archimedesprinciple as seen with the mug in the bucket", "During gardening science is used", "When we cook something the smell defuses all around".

3.2 Students' awareness and perception of scientists

3.2.1 Women scientists known to students

Responses mentioned by the students include Madam Curie, Kalpana Chawla, Tara Shinde, Maryam, Janaki Ammal, Sunita William, Tessy Thomas, Rosalind Franklin, Rohini Godbole, Asima Chatterjee etc. On being further quizzed how do they know about Janaki Ammal, the student answered that in KendriyaVidyalaya they had participated in an olympiad for science in which they were given the scientist Janaki Ammal and her contributions booklet were provided to them. Another student answered she know about Tara Desai because of the movie Mission Mangal that released some time back. Although students listed the names of different women scientists but the frequency of each name was very less. According to Karpodini-Dimitriadi (2008), gender stereotypes are interrelated to the lack of information leading to the consistentprevalence of stereotypes pertaining toscience and gender. Students' ignorance about women scientists can augment the prevailing stereotypes of scientists being male and dominant usually found among the students. No role models for students to look up to has been identified as an obstacle for women who choose to enter non-traditional careers

(Quimby and DeSantis, 2006). Even if role models exist but not promoted results in gender stereotyping

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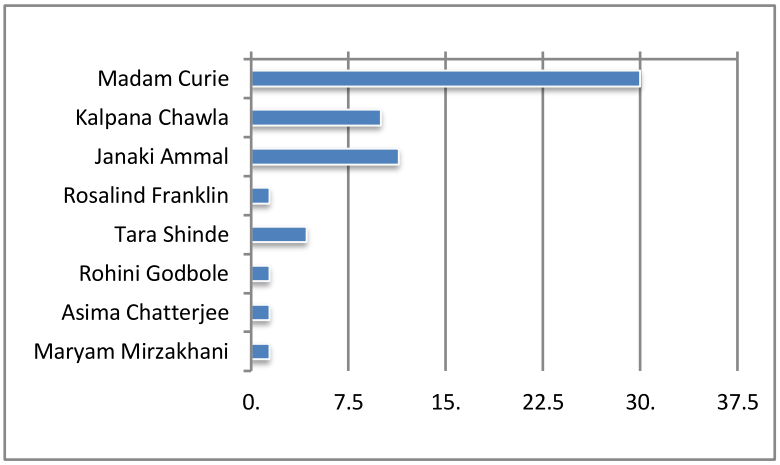

Figure: 3 Students' responses of female scientist name (in percentage)

3.2.2 Students' perception of whether they can become a scientist or not

As pointed out by Epstein, Mendick, & Moreau (2010) the image of a scientist as a brilliant genius is often reflected in prevalent stereotypes of mathematicians. In this study too students who associated themselves with the characters that of intelligence, thinking, innovation, invention thought that they can be scientist which simply implies that students have this perception that to become a scientist they need to be a great thinker or an innovator. On the other, hand students who thought that they could not be a scientist had varied reasons. While some reasons were tied to their disliking for the subject while others thought that they lack what it takes to be a scientist. Some of the main reasons as cited by the students that were indicative of their thinking that they can become scientists were: *"Because I am good in science", "Scientist is a person who researches new things so I can", "I can become a scientist in my future because I have characteristic of a scientist and discover about new things and to get knowledge from those new things that have been discovered", "Science is a subject of thinking and I am good in thinking", "I have creative and innovative ideas".*

Some of the main reasons as cited by the students they think they cannot become scientists were: *"It needs a lots of study", I don't think I can to do that much study", "I don't know much in science", "I haven't done any experiment till now, I don't have better understanding of doing experiment", "I hate to learn formulas", "I cannot because lam good in science not in maths","I am not interested in science field", "I do not understand science", "I don't have that kind of skills and creativeness that a scientist should have".*

3.3 Students' interest in pursuing science in Class XI

Three themes emerged from the reasons cited by the students to the question of whether why they would take up or leave science in class XI. These three themes listed below emerged from the reasons cited by the students for wanting or not wanting to take up science in Class XI.

Theme 1: Perceive science as difficult

The primary reason for students not showing interest in taking science in class XI is the perceived level of difficulty of science so students who are are not good in science or defined the subject as too hard for them do not want to opt for this stream. On the contrary, students who want to opt for a science stream associate themselves with positive traits associated with science like hard-working, intelligence, problem-solving capability etc. Some of the examples quoted by the students were: *"Physics is difficult subject for me", "I do not understand science", "I am weak in science", Science is very hard", "I am not good in solving physics problem"," I do not understand anything in science so it is impossible to make a career science in science".*

Theme 2: Lack of any interest/ do not display any liking towards science

Many students who want to take up science stream or they don't want to take up science link their decision to their interests towards the same and students who felt that they are interested in the subject to want to continue it further. They said "*Science is very interesting subject and I want to explore more in it",*"*Because I like science and understand science as well*", *I want the science subject in 11th class, because I like the science most".*

Students who found other subjects interesting or science subject boring wanted to drop them. Some of the examples quoted by the students are*: "I am not very much interested", "I am not perfect and interested in science", "I am not strongly interested in science subject", "Because I like commerce", "Because I have more interest in other subjects than science","I don't like this subject".*

Theme 3: Link to future career aspirations

For the majority of the students, their future career aspirations as a major factor choice in deciding the stream in class XI. Students who want to pursue a career in science were obviously inclined to opt for a science stream and said "I want science because I want to become a doctor in future therefore I want to take science", "I want to become a scientist in my life and to become scientist it is must for me to take up science as my career". But students who don't want a career in science don't want to study science at all. For example, one student wanted to become a cricketer while one wanted to be an army personel and both shared their view that this is the reason they don't want to pursue science. Students hold the perception that opting for science is a matter of necessity only for building the career otherwise it can be left. Some of the examples quoted by the students are: *"I want to become a teacher that's why I don't want science in 11th", "I will take science because I want to become an engineer", "I want to become army man I think arts is good for that", "I will because scienceis a field which can give us*

job opportunity in any field", "Because I want to take up commerce", "I will not take up science because I want to become a cricketer".

Conclusion

Based on the results of research conducted on secondary class students' image of science and scientist on science aspirations, it can be concluded that students' perceive science subject as the one requiring intelligence, innovation, perseverance and hard work. Students also find science difficult. These view of the students influenced their decision to take up a science career in future. According to DeWitt & Archer (2015) students' perception of 'who can be a scientist' or even a 'good science student' hampers the science aspirations formation. In line with the findings from other research (Buck, et al., 2002; Rahm, 2007), this study also found that the formation of students' aspirations is obstructed by the restricted portrayal of who can do science or can be a scientist. Therefore studying the perception of students becomes critical especially for science teachers as students understanding of the subject is deciding factor in enhancing their interest, helping them to perform better. There is a need to dispel myths related to understanding what type of students can do science and who can't. According to some studies more inclusive practices in (and outside of), the science classroom would be helpful to diverse students in finding science pertinent (e.g. Carlone et al., 2011; Calabrese Barton & Tan, 2010; Calabrese Barton et al., 2013). This can help to cater to participation issues in science fields and science careers which India is facing for a long time at least to some extent.

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Indices Determining Effective Teaching of Physical Education in Secondary Schools in Ilorin West Local Government Area, Kwara State, Nigeria

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Abstract

This study investigated indices determining effective teaching of physical education in secondary schools in Ilorin West Local Government Area, Kwara State, Nigeria using descriptive research design of survey type. The population for this study comprised Sixty-five (65) Physical Education teachers in both public and private secondary schools. Forty-five (45) public secondary schools and twenty (20) private secondary schools were purposively selected for this study. A well-structured questionnaire, designed by the researchers was the instrument used for data collection. The instrument was validated and reliability of the instrument was confirmed through the split-half method. The instrument was administered to 20 respondents from Ilorin East Local Government Area of Kwara State. All the items on even numbers were scored separately likewise, the scores on the odd items were scored separately. The two scores were analyzed using Cronbach alpha, which yielded 0.62r. The sixty-five (65) questionnaire forms administered were retrieved and analyzed using PPMC and Multiple Linear Regression at .05 alpha levels. Based on the findings of the study, the conclusion was drawn that Indices (Instructional Materials, Teaching Strategies and School factors) determines the effective teaching of Physical Education in junior secondary schools in Ilorin Local Government Area of Kwara State, Nigeria. Based on the findings, the researcher recommended that this type of research should be carried out in other Local Government Areas in Kwara State to investigate indices determining effective teaching of physical education in other Local Government Area ofKwara State, Nigeria.

Keywords: Physical Education, Indices, Teaching Strategies, Instructional Materials, and School Factors, Effective Teaching

Introduction

Physical education has a strong influence on promoting youth physical activity (PA). This review describes correlates of youth PA, examines however these factors have been targeted in physical education (PE) primarily based interventions and makes suggestions for PE pedagogy to market PA. Perceived physical competency, enjoyment of PA,

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intention, direct facilitation and support from parents and important others, and opportunities to be active were systematically related to youth PA. The large-scale PE-based PA promotion programs that were prosperous in increasing out-of-school PA applied a pedagogic framework targeting variables related to motivation (i.e., perceived competency, enjoyment of PA, self-determination). PE-based interventions ought to continue to address the character of activities, however, conjointly utilize pedagogy that promotes psychological determinants of student motivation.

Although the assertion that physical education plays a crucial role within the promotion of youth physical activity is inherently appealing to several pedagogues, closer scrutiny of the pedagogy literature reveals a lack of analysis that has examined the effects of physical education on physical activity out of the school environment. Youth physical activity is influenced by many psychological, physiological, biological, social, cultural, and environmental factors which will affect an individual's decision to adopt and maintain a physically active lifestyle (Buckworth&Dishman, 2002)

Numerous instructional jurisdictions currently check with life-long active living as a goal of their physical education curriculum. In such curricula, it is hoped that physical education will promote a positive perspective toward physical activity and increase participation rates which will offset and reverse the distressing present trends of inactive lifestyle and poor health in children (Hickson, 2003). It is conjointly thought that a well-structured physical education program will enhance and improve the movement proficiency and self-concept of students, thereby promoting the probabilities for life-long involvement in physical activity and, ultimately, improved health. Hickson and Fishburne (2002) affirmed that teaching of physical education are the trend of busy, happy, and good individuals, moreover, positive outcomes mere evident for both students, teachers and experienced teachers, and students learning.

Silverman (1991) reported that characteristics for the effective teaching of motor skills; the coming up with category management and student's learning; the anticipation of conditions and contingency plans; the awareness of individual students' skill differences and use of such information in designing and monitoring; the acquisition of information to design; the knowledge and use of, a repertoire of teaching strategies; the accuracy and focus of explanation and demonstration; the provision for adequate student practice time; the maximization of appropriate student practice and engagement; the minimization of inappropriate student practice and engagement; and the minimization of student waiting leads to effective teaching of physical education.

The teaching of physical education cannot be effective without appropriate instructional materials or aids that will serve as tools or medium for effective teaching of PE and the instructional materials capable to bring life to learning by stimulating students to learn. The employment of instructional materials within the classroom has the potential to assist the teacher to explain new ideas clearly, leading to better students understanding of the ideas being taught. (Kadzera, 2006). Abdu-Raheem (2011) asserted that non-

availability and inadequacy of instructional materials are major causes of ineffective school system and poor performance of students in schools. Ahmed (2003) confirmed that in most secondary schools in Nigeria, teaching and learning occur in a very in-conducive environment without access to essential materials. Eniayewu (2005) posited that it's important to use tutorial aids for instructional delivery to make students acquire a lot of knowledge and to promote the educational standard.

Teaching strategies will be used in the teaching of physical education. The strategies cannot be limited to the following: lecture, individualized instruction, cooperative learning, simulation, peer teaching, self-instruction formats, cognitive, team teaching, task teaching and teaching through questionnaire strategy (Glover, Miller, Averis& Door, 2005). Glover et al. (2005) postulated that the provision of several choices in teaching strategies accommodates students' various learning styles and meets the learning intentions of teaching sessions. Singobile, Simbarashe and Edmore (2017) submitted that all heads of department and PE teachers concurred that, there is no teaching strategy that most accurately fits the whole development of students. Mohammad, Ali, & Ali (2019) submitted that rather than using common and ancient teaching strategies for physical education in secondary schools, colleges of education and universities, it is better to use Physical education as an exercise method to extend the competency of students and enhance their physical fitness in physical education classes.

Githaga (2018) reported that several school factors influenced the effective teaching of PE which included; trained teachers that have experience and understanding of the advantages of physical education because every PE teacher was found to have undergone various levels of training. Githaga (2018) further affirmed that many students in a class significantly make workload become too much for the teachers, and many students tend to neglect PE to concentrate on examinable subjects. Inadequate provision of facilities and infrastructure played a basic role in influencing the frequency of teaching of physical education. Negative attitude in some schools by their head teachers made the physical education teachers feel isolated and deprived of much required support systems necessary for professional learning and for the teaching PE to students to achieve success in schools.

Physical Education in schools also faced changes in the area of time allotment for the subject which was buttressed by Hardman (2008) who established that PE had low programme time allocation was perceived as on inferior subject, deficient competent qualified and/or inadequately trained teachers (particularly in primary schools), inadequate provision of facilities and equipment and teaching materials often associated with under-funding, large category sizes and in some countries, inadequate provision or awareness of pathway links to wider community programmes and facilities outside of schools. Marshall & Hardman (2000) argued that PE was assigned solely several hours that most teachers and a few learners look down on the status of others as compared to different examinable subjects.

Statement of the Problem

The majority of the research works on effective teaching has been conducted within the classroom environment, concentrating on more traditional subject areas like mathematics and language arts. A relatively small amount of data has been gathered within the area of physical education. Consequently, knowledge of what is effective teaching in physical education and the way it supports student-learning outcomes is comparatively source, with solely a small number of studies providing insight. It is a research gap that must be attended to if teachers of physical education are to understand a way to support student learning by effective teaching.

It is on the note this research was carried out to investigate how indices (Teaching Strategies, Instructional Materials and School Factors) determine effective teaching of PE in secondary Schools in Ilorin West Local Government Area of Kwara State, Nigeria

Methodology

The study was carried out in Ilorin West Local Government Area, Kwara State using descriptive research design of survey type and the population for this study comprised 65 Physical Education teachers in both public and private secondary schools. Forty-five (45) public secondary schools and twenty (20) private secondary schools were purposively selected for this study. A well-structured questionnaire designed by the researchers was the instrument used for data collection. The instrument was validated by three (3) experts in the Department of Human Kinetic Education, University of Ilorin, and Ilorin, Nigeria. The reliability of the instrument was confirmed through the split-half method. The instrument was administered to 20 respondents from the Ilorin East Local Government Area of Kwara State. All the items on even numbers were scored separately likewise, the scores on the odd items were scored separately. The two scores were analyzed using Cronbach alpha, which yielded 0.62r. The copies of questionnaire forms were personally administered by the researchers with the assistance of the school heads. The sixty-five (65) questionnaire forms administered were retrieved and analysed using PPMC at .05 alpha levels.

Data Analysis and Result

HO1: There is no significant relationship between Instructional materials and effective teaching of Physical Education in secondary schools in Ilorin West Local Government Area of Kwara State, Nigeria.

Table1: PPMC Analysis showing relationship between Instructional Materials and Effective Teaching of Physical Education

Variable	No.	X	σ	df	r-value	p-value	Decision
Instructional Materials	65	1.06	0.62	63	0.61	.000	H0 Rejected

Effective Teaching Physical Education	65	2.03	0.81

P≤0.05

Table 1 shows the calculated r-value of 0.61 against the critical p-value of 0.000 with 63 degrees of freedom at 0.05 alpha level since the p-value of 0.000 is less than 0.05 hence the null hypothesis that stated that There is no significant relationship between instructional materials and effective teaching of Physical Education in secondary schools in Ilorin West Local Government Area of Kwara State, Nigeria., therefore, rejected which implies that there is relationship between Instructional materials and effective teaching of Physical Education in secondary schools in Ilorin West Local Government Area of Kwara State, Nigeria.

HO2: There is no significant relationship between Teaching Strategies and effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria.

Table 2: PPMC Analysis Showing relationship between Teaching Strategies and Effective Teaching of Physical Education

Variable	No.	X	σ	df	r-value	p-value	Decision
Teaching Strategies	65	1.91	0.74	63	0.63	.000	H0 Rejected
Effective Teaching Physical Education	65	2.03	0.81				

P≤0.05

Table 2 shows the calculated r-value of 0.63 against the critical p-value of 0.000 with 63 degrees of freedom at 0.05 alpha level since the p-value of 0.000 is less than 0.05 hence the null hypothesis that stated there is no significant relationship between Teaching Strategies and effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria is therefore, rejected. This implies therefore, rejected which implies that there is relationship between Teaching Strategies and effective teaching of Physical Education in secondary schools in Ilorin West Local Government Area of Kwara State, Nigeria.

HO3: There is no significant relationship between School factors and effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria

Table 3: PPMC Analysis Showing relationship between Schools Factors and Effective Teaching of Physical Education

Variable	No.	X	σ	df	r-value	p-value	Decision
School factors	65	2.06	0.71				H0
				63	0.59	.001	Rejected
Effective Teaching Physical Education	65	2.03	0.81				

P≤0.05

Table 3 shows the calculated r-value of 0.59 against the critical p-value of 0.001 with 63 degrees of freedom at 0.05 alpha level since the p-value of 0.001 is less than 0.05 hence the null hypothesis that stated that there is no significant relationship between School factors and effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria is, therefore, rejected. This implies therefore, rejected which implies that there is relationship between School Factors and effective teaching of Physical Education in secondary schools in Ilorin West Local Government Area of Kwara State, Nigeria.

Discussion of findings

The finding of hypothesis one reveal that instructional material contribute to the determining of effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria. This finding was in line with the conclusion reached by Abdu-Raheem (2011) which asserted that non-availability and inadequacy of instructional materials are major causes of the ineffectuality of the school system and poor performance of students in schools. It was also supported by Eniayewu (2005) that it is vital to use instructional aids for instructional delivery to make students acquire a lot of knowledge and to market academic standard. Fernandez (2014) affirmed that the quality of learning materials like the latest textbooks is an associate ingredient of education.

The finding of hypothesis two also revealed the relationship between teaching strategies and effective teaching of Physical Educationin secondary schools in Ilorin Local Government Area of Kwara State, Nigeria. The finding corroborates with Glover et al. (2005) who reported that the provision of several choices in teaching strategies accommodates students' various learning styles and meets learning intentions of teaching sessions. Also, Singobile, Simbarashe and Edmore (2017) affirmed that all heads and PE teachers concurred that, there is a no single teaching strategy that most accurately fits the whole development of students. They highlighted that rather a variety of teaching strategies contributed to that effect. Mohammad, Ali, & Ali (2019) submitted that rather than using common and traditional teaching strategies for physical education in schools, colleges and universities, it is better to use modern strategies, especially sports education; in other words, it is better to use sports

education as an exercise method to extend the competency of students and enhance their physical fitness in physical education classes. Fuhrman, Fuhrman, and DeLay (2010) submitted that effective teachers exhibit a passion for their subjects, are knowledgeable about and take care of students, use variety of teaching methods and facilitate students to appreciate the relevance of the information to their context.

The finding of hypothesis three affirmed the relationship between School factors and effective teaching of Physical Education. This finding was also supported by Githaga (2018) who reported that several school factors influence the effective teaching of PE which includes; trained teachers have experience and understanding of the advantages of physical activities and every one teacher were found to own various levels of training. Geringer (2010) submitted that good quality teacher is one of the school factors that influenced the students learning compared to other factors such as time allotted to PE, class size, sports equipment, and teachers' attitude and finances. Najumba (2013) declared that inadequate funding and a decrease in budgetary is visible in the erosions of standards of teaching. It ends up in declining library standards, scarcity of latest texts references books and journals.

Conclusion

Based on the findings of the study, the conclusion was drawn that the teacher uses instructional Materials to arouse the interest of the learners thereby enabling the learner to gain direct experience of Physical Education. It was also concluded that adoption of teaching strategies by PE teachers have a significant relationship to the effective teaching process and other school factors like sports facilities and equipment, time allotment, school administrations' attitude to PE also have a significant relationship to effective teaching of Physical Education in secondary schools in Ilorin Local Government Area of Kwara State, Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Ilorin West Local Government Education Authority should make a policy that will give room for adequate provision of instructional materials for effective teaching of PE to take place in secondary schools.
2. Ilorin West Local Government Education Authority should ensure that when recruiting teachers for Physical Education subject the subject methodology should be adequately examined for them to select qualified Physical Education Teachers for the appointment
3. Schools management in Ilorin West Local Government Area of Kwara State should try as much as possible to change their attitude positively towards to teaching of PE subject to realize the objectives of teaching of PE subject in Secondary Schools

4. This type of research should be carried out in other Local Government Areas in Kwara State to investigate indices determining effective teaching of physical education

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Digital Deprivation of ICT in Open and Distance Education in the National Open University of Nigeria (NOUN)

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Abstact

This study investigated digital deprivation of Information and Communication Technology (ICT) facilities for teaching in the NOUN, Ilorin study centre, Kwara State, Nigeria. Being a case study; a total of twenty (20) facilitators (65% of total staff strength) were purposively sampled. A researcher- prepared instrument was used for data collection. Copies of the ICTUQ were given to two lecturers at the Department of Educational Technology, University of Ilorin for validation. Their suggestions were reflected in the final copy of the instrument. To determine its reliability, the ICTUQ was pilot tested on 10 staff of similar Open University study centre in Osogbo, Nigeria; 0.85 reliability score was obtained through Pearsons Product Moment Correlation statistics which indicated its suitability for the study. Gathered data were processed and analysed using frequency counts and percentages. Findings revealed that most ICT facilities required for effective teaching at the centre were unavailable while those available were largely inaccessible thereby hindering utilization. The study therefore recommends that the Federal Government of Nigeria may endeavour to provide ICT facilities to NOUN, Ilorin study center and put in place necessary steps to remove every impediment that could hinder facilitators from accessing available facilities to promote efficiency.

Keywords: Availability, Accessibility, Information Communication Technology, Open and Distance Learning, University, Nigeria

Introduction

Africa, the second largest continent after Asia like otherless industrialized continent is bedeviled with numerous challenges across sectors including education. As the world population is increasing, there is also need to increase the learning techniques that could cater for large population. Oguguo et al (2020) established that the utilization of technology cannot be underestimated in the current endeavor.

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In Nigeria; the largest African country, the situation appears the same (Ayo, Odukoya & Azeta, 2014). Annually, millions of applicants compete for limited admission seats across the country. In 2013, more than 1.7million applicants competed for 500,000 admission slots available at the various universities (Private and Public) within the country, that is, about one-third of university admission seekers get to fulfill their dreams annually (Agyemang & Dadzie, 2010; Ademola, Ogundipe & Babatunde, 2014). From the foregoing therefore, it is evident that the combined capacity of the conventional universities within Nigeria cannot accommodate the increasing demand for university placement, hence the call for the Open and Distance Learning (ODL) (Jimoh, 2013).

ODL, Open and Distance Education (ODE), Distance Learning (DL) or Distance Education (DE), though different in names but generally means same thing; teaching and learning at different locations and times through certain communication channels or tools. According to Rahman (2014), ODL means a non-face- to-face educational interaction between teachers and students. Comprehensively, Gandhar and Saini (2016) explain ODL as a variant of education where all teaching- learning activities take place at separate locations and time through Information and Communication Technologies (ICT) for the purpose of overcoming the challenges of time and locations. ODL came into the educational scene with numerous advantages including access expansion, flexibility in learning, scalability, learner-centeredness, greater interaction with learning materials, prioritization of students' supports and promotes less- stressful professional development (Igbokwe, 2015). Specifically, according to Aralu and Adetimirin (2014), the main purpose of ODL is to deliver adult- friendly education to willing individuals who are desirous of university education regardless of their age, experience and work schedule. In this study, Open and Distance Learning (ODL) and Open and Distance Education are used interchangeably. ICT has brought in support of the human day-to-day activities (Yushau & Audu, 2018).

The History of ODL in Nigeria dates back to the pre-independence era where Colleges in the United Kingdom provided mid-level and advanced level training to qualified Nigerians through correspondence courses. However, the correspondence study, part-time, Open universities programmes and other variances run by conventional and non-conventional universities started with the University of Ibadan in the 1970s (Jimoh, 2013). The ODL was established to create access to university education for willing but qualified individual regardless of their locations and ages. Specifically, it aimed at: providing flexible, time- independent and open education to willing participants through alternative route; delivering instruction to people everywhere within Nigeria through several channels; developing individuals equipped with specific skills, knowledge and attitude in a specific area of interest or needs while keeping in focus their learning styles among other things; and providing learning opportunities that are systemically delivered without significant disruption to the cultural and socio-economic life of the participants (Jegede, 2002).

NOUN, being the first of its kind in the country, it is a University which operates fully on the principles of ODL; teaching and learning activities are conducted most times at a

distance with course materials accessible through print and ICT (Igbokwe (2015). ICT remains a veritable tool for effective delivery of ODE worldwide; its embrace has radically changed the way the business of distance education is conducted across board (Rahman, 2014; Gandhar & Saini, 2016). Specifically, to deliver effective and efficient ODE, different ICT infrastructures are required for different services.

ODE as a mode of learning thrives on the availability of internet services through connected computers. The embrace of ICT in ODE is primarily to sharpen learners' sense of purpose and equip them with the needed skills for maximum ICT utilisation in their various specialties (Aralu & Adetimirin, 2014). For ODE to truly achieve its goals at all levels therefore, it must deploy ICT to its fullest. This is necessary as argued by Gandhar and Saini (2016) that in the future world, learnable information would meet the learners at their place and time of convenience.

Using ICT in ODE increases access to education for those hitherto deprived of such opportunity, it makes information sharing and retrieval easier for teachers and learners alike and makes teaching and learning interesting for the participants (Jimoh, 2013; Aralu & Adetimirin, 2014; Rahman, 2014). Other advantages of ICT in ODE include reduction of delivery cost, improve content delivery thereby improving quality of education and help to provide timely support services to staff and students (Igwe, 2012; Igbokwe, 2015).

Statement of Problem

Open and distance education plays a critical role in expanding access to education worldwide. It in a phenomenon that has come to solve the problem of limited admission placements especially in developing country like Nigeria. Studies have shown that when ICT is appropriately deployed in ODE, it brings about enhanced service delivery in a conducive environment without sacrificing quality. However, the National Open University of Nigeria (NOUN) is documented to be behind its contemporaries in the area of ICT uptake as a critical factor to achieving its mandate (Igwe, 2012; Jimoh 2013; Igbokwe, 2015). The country was on lockdown due to COVID19 but there was still interaction between lecturers and students as students were doing their studies minimally. However, the Open Universities did not cancel its 2019/2020 session despite the lockdown but had minimal extension to the period. This study therefore investigated availability of and access to ICT in NOUN, Ilorin study centre.

Purpose of the Study

The study investigated:

i. availability of ICT facilities in NOUN, Ilorin study centre; and
ii. access to ICT facilities at the centre by facilitators.

Research Questions

The study answered the following questions:

i. what ICT facilities are available in NOUN, Ilorin study centre?
ii. How do facilitators access the available ICT facilities in the centre?

Methodology

Descriptive research of the survey type was employed. As at 2017, NOUN has 65 accredited study centres across Nigeria from which the Ilorin study centre was deliberately selected. Purposively, 20 facilitators (65% of total staff strength) from NOUN, Ilorin centre were selected to partake in the research.

A researchers-designed questionnaire was used. The instrument had three sections: Section A was on respondents' demographics; Sections B and C asked questions relating on availability of and access to ICT facilities in NOUN, Ilorin study centre respectively. To be sure of its validity, the ICTUQ was given to two lecturers at the Department of Educational Technology, University of Ilorin; their comments were reflected in the final draft of the questionnaire.

To determine its reliability, the ICTUQ was pilot tested on 10 facilitators of a similar NOUN study centre in Osogbo, Nigeria; after respondents' responses were analysed, 0.85 reliability score was obtained through Pearsons Product Moment Correlation statistics which indicated its suitability for the study. All copies of questionnaire were distributed to the respondents in person at the centre, while some completed questionnaire were returned immediately, others were harvested within 72 hours of distribution. All copies of the instrument were recovered and found usable. Data gathered were analysed using frequency counts and percentages.

Results

Table 1: Demographic Data of Facilitators Based on Gender

Variable	A	Total	Percentage	B	Total	Percentage	Total
Gender							
Male		12	60	Female	08	40	20

Table 1 shows respondents' demographic with 12(60%) facilitators being males while female respondents were eight representing 40% of the total respondents.

Research Question 1

What ICT facilities are available in NOUN, Ilorin study centre?

Table 2: Availability of ICT facilities in NOUN, Ilorin study centre

S/N	Ictfacilities	Available	%	Notavailable	%	Total
1.	Official computer in the centre	17	85	3	15	20
2.	Personal Computer Desktop/ Laptop	10	50	10	50	20
3.	Official printer	5	25	15	75	20
4.	Learning Management Systems(L.M.S)	2	10	18	90	20
5.	Network infrastructure	3	15	17	85	20
6.	Internet facilities	3	15	17	85	20
7.	Multimedia Projector	5	25	15	75	20
8.	Audio Tapes	4	20	16	80	20

S/N	Ictfacilities	Available	%	Notavailable	%	Total
9.	Photocopier machine	5	25	15	75	20
10.	e-learning platform	2	10	18	90	20
11.	Application software and webtechnology	2	10	18	90	20
12.	Television	1	5	19	95	20

Table 2 shows availability of ICT facilities in NOUN, Ilorin study centre, Kwara State. According to the table, 17 (85%) respondents indicated that official computers were available at the centre, while 3 (15%) respondents stated otherwise. In the case of Personal computer, 10 respondents representing 50% submitted that they had personal computers while the other 10 (50%) indicated otherwise. 5 (25%) respondents submitted that Official printers were available to do their work at the centre while the 15(75%) respondents stated otherwise. On the availability of Learning Management System at the centre, 2 (10%) respondents indicated that they were available against 18 (90%) respondents who answered not available. As regards Networked Infrastructure, 3(15%) of the respondents submitted that they were available while 17(85%) stated otherwise. Others followed suit as shown in table 2.

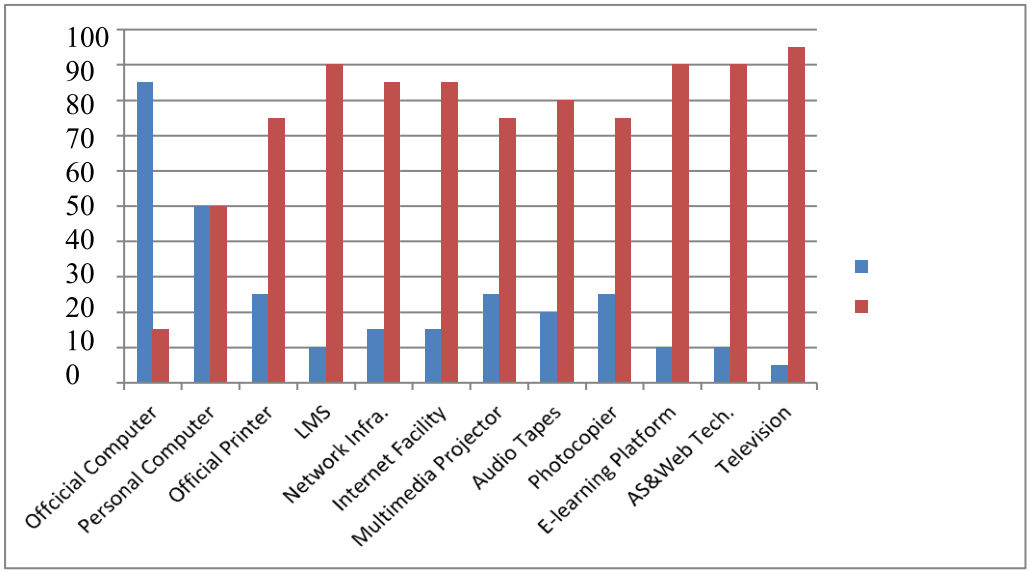

Figure 1: ICT facilities in NOUN, Ilorin study centre

Research Question 2

To what extent do facilitators have access to available ICT facilities at the centre?

Table 3: Facilitators' access to ICT facilities

S/N	Ictinfrastructure	Accessible	%	Not Accessible	%	Total
1	Internetinthelibrary	02	10	18	90	20
2	Internetinthe office	04	20	16	80	20
3	CDROM	01	5	19	95	20
4	Network Access	03	15	17	85	20
5	Local Area Network(LAN)	01	5	19	95	20
6	Virtual orDigital Library	02	10	18	90	20
7	Functional mobilephone	12	60	08	40	20
8	Multimedia projector	05	25	15	75	20
9	Computer(Laptop/Desktop)	05	25	15	75	20

Table 3 shows respondents' reactions to questions bothering on access to available ICT facilities at the study centre. Specifically, about respondents' access to Internet in the library, 2(10%) of the respondents confirmed that the facilities were accessible against 18(90%) respondents who claimed otherwise. Similarly, on whether respondents could access internet facilities in their offices, 4(20%) of the respondents claimed they could access the facilities while the remaining 18(80%) of the respondents claimed otherwise. On access to CD ROM and LAN, just 1(5%) of the respondents claimed that the facilities were accessible while majority of the respondents 19(95%) submitted that the facilities were not accessible to them. Regarding access to Internet at the centre, 4(20%) of the respondents submitted that the facility was accessible against 16(80%) respondents who disagreed with the claim. On whether the respondents have Network Access, 3(15%) respondents claimed they had access while 17(85%) refuted the claim. About access to Multimedia projector and Computer (Laptop/Desktop), 5 respondents attested to the fact that they had access to the facilities representing 25% of the total respondents against 15 respondents who submitted that the facilities were not accessible representing 75% of the total respondents. On whether respondents have access to functional Mobile phones, 2(60%) of the respondents claimed they had access while 8 respondents representing 40% of the total respondents claimed otherwise.

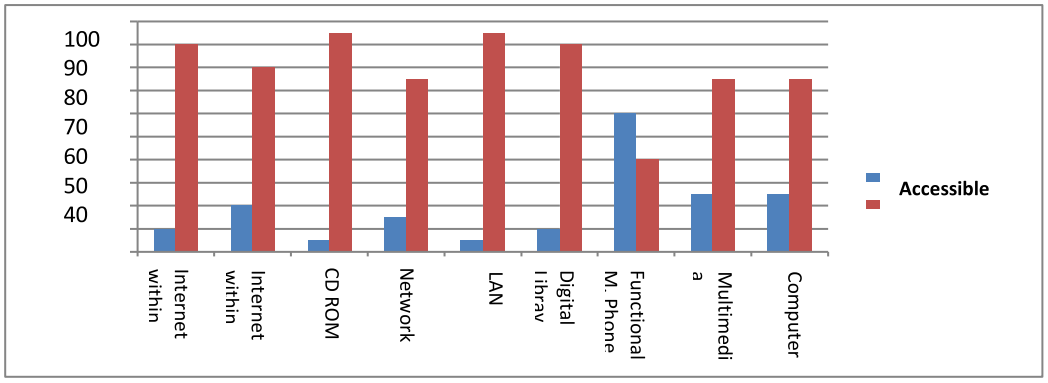

Figure 2: Extent of faculitators' access of ICT facilities at the centre

Discussion

The study investigated availability of and access to ICT facilities at the NOUN, Ilorin study centre. With regards to ICT facilities at the centre, findings revealed that computers were available at the centre for official use. Similarly, while half of the respondents indicated availability of personal computer, the other half submitted otherwise. However, majority of the ICT facilities listed were not available at the study centre. Specifically, facilities such as Learning Management System (LMS), Network Infrastructure, Internet facilities, Multimedia Projector, Printers, Audio Tapes, Photocopier Machine, E-learning Platform, Application Software and Web Technology as well as Television set were not available at the centre. This finding agrees with Jegede (2000) and Jimoh (2013) who reported low availability of ICT facilities in ODL centres but disagrees with Igbokwe (2015) who earlier reported that most centres of the NOUN are furnished with required ICT facilities needed to conduct the business of teaching and learning. Findings of the research of Ezekwe (2019) showed that some ICT resources are available for use.

With regards to accessibility of ICT facilities at the centres by the facilitators, findings revealed that the only ICT facility that was accessible to the facilitators were functional mobile phones. Other facilities such as the Internet, CD ROM, Network Access, Local Area Network, Virtual/Digital Library, Multimedia Projector, and Computer Laptop/Desktop were not accessible. This finding corroborates that of Aina (2012) which affirmed that lecturers in Nigeria Universities had little access to relevant and reliable information when making work-related decisions. Ankweze & Kanu (2019) deduced that ICT correlate with advanced productivity and pioneering reasoning.

Conclusion

This study concludes that majority of the ICT facilities required for effective teaching and support services were not available and accessible at the NOUN, Ilorin study centre. This development if left unaddressed may jeopardize the smooth running of the centre which could negatively affect its objectives.

Recommendations

Based on the conclusion, the study recommends that:

1. The Federal Government of Nigeria may endeavor to provide ICT facilities to NOUN, Ilorin study center to promote efficiency.

2. The Federal Government of Nigeria may put in place necessary steps to remove every impediment that could hinder facilitators from accessing available facilities at the study centre.

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Students' Attitude and Achievement Motivation as Correlates of Performance in SSCE Arabic in Kwara State, Nigeria

Musa Siddiq Abdullahi

Abstract

This study investigated students' attitude and achievement motivation as correlates of performance in Senior School Certificate Examinations (SSCE) Arabic Language in Kwara State, Nigeria.A descriptive survey method of correlational type was adopted for the study. Two hundred students were randomly selected as sampled for this study using simple random sampling technique. A researcher-designed-questionnaire was used to collect data on students' attitude and achievement motivation while a proforma was used to collect students' results in SSCE Arabic Language. The reliability coefficient of 0.76 was obtained for the questionnaire. The percentage was used to answer research question one and two while research question three was answered using mean and standard deviation. The hypothesis postulated was tested using multiple regression analysis at 0.05 level of significance. The findings revealed that majority of students were positively disposed to Arabic Language. Findings also revealed that there was a significant correlation among students' attitude, achievement motivation and academicperformance in Arabic Language in Kwara State. It was therefore recommended, that Arabic teachers should make their lessons interesting to students using relevant illustrations and resources which would promote readiness for regular and steady learning and also assist in developing positive attitudes in students towards their subjects.

Keywords: Attitude, Achievement Motivation, Arabic Language, Performance, SSCE.

Introduction

Arabic as a foreign language has remained an essential part of Islamic religious education since its inception in Nigeria and this has played significant role in spreading Islamic civilization outside the Arabian Peninsula. Arabic education has flourished and passed different stages and media in Nigeria over the time (Muhammed, Hanafi&Abdwahab, 2014). The emergence of the language in the history of Nigeria which dates back to the 7thcentury C.E. shows that the early Nigerian Muslims gave much recognition to the language in order to understand their religion. As a result, Arabic and Islamic studies became twin subjects that cannot be easily separated from each other. The close relationship between Arabic and Islamic studies makes it easy for the students learning the language to access it from time to time and it is against this

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background that Muslims in Nigeria attached great commitments to the course of Arabic and Islamic studies (Kazeem, Arifi & Yusuf, 2015).

The primary objective of learning Arabic language by the Non-Arab Muslim scholars, in general and Nigerian Muslims in particular, was to obtain proper understanding of the *Qur'an* and by implications – Islam.Theteaching and learning of Arabic language were given attention, while the design and the development of Arabic curriculum and the methodology of teaching Arabic language became the sole concern and responsibility of the traditional private Arabic teachers (Oladosu, 2000). However, the learners of the language, within the society, were relegated to the lowest ebb, as they were not recognised by the government and were not allowed to take any post in the government's administration and offices. Thus, the learning of the language was confined to the study of Islam while the ambit and functions of the Arabic language graduates were restricted to the mosque affairs only. They see it as a part of Islamic religion that needs to be handled with caution because of the multi-religious nature of the Nigeria. Thus, Arabic language is assumed by many people as a course that is offered in most of the Nigerian institutions solely because of Islamic studies(Ojerinde, 1986; Raji, 2002; &Lawal, 2008).

The job opportunity of Arabic language as a subject of study in Nigeria is threatened with the nature of the curriculum which is still very stagnant and yet to actualise the aims and objectives of teaching Arabic as a foreign language in Nigeria. This has been identified to be the main cause of poor number of students registering for Arabic Language in Senior Secondary School Certificate Examinations such as WAEC, NECO, NABTEB etc. in Nigeriawhich has greater tendency to affect their academic performance in the subject (Kazeem, Arifi& Yusuf, 2015).

Academic performance is an area that parents, teachers and national leaders have keen interestsin.Academic performance, according to Scortt (2012), referred to how well a student is accomplishing his or her tasks and studies. Nwokocha and Amadike (2005) opined that students' academic performance is the yardstick for testing the educational quality of a nation. Hence, it is expedient to maintain a high performance in internal and mostly external examinations.

However, according to Abdullahi (2020),the performance of students in WAEC and NECO Arabic Language examinations for the past few years was encouraging. Several variables have been used to obtain information on the factors that facilitatestudents' academic performance. The pertinent among them are: students' attitude and achievement motivation (Onileowo, 2016).

Attitude is seen as a consistent tendency to react in a particular way, often positive or negative, towards any matter. Attitude possesses both cognitive and emotional components that involve feelings, beliefs and actions. It may not be directly observed but can be inferred from behaviour or opinion expressed (Adebisi, 2002). Adediwura and Tayo (2007) described attitude as a learned orientation or disposition towards an

object or a situation which provides a tendency to respond favourably or unfavourably to such an object or a situation. According to Akinyemi (2009), attitude is a tendency to respond in relation to some stimulus known to the individual. The stimulus which may be a person, a place, thing or a phenomenon is known as the object of the attitude. Psychologists believed that attitudes are measured since they are reflected in the response pattern to the attitude object. Since an attitude is thought to be something within the person which possesses the characteristics of an inclination or a predisposition the question of how it may be measured or identified becomes very important (Akinyemi, 2009).

It has been noticeable that during external or SSC Examinations, some students begin to doubt their intellectual abilities and come to believe that their efforts to achieve their aims may not bear expected results. These feelings in turn, lead to a low persistence level which could make them give up quickly even in a learning situation as soon as something appears to be difficult. According to WAEC Examiner's report, majority of the candidates exhibited a complete lack of preparation and understating of the questions in the examination. This is because they showed very shallow knowledge of the subject. WAEC further stated that many of the students rushed into attempting questions without understanding them while many misinterpreted the questions (WAEC, 2009).

Therefore, there is a great need for students to develop positive attitude and be motivated because they (positive attitude and motivation) are crucial to high performance in any subject. Motivation holds the key to the understanding human behaviour while at the some timea number of academic issues are of greater concern to achievement motivation of the students. Students who have been motivated are seen to perform better in school work, value their schooling, have academic goals, possess academic confidence and tend to have positive feelings of self-worth which is also a key for improving academic performance (Saadu, 2016). Achievement motivated students in most of the cases suffer fewer disciplinary problems, engage in their school-work with confidence and interest, and prove to be resilient in the face of setbacks and obstacles (Ayandele, 2014). Also, Marsh (2007) believes that achievement motivation is the reason why some people seem to be very keen to do well, while others seem to be reluctant to make an effort, and do not mind whether they are successful or not.Hence, this study examined students' attitude and achievement motivation as correlates of their performance in SSCE Arabic Language examinations in Kwara State, Nigeria.

Objectives of the Study

The main objectives of the study was to investigate students' attitude and achievement motivation as correlates in senior secondary certificate in Arabic examinations in Kwara state, Nigeria. Specifically, the study examined:

1. The attitude of students towards the learning of Arabic Language.

2. The profile of students' achievement motivation in Arabic Language.

3. The general academic performance of students in 2019 SSCE Arabic Language examination.

4. If there is any significant correlation among students' attitude, achievement motivation and students' performance in SSCE Arabic Language

Research Questions

Following questions were raised to guide this study.

1. What is the attitude of students towards the learning of Arabic Language?
2. What is the profile of students' achievement motivation in Arabic Language?
3. What is the general academic performance of students in 2019 SSCE Arabic Language examination?

4. Is there any significant correlation among students' attitude, achievement motivation and students' performance in SSCE Arabic Language?

Research Hypothesis

Following hypothesis was postulated for this study.

$H0_1$: There is no significant correlation among students' attitude, achievement motivation and students' performance in SSCE Arabic Language

Methodology

This study was a correlational survey type. The population for this study were all Senior Secondary School students who offered Arabic Language. Two hundred students were randomly sampled for this study using a simple random sampling technique. A researcher's designed questionnaire was used to collect data on students' attitude and achievement motivation while a proforma was used to collect students' results in SSCE Arabic Language. Prior to 2019 SSCE examinations, the researcher went to all registered Islamic/Arabic schools and public schools that registered students for SSCE Arabic Language examinations and administered questionnairesto collect data on students' attitude and achievement motivation. During this exercise, students were asked to write their registration number on their questionnaire form. This was to enable the researcher to locate and relate their performance in SSCE Arabic Language to their attitude and achievement motivation. The questionnaire was made up of twenty items (10 item on attitude and 10 item on achievement motivation) structured in a four-point Likert-scale. The content validity of the instrument was determined by two experts. The reliability coefficient of 0.76 was obtained for the instrument.Data collected were therefore analysed using the percentage to answer Research Questions; One and Twowhile Research Question Three was answered using the mean and standard deviation. The hypothesis postulated was tested using the multiple regression analysis at 0.05 level of significance.

Results

Out of two hundred students that were selected as sample, 176 were males while 24 were females. This implies that the number of male students that offered Arabic Language is bigger thanfemale students.

Research Question One: *What is the attitude of Senior Secondary School studentstoArabic Language in Kwara State?*

The scores of each respondent on attitude to Arabic Language were subjected to percentage analysis. Given that attitude could either be positive or negative, students whose scores fell within score range10 – 25 and 26 – 40 signified negative and positive attitudes respectively. The statistics of respondents' scores are summarised and presented in Table 1.

Table 1: Students' Attitude to Arabic Language in Kwara State

Attitudes	Frequency	Percentage (%)
Negative	57	28.5
Positive	143	71.5
Total	200	100.0

Table 1 reveals that 143 (71.5%) of the respondents displayed positive attitude to Arabic Language while 57(28.5%) of the respondents had negative attitude to Arabic Language. This shows that a majority of students were positively disposed to Arabic Language.

Research Question Two: *What is the achievement motivation of the Senior Secondary School students in Arabic Language?*

The scores of each respondent on achievement motivation to Arabic Languagewere estimated and subjected to percentage analysis. Given that motivation level could be high, fair or low, students whose scores fell within the score ranges of 10 – 20, 21 – 30 and 31 – 40 indicated low, fair and high motivation levelsrespectively. The statistics of respondents' scores are summarised and presented in Table 2.

Table 2: Students' Achievement Motivation Level toArabic Language

Achievement Motivation Level	Frequency	Percentage (%)
High	134	67.0%
Fair	49	24.5%
Low	17	8.5%
Total	200	100%

Table 2 shows that 134 (67.0%) of the respondents were highly motivated and49 (24.5%) of the respondents were fairly motivated, while 17 (8.5%) of the respondents

had low achievement motivation to Arabic Language. This implies that a majority of Senior Secondary School students have high achievement motivation to Arabic Languagein Kwara State.

Research Question Three: *What is the general performance of students in Arabic Language in WASSCE?*

A pro forma was used to obtain students' scores (performance) in 2019 WAECArabic Language. The results obtained which were in categorical form (A1, B2, B3 C4, C5, C6, D7, E8 & F9) were transformed into continuous data using a stanine (A1=9, B2=9, B3=7, C4=6, C5=5, C6=4, D7=3, E8=2 and F9=1). The statistics of students' performance in Arabic were presented in Table 2.

Table 3: General Performance of Students in Arabic Language in 2019 WASSCE

Subject	N	Mean Score	S. D.	Minimum Score	Maximum Score	Remark
Arabic Language	200	5.73	1.14	3.00	9.00	C_5

As shown in Table 3, the mean score of 5.73 was obtained with a minimum and maximum score of 3.00 and 9.00 respectivelyin Arabic Language examinations. This shows that the general performance of students in WASSCE Arabic Language is relatively high (C_5).

Hypothesis Testing

The null hypothesis postulated in this study was tested using the multiple regression at 0.05 level of significance.

Hypothesis:*There is no significant correlation among students' attitude, achievement motivation and academic performance in Arabic Language.*

Table 4: Regression Analysis of Students' Attitude, Achievement Motivation and Academic Performance

Model	Sum of Squares	df	Mean Squares	F	Sig.
Regression	136.712	2	45.571		
Residual	1071.115	197	5.437	8.382	0.000
Total	1207.827	199			

a. Dependent variable: Performance in Arabic Language

b. Predictors: (constant), attitude and achievement motivation

The model in Table 4 indicates the linear combination of predictor variables (i.e. students' attitude and achievement motivation). The F-value is 8.38 with 2 and 197 degree of freedom at 0.05 level of significance. Since the p-value of 0.00 is less than 0.05 level of significance, the null hypothesis is rejected. Therefore, the combination of the

independent variables significantly predicted the dependent variable (F= 8.382, p<0.05). Thus, there is a significant correlation among students' attitude, achievement motivation and academic performance in Arabic Language in Kwara State. In order to ascertain the contribution of the two independent variables together, r-square was calculated and the output is in Table 5.

Table 5: Regression Model Summary of Students' Attitude and Achievement motivation on Academic Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.054	0.003	-0.005	8.446

a. Predictors: (constant), attitude and achievement motivation

As shown in Table 5, the two independent variables (students' attitude and achievement motivation) jointly contributed R-Square of 0.003, representing 0.3% to the dependent variable (Students' Performance in Arabic Language). Thus, the total variance in academic performance of senior secondary school students was accounted for by the combination of students' attitude and achievement motivation. This implies that students' attitude and achievement motivation jointly explained 0.3% of the total variance on students' academic performance in Arabic Language inKwara State. To determine the contribution of each of the independent variable, Beta Weight was calculated and the outputs are shown in Table 6.

Table 6: Relative Contributions of Independent Variables to Students' Academic Performance inArabic Language in Kwara State

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
Model				T	Sig.
(Constant)	60.305	2.374		25.399	0.000
Attitude	0.357	0.696	0.033	0.153	0.008
Achievement motivation	0.485	0.571	0.064	0.513	0.000

a. Dependent Variable: Performance in Arabic Language

b. Predictors: (constant), attitude and achievement motivation

Table 6 shows the relative contribution of each of the independent variable. The table reveals that the achievement motivation has the higher contribution of Beta weight of 0.064 with t-value of 0.513 then attitude which has the Beta weight of 0.033 with t-value of 0.153. This implies that achievement motivation has more significant

contribution than attitude on academic performance of students in Arabic Language. The contributions are presented in the equation below:

$Y = a + biX_1 + b_2X_2....b_nX_n$

Thus, the weight of each independent variable in this study can therefore be substituted in the equation as

$Y = 60.305 + .357X_1 + .485X_2$

where

Constant (Students' performance) = 60.305

Students' Attitude (bi) = 0.357

Students' Achievement Motivation (b_2) + 0.485

Findings and Discussion

The first finding from this study revealed that a majority of students were positively disposed to Arabic Language.This outcome disagrees with the finding of Uthman (2015) that students had negative attitude to Arabic Language. However, this result is in support of Saadu's (2013) outcome that there was a positive relationship between students' attitude and their academic performance. The type of learning experience, environment and teachers' instructional methods which the learners are exposed to might be accounted for their positive attitudes towards Arabic Studies as a subject in Senior Secondary School.

The second finding showed that the majority of Senior Secondary School students had high achievement motivation to Arabic Language in Kwara State. This result is in line with Ayandele (2014) who found students to be having high achievement motivation in Mathematics. This outcome also corroborates Kazeem, Arifi and Yusuf (2015) whose findings showed that many students are not motivated to learn Arabic language as studying it was perceived as a waste of time and not lucrative enough to cater for their future needs. However, this disagrees with the submission of Al-Hakani (1999) who opined that students were poorly motivated to achieve academically.

The third finding indicated that the general performance of students in WAEC SSCE Arabic Language was relatively high.This result is in line with the study of Saadu (2017) which revealed that the general students' knowledge of Arabic Language in University of Ilorin was relatively high. This is also in line with the finding of Awoniyi(2015) which revealed that students' performance is generally above average. The high performance of students in Arabic Languagecould be attributed to students' positive attitudes and their achievement motivation which also tend to be high.

The last finding revealed that there was a significant correlation among students' attitude, achievement motivation and academic performance in Arabic Language in Kwara State. Thus, the combination of the independent variables significantly predicted the dependent variable. However, students' achievement motivation was found to have the higher contribution to students' performance in Arabic Language than their attitude. This implies that achievement motivation is amore significant variable than attitude on academic performance of students in Arabic Language.

Implications:

It was concluded that students' achievement motivation was the stronger predictor between the two independent variables involved with the higher contribution than attitude on academic performance of students in Arabic Language. Below is the implication of the study:

1. Arabic teachers should make their instructions interesting to the students with relevant illustrations which could promote readiness for regular and steady learning and assist in developing positive attitudes in students towards the subjects.
2. Students need to be provided with feedback on their actions such as marking their scripts and reinforcing good responses to learn and develop internally generated motives in order to perform excellently in their academic endeavor.
3. School authorities should create a composed and conducive learning environment for students in order to encourage or motivate them to learn.
4. Curricular planners should formulate broad-based curriculum that would mak students find studying Arabic Language interesting, not a theoretical curriculum without practical orientation.

Conclusion

Based on the findings of the study, it could be concluded that majority of the students were positively disposed to Arabic Language. Significant correlation existed among students' attitude, achievement motivation and academic performance in Arabic. Achievement motivation was the stronger predictor between the two independent variables involved with the higher contribution than attitude on academic performance of students in Arabic Language. Some other factors that were not captured in the study may also contribute to students' performance in Arabic Language.

Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations are proffered;

1. Arabic teachers should make their instructions interesting to students with relevant illustrations which would promote readiness for regular and steady learning and assist in developing positive attitudes in students towards the subjects.

2. Students need to be provided with feedback on their actions such as marking their scripts and reinforcing good responses to learn and develop internally generated motives in order to perform excellently in their academic endeavor.

Limitations of the Study: This study made use of descriptive research of correlational type and structured questionnaire for data collection and limited to Kwara State.

Therefore, future researchers may increase the number of schools as well expand the locale. Researchers could also use more robust statistical tools for data analysis.

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Learning from community's options of supply management for reducing drought risk in Bangladesh

Md. Abdus Sattar

Abstract

Drough as a natural calamity, affects the society, economy and environment. Drought has long run effects on the community and environment. Randomly selected 100 male and female respondents from Niamatpur Upazilla under Naogaon district have been interviewed with a structured survey interview questionnaire. The study explores the historical drought situation in Bangladesh. The correlation between causes and impacts of droughts has been drawn in this study. Moreover, this study incorporates the community's learning on drought risk reduction with Rossi (2000) matrix on three dimensional drought mitigation measures of supply management. This study would help the researchers, academicians, learners, development partners, NGOs and government to take their future decision.

Keywords: Community knowledge, drought risk reduction, supply management, Bangladesh.

Introduction

As multifarious event, drought has enormous impacts on human and cattle population and environment also. Shortage of water availability in the nature, lack of precipitation, moisture deficiency in the air, river run off etc. make this event harmful for any particular region by dryness in the environment. Harmful drought affects the economy of any region by reducing agricultural products; cattle fodder elimination, making shortage in energy generation and water supply in the domestic and supply chain management and industrial processes. The drought situation may depend on and differ in space and time. The spatial and temporal irregularity of rainfall in the particular region may affect hydrologic response of river basin of that particular region. Climatologic and hydrologic regimes characterize the drought and its impacts on human population cattle population and Flora and Fauna. Drought refers to the less content of moisture in the soil for cropping and in Bangladesh which usually occurred in the northwestern region (Banglapedia). Due to the gradually increasing global warming, affects of green house gases and finally changes in climate variability make the drought situation worst day by day. As a consequence, drought has immense impacts on social and economic condition of any community and region. Few years ago, drought makes a

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vulnerable socio-economic community condition generally called *"Monga*[1]*"* in the Northern part of Bangladesh as result of drought.

Conceptual framework

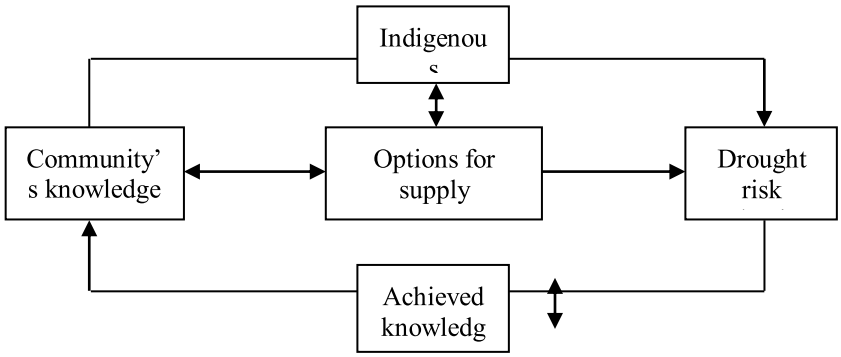

Figure 1: Community knowledge and supply management for drought risk reduction

The Figure 1 indicates that the drought risk reduction options can be effective by the collective responses of the community's knowledge (indigenous and achieved) in association with the options for supply management.

Community knowledge: In this case, community knowledge refers to the complex of the indigenous knowledge and achieved knowledge.

Indigenous knowledge: Inherited knowledge from the community about drought risk reduction that has been practiced in the community in the long run. Sometimes it refers to the local knowledge.

Achieved knowledge: The achieved knowledge refers to the previous drought risk reduction experiences of the community by the help of the external resources.

Supply management options: Rossi (2000) matrix of three dimensional supply management options refers increase water collection and storage opportunities (reservoirs); desalinization of brackish and saline water; treatment and reuse of waste water; water transfer; artificial precipitation; locate potential new resources (standby supplies); aqueducts and canals; groundwater recharge; monitoring and forecasting; and adjust legal and institutional framework as long term options and mixing fresh and low quality water; exploiting high-cost water; over-drafting; aquifers; diverting water

[1] The economic crisis manifested through seasonal unemployment and absence of any alternative source of income typically faced by certain groups of population in Northern Bangladesh resulting in sudden loss of their purchasing power leading to lack of access to food and other daily necessities (Elahi and Ara, 2008).

from the given uses; decreasing transport and distribution losses; and adjust legal and institutional framework refer as short term options.

Drought risk reduction: In this case, drought risk reduction generally defined as the process of reducing risk by analyzing and managing factors of droughts including exposure to hazards, vulnerability of people and property, planned management of land and finally the development of preparedness initiatives for managing severe effects of droughts.

Objectives and Methods

The objectives of this study are to identify the historical drought situation in Bangladesh; to explain the correlation between causes and impacts of drought and to analyze community's learning related to supply management options for drought risk reduction. To achieve these goals this study has been conducted in the Niamatpur Upazilla under Naogaon district of Bangladesh. Randomly selected 100 male and female respondents have been interviewed with a structured survey questionnaire for collecting primary information regarding this study. Moreover, related books, articles, conference and seminar proceedings etc. have been reviewed for collecting secondary information. The collected information was sorted and presented in table and figure and analyzed in accordance with the objectives.

Results and Discussions

Historical drought situation in Bangladesh

Drought category

McKee et al. (1993) identifies that every 50 year one extreme drought situation occurred with SPI value <-2.00 and 2.5 droughts occurred in 100 years followed by one severe drought occurred in 20 years with SPI value -1.50 to -1.99 and 5 droughts in 100 years; one moderate drought occurred in 10 years with SPI value -1.00 to -1.49 and 10 droughts in 100 years; and one mild drought occurred in 3 years with SPI value 0 to -0.99 and 33 droughts in 100 years (see Table 1).

Table 1: Drought occurrence probability and Standardized Precipitation Index (SPI) value

SPI Value	Category	Number of drought occurrence in 100 year	Frequency of event
0 to -0.99	Mild	33	1 in 3 years
-1.00 to -1.49	Moderate	10	1 in 10 years
-1.50 to -1.99	Severe	5	1 in 20 years
<-2.00	Extreme	2.5	1 in 50 years

Source: McKee et al., 1993

Droughts in Bangladesh

Year	Affected area	Impacts
1791	Jashore	Due to the immense drought situation the prices of the commodities had risen.
1865	Dhaka	The drought pushes famine in the region.
1866	Bogura	As a consequence of this drought, the rice production had fallen in minimum level.
1872	Sundarbans[1]	Due to insufficient rainfall crops production severely suffered.
1874	Bogura	Due to enormous drought situation rainfall was extremely low and causes enormous crop failure.
1951	Northwest part[2]	Rice production fallen into very low range.
1973	Northern part	Pushes factor of 1974s famine in Bangladesh.
1975	47% of the total land	More than half (53%) of total population affected due to this drought.
1978-79	42% of the total cultivated land	As a consequence, rice production reduced by about 2 million tons and 44% of total population affected.
1989	Naogaon, Nawabganj, Nilpahamari and Thakurgaon	Most of the rivers lost water and the top soil dried up and a dust syndrome was appeared.
1994-95	Northwest part	Crops production reduced in large range.
1999-2000	Southwestern part	Crops in the south-western region of Bangladesh were severely affected.

Source: Compiled from Rasheed, 2008, p. 95 & Bangladpedia

Correlation between causes and impacts of drought: Bangladesh context

Ramamasy & Baas (2007) explore the correlation between causes and impacts of drought situation (see Figure 2) and they identify the droughts as meteorological, agricultural and hydrological and they also identify the economic, social and environmental impacts of drought situation. Precipitation deficiency (amount, intensity and timing) in northern, northeastern[3] and Barind Tract[4] area causes drought in the country. Ground water depletion, soil moisture reduction and decrease of stream flow in the north eastern region of Bangladesh causes drought. Moreover, high temperature, high wind and low relative humidity, greater sunshine and less cloud cover in this area

[1] Mangrove forest in the southern part of Bangladesh.

[2] Generally refers greater Rangpur and Dinajpur district of Bangladesh

[3] Rajshahi, Gaibanda, Kushtia, Meherpur, Kurigram, Rangpur, Dinajpur, Lalmonirhat, Thakurgoan, Panchagor, Joypurhat etc. (Banglapedia).

[4] Greater Dinajpur, Rangpur, Pabna, Rajshahi, Bogra, Joypurhat and Naogaon districts of Rajshahi division. (Banglapedia).

increase the intensity of drought situation and finally create environmental imbalance in this region. Soil water deficiency of this area induced agricultural drought. High temperature, high wind and low relative humidity, greater sunshine and less cloud cover create drought situation which lessen the moisture in the atmosphere and soil also. Agricultural crops production reduced due to drought and that pushes social and economic impacts in this region. Mistreatment of land by using human interventions and mismanagement of land using by the human may spells periodic droughts in northeastern Bangladesh. Reduced stream flow, inflow to reservoir, lakes and ponds; reduced wetland and wild life habitat causes hydrological drought in Bangladesh. This hydrological drought reduces crops and fodder productions and finally affects socio-economic condition and environment. Hydrological imbalance is a major cause for occurring of drought that found in the north western area of Bangladesh. Inadequate pre-monsoon showers, delay of starting rainy seasons and early departure of the monsoon may create drought conditions and adversely affect the crops production.

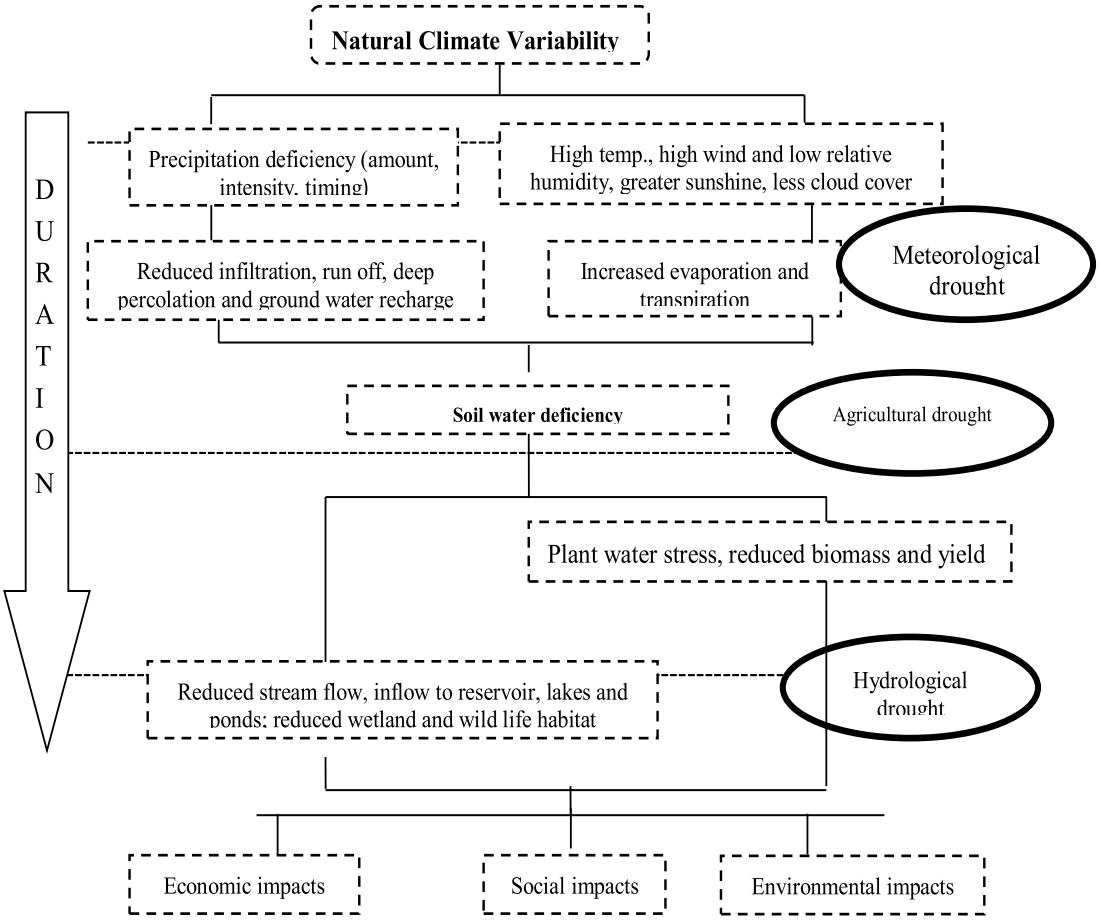

Figure-2: Correlation between drought type and impacts (Ramamasy and Baas, 2007)

For the cumulative effects of dry days, higher temperatures[1] during pre-Kharif[2] and low moisture availability in soil make two dry periods such as, Rabi and pre-Kharif drought are distinguished (Karim et al., 1990) usually affects all Rabi crops (HYB Boro, wheat, pulses, potatoes and sugarcane).

Supply management options for drought's risk reduction

A sample of measures (FAO, 2001 & Dziegielewski, 2001) classified in such a matrix, as adapted from Rossi (2000), is given in the Figure 3 (Bazza, 2002).

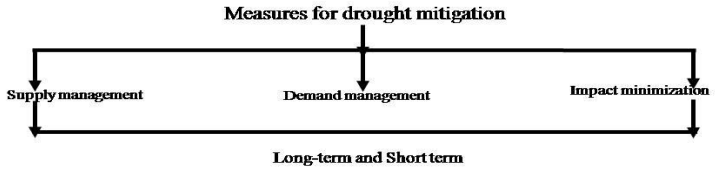

Figure 3: Drought mitigation measures

Community's learning related to supply management options

Table 2: Community's responses to learning of drought management options of Rossi's matrix, 2000

Long term options	Community's response %			Short term options	Community's response %		
	Agree	Neutral	Disagree		Agree	Neutral	Disagree
Increase water collection and storage opportunities (reservoirs)	94	03	03	Mixing fresh and low quality water	92	03	05
Desalinization of brackish and saline water	92	03	05	Exploiting high-cost water	34	36	30
Treatment and reuse of waste water	95	02	03	Over-drafting	54	23	23
Water transfer	96	02	02	Aquifers	93	02	05
Artificial precipitation	21	39	40	Diverting water from the given uses	97	02	01
Locate potential new resources	67	13	20	Decreasing transport and	92	03	05

[1] >40 degrees Celsius in March/May
[2] January to May

(stand by supplies)				distribution losses			
Aqueducts and canals	91	03	06	Adjust legal and institutional framework	69	10	21
Groundwater recharge	28	42	30				
Monitoring and forecasting	89	05	06				
Adjust legal and institutional framework	69	10	21				

Source: Field study, 2019 N=100

The Table 2 shows that most of the drought risk reduction options of Rossi's supply management strategies agreed by the respondents of the study area. Such as, increase water collection and storage opportunities (reservoirs) agreed by 94 percent of the respondents; desalinization of brackish and saline water agreed by 92 percent of the respondents; treatment and reuse of waste water agreed by 95 percent of the respondents; water transfer agreed by 96 percent of the respondents; locate potential new resources (standby supplies) agreed by 67 percent of the respondents; aqueducts and canals; groundwater recharge agreed by 91 percent of the respondents; monitoring and forecasting agreed by 89 percent of the respondents; adjust legal and institutional framework agreed by 69 percent of the respondents as long term options and on the other hand, mixing fresh and low quality water agreed by 92 percent of the respondents; over-drafting agreed by 54 percent of the respondents; aquifers agreed by 93 percent of the respondents; diverting water from the given uses agreed by 97 percent of the respondents; decreasing transport and distribution losses agreed by 92 percent of the respondents; adjust legal and institutional framework agreed by 69 percent of the respondents as short term options.

Conclusions and recommendations

As prolong disaster drought has various causes and impacts. It has a severity in our agricultural production and livelihood management system. Drought risk/impacts are increasing day by day due to the changes in climate variability, the frequency and severity of extreme events, societal and economic vulnerability. Improved drought management requires a paradigm shift to a risk-based approach directed at better monitoring, prediction, mitigation, and planning. It may be easy and effective if the community knowledge about drought risk reduction is incorporated with the supply management options. Moreover, the following may be useful for drought risk reduction, such as, use barrage, pump to change the water direction to agricultural field; desalinate the ground water by canal system; reuse waste and use water after proper treatment;

related technology may import or invent for artificial precipitation; use canal system for recharging ground water; adopt supplementary and deficit irrigation system by shallow and deep tube wells; use water saving irrigation system and use drought resistant crops. This research recommends the following options:

- ✓ To introduce drought tolerant crops varieties;
- ✓ To provide alternative livelihood options;
- ✓ To conduct further research to mitigate drought risk;
- ✓ To formulate policy for more participation of community people in drought management.

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Inclusive Education in Nigeria Basic Education Teachers' Awareness and Views

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Abstract

The fundamental fact underlining inclusive education generally is to extend equality of educational opportunities to all categories of learners irrespective of their shortcomings. The acceptance of inclusive basic education differs from one country to the others. Therefore, this paper attempts to examine basic education teachers' awareness and views on inclusive education in Nigeria. Descriptive design of survey type was adopted. The population comprised all basic education teachers in North central, Nigeria. A sample of 480 basic education teachers was used for the study. Six research questions and four hypotheses were raised to guide the study. A researcher design questionnaire and interview schedule was used to gather information from the sample. Cronbach Alpha reliability test was used to determine the internal consistency of the instrument which yielded a co-efficient of 0.82. Among other things, the findings revealed a low level of teachers' awareness about inclusive education but had positive views supporting its practice. It was therefore recommended that the public should be more enlightened about inclusive education, its benefits and practice, especially with respect to people with special needs.

Keywords: Inclusive Education, Teachers' Awareness, Basic education, Views, North-Central, Nigeria

Introduction

Nigeria like the most African countries, is striving hard to align herself with the whole world to pursue the objectives of Education for all (EFA) by the year 2020. Inclusive education, if well implemented and adequately practised would help in no small way to facilitate the realisation of EFA laudable objectives. For this purpose, inclusive education as a concept has attracted the attention of the general public, particularly stakeholders in the education sector. It is receiving worldwide attention as a new concept in the process of providing educational services to all categories of learners, irrespective of their shortcomings. The UNESCO SalamancaStatement of 1994 proposed the required framework for inclusion in education.

Ademokoya (2003) simply defined inclusive education as an attempt to make educational opportunities equal for all children irrespective of their disabilities, sex,

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race, religion or language. For instance in Nigeria, the insurgence of the terrorist group called “Boko Haram” evolved from the platform of religion; it is the resultant effect of a long time neglect of a certain set of religious youths who wanted recognition by all means.

It is no gainsaying that certain ethnic groups in Nigeria are educationally backward and are calling for attention in the inclusive education programme. Girl-child education is a taboo in some areas until recently when the government and some non-governmental organisations (NGOs) started campaigning against this practice. Girls are quickly married off to prospective husbands as soon as they reach puberty. Therefore, girls found in the schools in these areas are often neglected and later on frustrated out of the school system. How much awareness and enlightenment on inclusive education do teachers and other stakeholders in education in these affected areas have to be able to cater for these categories of disadvantaged students is an important question that needs to be answered urgently.

Statement of the Problem

Education is on the concurrent list of the Nigeria’s constitution and of utmost concern to the United Nations. The world is very keen on how all segments of society are granted access to basic education. Inclusion in education is the right of all children to quality education that meets their fundamental learning requirements. Focusing particularly on vulnerable and marginalised groups, it seeks to develop the full potentials of every individual (Soodak & Erwin, 2012). The objective of inclusion in education is to put an end to all type of discrimination and enhance social cohesion. However, in spite of the huge resources Nigeria expends on basic education, remarkable access by all citizenry (inclusion) has not been attained in the nation’s education programme. This is partly due to the awareness level of the education practitioners (teachers) on inclusive education.

There is therefore need to investigate the awareness level of the basic education teachers, so as to sensitise them and also assess the preparedness of North central zone educational institutions, in terms of provision of all the necessary resources and materials by the government. The area of interest in this paper is exclusion on the basis of gender, religion, special needs and ethnicity. There is therefore the need to examine the level of teachers' awareness and their views about inclusive education on the basis of the four components.

Objectives of the Study

The general objective of the study was to examine basic education teachers’ awareness of inclusive education in Nigeria and their views. Specifically, the study sought to:

a. find out the level of basic education teachers’ awareness of inclusive education
b. find out the views of basic education teachers on inclusive education;
c. determine whether the views of basic education teachers on inclusive education differ based on gender;

d. determine whether the views of basic education teachers on inclusive education differ based on religion;

e. e. find out whether the views of basic education teachers on inclusive education differ based on ethnicity; and

f. F. find out whether the views of basic education teachers on inclusive education differ based on people with special needs.

Research Questions

1. What is the awareness level of basic education teachers about inclusive education?
2. What are the views of basic education teachers about inclusive education?
3. Is there any difference in the views of basic education teachers about inclusive education on the basis of gender?
4. Is there any difference in the views of basic education teachers about inclusive education on the basis of religion?
5. Is there any difference in the views of basic education teachers about inclusive education on the basis of ethnicity?
6. Is there any difference in the views of basic education teachers about inclusive education on the basis of people with special needs?

Research Hypotheses

HO_1: No significant difference exists in the views of male and female basic education teachers about inclusive education.

HO_2: No significant difference exists in the views of basic teachers about inclusive education on the basis of religion.

HO_3: No significant difference exists in the views of basic education teachers about inclusive education on the basis of ethnicity.

HO_4: No significant difference exists in the views of basic education teachers about inclusive education on the basis of people with special needs.

Conceptual Clarification

The Concept and History of Inclusive Education in Nigeria

In recent years, the concept of inclusion in education has been widened to cover not only students with special needs but also all children who may have challenges. Earlier, Skrtic et al. (1996) had argued that inclusion in education is more than putting the students with special needs in general classrooms; but it should also involve also taking into consideration or paying attention to their needs. Succinctly, Lipsky & Gartner (1998) described inclusion in education as children with special needs having full membership in age-appropriate classes in their neighbourhood schools, with appropriate supplementary aids and support services. To Antia et al. (2002), inclusion denotes a

student with a disability unconditionally belonging to and having full membership of a regular classroom in a regular school and its community.

They contrasted this with 'integration', or 'mainstreaming', both of which imply that the student with a disability has the status of a visitor, with only conditional access to a regular classroom, but primary membership of a special class or resource room. This was also emphasised by Slee (2005) who said that inclusive education refers to the cultural politics of the protection of students' rights as citizens. The resulting agreement, known as the *Salamanca Statement*, demonstrated an international commitment to inclusive education. Governments were called upon to adopt the principle of inclusive education by enrolling all children in regular schools unless there are prevailing circumstances which do not permit such. This implies that there is need for proper management of inclusive education in schools.

Inclusive Education in Nigeria: A Perspective

Practitioners, government, parents, disabled people's organisations (DPOs) and other stakeholders view inclusive education from different perspectives. Right from the beginning, inclusive education has been an issue difficult to tackle. In spite of the fact that inclusive education has been internationalised (UNESCO, 2008), it has not been evenly implemented throughout the world as a result of historical, cultural, social and financial reasons. Specifically, it has been a major issue in developing countries, where resources are scarce and less than 2% of children with special needs have access to any form of education.

In Nigeria, formal education has been known for tolerance of negative forms of behaviour and with a more encouraging attitude towards special assistance for students with sensory disabilities. Educators of special needs students in Southern Nigeria may be more skeptical than their Northern colleagues about the fact that students with behavioural challenges should attend the same schools as those without such challenges.The basis of inclusion is that special needs students are entitled to the gains of school attendance with required support just as their counterparts who do not have challenges have access to general education.

Teachers' Awareness and Practice of Inclusion

Inclusive education as concept coined decades ago, still remains new to many teachers. This is not only because they are not aware, or lag behind in the modern concepts or practices in education but also because of the low level of the implementation of inclusive education in Nigeria, its improper practice, and poor understanding of the concept. Many scholars (Garuba, 2003 & Ajuwon, 2008) found that many teachers consider it as special education for people with challenges.

Garuba (2003) stated that the socio-economic and resource problems as well as the unscientific method of explaining human conditions in Nigeria where 41 percent of people are still illiterate can make the adoption of inclusion end up not in the best interest of the concerned individuals (children with special needs). To cap it up, Laasch

and Conaway (2009) said that the difference between males and females in terms of their understanding on the issue of inclusion can be linked to high level of tolerance for inclusion which associated with females.

Methodology

A descriptive survey research design was adopted for the study. This is because the study sought for the facts and opinions of the respondents. Eight basic schools were selected from each of the six states in North-central zone of Nigeria, making a total number of 24 schools used for the study. The population for the study comprised all the basic education teachers in both private and public owned schools out of which 80 teachers were selected from each state in North-central zone, making a total of 480 teachers. Two research questions were raised and four hypotheses were tested in this study.

A researcher's designed questionnaire and interview schedule was used for collection of data. The questionnaire was divided into three sections. The instrument was subjected to a face validation by two experts in Measurement and Evaluation from University of Ilorin. Cronbach Alpha reliability test was used to determine the internal consistency of the instrument. Reliability co-efficient of 0.82 was obtained which was high enough to confirm the reliability of the instrument. The research questions for the study were answered using percentage. The independent sample t-test and Analysis of Variance (ANOVA) were used to test all the hypotheses at 0.05 alpha level.

Analysis of Data and Results

This section presents the responses of basic education teachers from the selected schools on their awareness level and views about inclusive education in Nigeria on the bases of the selected variables of gender religion, ethnicity and people with special needs of inclusive education.

Research Question One: What is the awareness level of basic education teachers about inclusive education?

Table 1: Percentage Analysis on Awareness Level of Basic Education Teachers about Inclusive Education

Level of Awareness	Frequency	Percentage
Not Aware	302	63%
Aware	178	37%
Total	480	100.0%

Table 1 reveals that out of 480 respondents sampled for this study, 302 (63%) respondents claimed that they were not aware of inclusive education, while 178 (37%) claimed that they were aware of inclusive education. This result shows that a small percentage of the respondents possess a high level of awareness of inclusive education.

This implies that the general level of basic education teachers' awareness of inclusive education in North-central, Nigeria is very low.

Hypotheses Testing

Hypothesis One: No significant difference exists in the views of male and female basic education teachers about inclusive education.

Table 3: T-test Analysis on the Difference in the Views of Male and Female Basic Education Teachers about Inclusive Education

Gender	N	Mean	Std. D	Df	t-value	Sig.	Decision
Male	288	46.68	3.81				
				498	.840	.001	Rejected
Female	192	42.17	3.42				

Table 3 reveals that there was a significant difference in the views of male and female basic education teachers about inclusive education. This is reflected in the result: df (498) t= .840, $p < 0.05$. Since the calculated sig. (.001) is less than 0.05, the hypothesis is rejected. This implies that there was a significant difference in the views of male and female basic education teachers about inclusive education.

Hypothesis Two: No significant difference exists in the views of basic teachers about inclusive education on the basis of religion.

Table 4: ANOVA Analysis on the Difference in the Views of Basic Education Teachers about Inclusive Education on the basis of religion

Religion	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	6.949	2	.116			
				.982	.003	Rejected
Within Groups	39.287	477	.118			
Total	46.236	479				

From Table 4, it can be deduced that there was a significant difference in the views of basic education teachers about inclusive education on the basis of religion. This is reflected in the result F (.982), $p < 0.05$ since calculated sig. (.003) is less than 0.05. This means that the hypothesis is rejected. This implies that there is a significant difference in the views of basic education teachers about inclusive education on basis of religion.

Hypothesis Three: No significant difference exists in the views of basic education teachers about inclusive education on the basis of ethnicity.

Table 5: ANOVA Analysis on the Difference in the Views of basic Education Teachers about Inclusive Education on the basis of Ethnicity

Ethnicity	Sum of Squares	Df	Mean Square	F	Sig.	Decision

Between Groups	74.49	2	.116			
				.982	.421	Not Rejected
Within Groups	62.28	477	.118			
Total	46.236	479				

Table 5 reveals that there is no significant difference in the views of basic education teachers about inclusive education on the basis of ethnicity. This is reflected in the result F (.982), $p > 0.05$ since calculated sig. (.421) is greater than 0.05. This means that the hypothesis is retained. This implies that there was no significant difference in the views of basic education teachers about inclusive education on the basis of ethnicity.

Hypothesis Four: No significant difference exists in the views of basic education teachers about inclusive education on the basis of people with special needs.

Table 6: ANOVA Analysis on the Difference in the Views of Basic Education Teachers about Inclusive Education on the basis of People with Special Needs

People with Special Needs	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	27.548	2	.459			
				1.173	.002	Rejected
Within Groups	130.350	477	.391			
Total	157.898	479				

From Table 6, it is revealed that there is a significant difference in the views of basic education teachers about inclusive education on the basis of people with special needs. This means that the hypothesis is rejected. This is reflected in the result F (1.173), $p < 0.05$ since calculated sig. (.002) is less than 0.05. This implies that there is a significant difference in the views of basic education teachers about inclusive education on the basis of people with special needs.

Discussion

The findings of the study revealed that the general level of basic education teachers' awareness of inclusive education in general was very low. This could be attributed to the low level of the practice of inclusive education in the country, and some teachers' lack of willingness to learn and apply the new trend in educational or pedagogical system. The result of this study corroborated the findings of Garuba (2003) who identified poor awareness of people about inclusion in addition to the fact that many teachers considered it as special education for the disabled/disadvantaged.

Also, the results revealed that there was a significant difference between the views of male and female basic education teachers on inclusive education. This is in line with Laasch and Conaway (2009) study that observed that the difference between males and

females in terms of their understanding on the issue of inclusion could be linked to high level of tolerance and more cognitive attitude for inclusion which is a character associated with females.

Lastly, the findings revealed that there was significance difference in views of basic education teachers on inclusive education on the basis of religion, ethnicity, and people with special needs. These findings are supported by Ademokoya (2003) that inclusive education is an attempt to make education opportunities equal for all children irrespective of their disabilities, sex, race, religion or language.

Conclusion

The study concluded that generally most basic education teachers were not aware of inclusive education in North-central Nigeria. Also, many of the basic education teachers did not have the same opinions about inclusive education on the basis of gender, religion, ethnicity and people with special needs.

Basic education teachers had positive views supporting the practices of inclusive education on account of its four components though with distinct percentages. This implies that basic education teachers agreed that in the school system children should not be separated from one another on the basis of gender, religion and ethnicity. However, children with severe condition of disability should be given more attention for them to learn at their own pace. All pupils/students should be exposed to the same teaching learning process and contents in order to achieve the overall goals of education. Also, there are differences in the views of the respondents about inclusive education on account of its major components of gender, religion, ethnicity and people with special needs based on the variable of gender. However, the majority of the respondents did not support the practice of having children with special needs in the same class or teaching-learning setting with those without any challenges.

Recommendations

Based on the findings of the study the following recommendations were made:

I. More awareness should be made about inclusive education; its socio-cultural, inter-relational, peace-building benefits and its practice so that the public can be better enlightened, and they can advocate more for its practice.

II. Teachers should be more trained on the practice of inclusive education at the levels of instruction, decisions, management, first aid treatment, guidance and counseling.

III. Government at all levels should equip all schools, especially in the immediate communities, with necessary resources to cater for all divergent learners.

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Students' Mathematization with Learning Trajectoriesat Secondary Classroom

Puja Pratihasta[1] & Dori Lal[2]

Abstract

This paper is totally based on the live classroom interactions and discourse where a teacher tried to facilitate the whole pedagogical activities in such a way where she could get experiences about the development of level character in Maths learning which happen in classroom in finding, proving, verifying various mathematical phenomena.The level charachter in learning mathematical facts and concepts generates the ideas through ideas in a helical path in upward direction from one path to other one at any height depending upon the pitch of its heights. The idea of level-raising is the soul of ***Freudenthal's idea (1971, p417).****The activity of one level is subjected to the analysis of next level; operational matter at one level becomes subject matter to higher level.For getting such mathematical discourse,teachers have to create such conducive environment which make such paths directrional .For doing so.the researcher hypothesised learning trajectory by which she anticipated the learning goals,planning tasks and hypothesised learning procedures .*

Keywords: Mathematization, Learning Trajectories, Secondary Classroom

Introduction

Mathematics as a core subject and mathematical literacy occupycentral positions in any education system and Indian education system is no exception. Buttragically, Mathematics learning has become phobia among the students. Recently, data from Program for International Student Assessment (PISA) revealed a challenge for India where it secured 151st rank among 152 countries. The discourse about higher aim of mathematics education as stated in **NCF 2005** (*Mathematizing young mind is more important rather than to know more mathematics*)has taken rear seat..Amathematised mind might be panacea for problems related to Mathematics learning. The claim gets a boost by the researcher's own 10 years of teaching experience. The mathematization process (Freudenthal term) related to theunderstanding of mathematics as an activity of organising fields of experience, in which the means of organizing the lower level becomes the subject matter on the higher level. (Freudenthal, 1973, p 123). Mathematisation is something beyond mathematical thinking. It is athought process where a child canarticulate, discover, frame, and structure ideas through existing ideas or generate new ideas and provide meaning to Mathematics itself. Mathematics

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learning should be in such a way that a learner getsproblems and then she shall operate them into mathematical problem (Horizontal Mathematization).The next step is trajectories of learning or learning strandsbased on level character of learning forming basis of vertical mathematization.Treffers,(1978,p 47) asserted that the problems for the previous levelis the solution of later problem. The level character of learning generates the ideas through ideas in helical path in upward direction depending upon the pitch of the helix. The idea of level-raising is the soul of Freudenthal'sideas (1971, p417).The activity of one level is subjected to the analysis of next level; operational matter at one level becomes subject matter to higher level. Such development in learning could happen in the classroom in finding, proving, verifying various mathematical phenomena. The research objective of this study is to show paths for secondary students. The results are expected to be useful for learners to learn any mathematical facts. It gives an insight for practitioners; to create such conducive environment: for educational institutions: useful for improving quality of educationin maths itself.

Theoretical Framework:

This study is inspired by the RME (Realistic Mathematics Approach)which is quoted by the famous educationist Hans Freudenthal.According to him, Mathematics should be treated as a human activity **(p122,1973)** which enforced the idea of learning by doing instead of learners being merely receivers of ready-made Maths. Learnersbeing active participants in Maths processdevelop all sorts of tools and insights by themselves.Treffer brought the idea of Freudenthal in practice with following being learning principles:

1. Learning as construction
2. Level character of learning
3. Reflecting aspect of learning
4. Learning as a social activity
5. Structuring and schematising character

Level character of learning explains nature of learning pattern enforcing the idea of Freudenthal (1992) where he asserted that a higher-level subject may transform into lower level one. For example, a group or a vector space studied in Modern Algebra at university level can be thought of as a higher-level subject with set theory being the corresponding lower level.

The study revolves around level raising character while learning a mathematical phenomenon. Here, the level raising character talks of the learning trajectories that a student may follow or acquire while aiming a certain learning pattern.

The concept of learning trajectories consists ofan effective approachwhere those tracks are recorded and defined. They provide an experimental basis of creating conducive learning environmentsabout when, how,what andwhom to teach. Learning progressionsidentify key waypoints along the path where students' knowledge and skills

are likely to grow and develop in school subjects (Corcoran, Mosher, &Rogat, 2009).These are termed learning trajectories in maths education.Either it is produced or reproduced in learner's mind aimlessly , without any external help or teachers may help simulatesituations leading to such trajectory. Such hypothesis created by teachers are all about levels,paths ,pitches as well as extremum of these trajectories that students are likely to pass through while learning any mathematical concepts ,facts or phenomena.Through experience,the teacher tries to provoke or evoke the mental actions triggering developmentof thesehelical trajectories.



The helical path

Hypothetical Learning Trajectories" (HLT) has three important components- goal of learning, activites involved in learning and whole steps involved in students works towards maths learning. A teacher should hypothesize and consider students' reaction to each stage of the learning trajectories toward the learning goals while designing an activity. This hypothesis is elaborated in a day-to-day basis of a planning for activities and is termedHLT (Rezky, R., & Wijaya, A. (2018, September).

Pre-assumingwith reasoning and theories based on the experiences, such learning trajectories are tools to understand the evolution of student's thought process.This comes from the constructivist approach in which the structure,acknowledgement and genesis of this knowledge comes in the form of learner's own experiences, created or recreated by learner himself whileparticipating actively in the whole process.**Constructivism** is 'an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner' (Elliott et al., 2000, p. 256).

In this study, the teacher established ' **HLT** based on her long experience of maths teaching and learning and Freudenthal's ideas of learning trajectories principles. Mathematization is kind of thought process where a student can articulate ,draw, frame , discover and generate ideas through the ideas in helical path.The width of path describes association of real world into mathematical world through variety of symbols,patterns,analogies,methods etc .The pitch of path has tendency of moving in upward direction in such a way that existing ideas generate new ones that may or may

not relate to the previous ones. This may be genesis of expansion of Mathematics as a subject itself.

Here, the teacher cum practitioner hypothesised the learning trajectories while teaching the concepts related to "Circles" prescribed in class 9 maths text book by NCERT, followed by CBSE board.

Learning Goals

Proving the properties related to circle a two-dimensional concept like:

- Equal chords in circle subtend equal angles at centre
- The perpendicular from the centre bisects the chord in a circle
- The angle subtended by an arc at centre of circle is twice of angle subtended at the remaining part of circleetc

After targeted goals, she tried to hypothesiseactivities from projecting the concepts to propagating the concepts. These activities are sometime contextual i.e., something related to learner's daily life, sometime might be related to the learner's previous knowledge. The categories and varieties of such instructional activities depend on steps involved and sub-objectives of teaching "Circles". It was based on leaner's learning requirement and concepts to be taught.

The third component ofhypothesis, involved verifying facts, theorising the theorems and teaching concepts. The whole procedure involved was based on teacher's own reflective pedagogical behaviour where she constantly took actions as well as reactions by getting ideas from classroom. Sometime she had to give "think time" to learners. The range of "think time" has no fixed extremum. It may vary from 1 minute to may be even months. The process involved the collaborative approach and peer learning as well in resonance.

Research Design

This study can be termed a kind of qualitative research which is solely based on the subjectivity of researcher, research and data itself. Accordingly, the researcher is an active participant also.In presentstudy the research design follows as;

- The identification of problem to be solved: Learner's approach in level-raising character in learning.
- Selection of the learners: 40 students of class 9 of Kendriya Vidyalaya, Greater Noida, U.P. This school is part of Kendriya Vidyalaya Sangathan (KVS), an autonomous body running under Ministry of Education. The 1498 such schools followcommon CBSE Board curriculum.
- Generation of hypothesis: level raising character in learning is important and essential aspect of maths learning and development of maths as a subject itself.
- Data collection: Used observation, self-experiences, student's work to get insights of understanding.

- Data analysis: Analysing data by reflecting researcher's own experience, observations and interpretation by using redundancy of data.

Learning Activities

The classes are of 70 minutes (Two periods). The teaching activity starts with a contextual problem by giving them an example of a cow being tied to a pillar with the rope (Fig 4) on muddy ground. Students are expected to answer type of shape formed bycow's footprints while moving around pillar. Students easily understood that shape is circle.Through Fig 5 the students are required to get the idea of circle in more systematic way. From the above two examples from the student's daily life, a contextual situation was created so that they can concretise the subject-matter properly. But the teacher wanted to trigger the idea of circle being different to other closed shapes. For this, she drew and showed some more closed shapes but are not Circles. These were concluded by a classroom discussion among the students. The notion and properties of circle is thus reinvented by the students under the guidance of the teacher.

Few snapshots of discussionare given below along with whiteboard work:

The teacher drew three figures (Fig 1, Fig 2, Fig 3) and had following dialogues students in the class:

Teacher: ok! The cow was tied by a pillar with a rope (assuming rope remains taut) followed the path is circle! Right! Then are these (figures drawn on the board) would be circles as well?

Yasir: Mam! Among these figures, Figure 3 is circle.

Nitika: But Yasir! All are round! Then why allare not circles?

Yasir: Figures 1 and 2 are a bit *dha* (curved) type.

Anu: But figure 2 is not *dha* (curved). This is completely round.

(Teacher smiled at the word "round" for a closed curve. However, she decided not to interrupt)

Nitika: ummm… This looks like egg shaped.

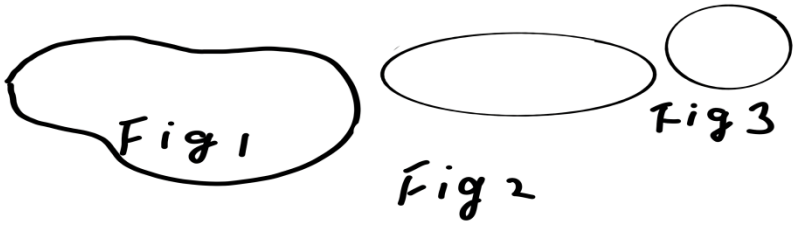



Fig 4

William: (withconfidence): Arre! you all people are too confused. Figure 2 is called ellipse and Figure 3 is circle and figure 1isjust a closed curve.

Sonam: (A shy girl murmuringto Raj): circle is round !! then why William did not consider the other figures as circles?

Raj: *puch le jor se! (Ask loudly)*

Sonam: no no you ask!

Raj asked this question to William!

William: Arre! simple he. Figure 3 looks like coins, upper face of Pizza, etc but the figure 2 is kind of egg-shapedellipse.

Rohan: Right! It simply means not all-round figures can be termed circles. Then how can we differentiate?

Sindhi: I do agree with you. Circle is definitely a specific shape with certain conditions.

Rohan: conditions??

Sindhi: yes. Just re-look the cow. Rope is fixed and taut and cow is compelled to move around pillar

Yasir: so?

William: correct! *sarakhel is fixed tight rope ka he*. Cow moved in a specific path which is different than the path moved by a cow when the rope /pillar are not fixed/tight.

Rohan: okkk… just like the ceilingfan. When this fan is moving, the shape exactly looks like the one formed by the cow.

Yasir: can we verify this by taking measurement?

Sindhi: yes, why not? The blades of celling fans are equal and it is fixed by a hanging rod. At every point when fan is moving, the length of blades isequal.

Rohan: wow Sindhigreat. This means not every round shape is a circle.

The teacher who gave enough "think time"with great patience interrupted by taking this catchy moment and defined the circle formally.

Hence, students are able to reach the notion of circle as a locus of all points which areequidistantfrom a fixed point. The students are familiar with the idea of circle as mathematical shape butnow they are not only able to recapitulate the previous knowledge but also, they visualise circle as collections of points with specific condition. This activity was certainly done keeping constructivist approach.

The above discussion ended with a home assignment aimed at generating a new idea consciously created by the teacher. The teacher tried triggering students' mind by giving a situation where cow is tied with a single rope with two pillars in such a way that one end of a rope is tied to one pillar and the other to secondpillar. In between, the rope is also tied to a leg of the cow (through a loop). In such situation, what type of shape will be formed by the paws of the cow on the field given that rope always remains tight?

Now, the discussion moved forward through one more example of circular shape from a ceiling fan of three blades (Fig6) hanging in the classroom and the students are required to visualise the shape made when the ceiling fan moved at full swing.

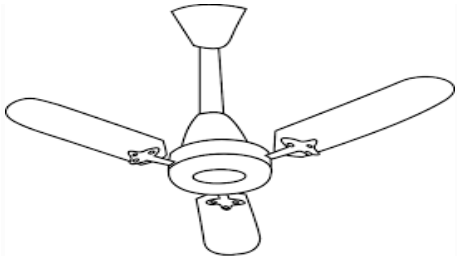

Fig 5

The activity continues to prove properties related to circle like:

Equal chords of a circle subtend equal angles at the centre.

As learning trajectories are domain-specific so the students are led to this property by starting with the same context of ceiling fan.

The next class is also of 35 minutes and resumed at same point. This time few (may be only one) students from a heterogeneous group of learnerscome forward (and say "*Aha*") by taking charge of learning progression (Freudenthal, 1978). This moment occurs when that *'aha - 'Wala'* student might have obseverd ceiling fan at his home or this moment can be created by teacher herself when she proposed such context (the ceiling fan) purposefully with a planning and guided student for reinventing the idea. This is the moment a teacher can create a specific, typical, higher level learning activity in which student could reflect, articulate, synthesize and create conceptions or misconceptions about the subject matter. Also the student has conceived the idea of drawing an equilateral triangle by joining the tips of the fan blades. If this is in line with the expectations, when the teacher poses a question to the whole classlike: Which type of triangle do you get after joining the tips of fan blades?

The students are of class 9th so they must know the type of trianglesand can draw different types of triangles. Since then, the learning activity is now leading to each angle of an equilateral triangle being 60 degree and the angle at the centre of two blades is 120 degree. This was verified by drawing this fan on notebook with exact measure using protractor. This was done by the help of student's mutual discussion like:

Yasir: Mam, how this would be 120 degree only?

Khushi: *Arre baba!*You can drawand measure by protractor.

Aisha: See! I've done this

Pushkar: ohho! What is the need of drawing and measuring it? It is easily seen the angle around the centre of fan is complete angle i.e.,360 degree.

Roshan: (intervening Pushkar statement): yesss*bhai!* It is simple.

Such mathematical discussion is soul of collaborative learning in which a group of students co-construct their knowledge to get a joint solution. Collaborative learning is an important aspect of level-raising character.

The student who experienced"Aha moment"shared his idea further. He created a concept by observing the equal three sides of equilateral triangle as three chords of circle. He shared his observation that angles (120 degree) at the centre of circle are subtended angles by chords and they are equal. The teacher captured such 'catchy moment' quickly and provoked him to think further by posing questions like: does this happen in all types of triangles formed? Still, they get equal angles at the centre of circle. This was proved by making more models of triangles inscribed in a circle and measuring them by protractor. This is also proved by providing them such situation in which chords of a circle are unequal and the students have to verify the angles. As the activity at the lower level can be the subject matter of inquiry of higher level. Such inquiries go on through mathematical discussions and by collaborative learning again.

Riya:aaaa…it means equal chords of circle only subtend equal angles at the centre!

Fatima: haan! Chords should be equal in length

Abhishek: (surprisingly) Not only for chords! It is true for equal arcs also.

Sushil: For arcs! How?

Mahi: *dekh bhai!* (Showing fingers towards ceiling fan path). You can get three arcs and angles subtended by all arcs are also of 120 degree each at the centre.

Teacher summed the whole mathematical discussion by her assertion and told them "Equal arcs/chords of a circle subtend equal angle at the centre."

Meanwhile, the period was over.The result of such learning trajectories triggered other higher ideas very easily like:

"*The angle subtended by an arc at the centre of a circle is twice that of subtended at the remaining part on the circumference of the circle."*

"The perpendicular drawn from the centre bisects the chord of a circle"

"Equal chords are equidistant from the centre of a circle and many more.

The class activity run towards a general, well-established mathematical principles from a specific, domain based contextual situation. The level raising character of learning occurs by achieving the learning trajectories which a teacher designs to get in the beginning of the activity. The learning activity has some pre-assumptions and some expectations which are very much closer to the reality. The learning activity is done by contextualisation of problem which converts the problem into mathematical matter. At some point, the teacher guided the students for reinventing the subject matter by throwing them into a learning trajectory. This trajectory decides the student's orientation of moving in upward direction such that their learning level is raised. This level raising leads the mathematical discussion towards generating a new idea or re-discovering the old one for sake of maths only in a helical path over the long time-period or at spot. The teacher should create such environment for students in which they can do well.

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Green ICT and Education for Sustainable Development: Need of the Hour

Mohsin Ali Khan[1]

Abstract

ICT plays an important role in business, defence, education and individual's private life, increased international interconnectedness and speed up the process of globalization. The total energy consumption by the communication and networking devices (IT) and the global carbon emission by heavy industriesin developed countries (USA,Europe, China Russia) arethe main causes of global warming. Education is also a large sector where we are using ICT in many ways, thus adding heat and radiations to the environment every day. Green technology focuses on reducing the environmental impact of industrial processes and on innovative technologies caused by the earth's rapid growing population. America is the first nation to take the initiatives for green ICT in 1990, followed by several nations in Europe and Asia including India resulted in the widespread adoption of sleep mode among computer devices and other consumer electronics which reduces consumption of power. Adopting green computing strategies make sense not only from an ethical stand-point but also from a commercial stand-point. Present paper tries to describe;origin, need andscope of Green ICT theresearch data related to energy production,consumptionand reduction inuse of power in ICT industry. It may also assist the public and policy makersinadopting and designing green strategies to meet sustainable development challengesnot only in India but throughout the world.

Keywords: GreenICT, Green computing, E-waste, SustainableDevelopment Challenge, Global warming

Introduction: ICT has a vital role to play in many ways. It is the operative part of IT industry, playing an increasingly important role inbusiness,defense, educationand individual's private life. It has increased international interconnectedness and speed up the process of globalization. But on the other side the total energy consumption by the communication and networking devices and the relevant global CO (carbon) emission is increasing exponentially, the main cause of global warming. Green technology is the practice of environmentally



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sustainable computing. Green ICT deals with people, processes and technologies relating to the environment.Green technology focuses on reducing the environmental impact of industrial processes and on innovative technologies caused by the Earth's growing population.The existing studies on Green ICT describe it at varied point of views and perspectives. America and Europe along with some Asian nations including India are inclined to reduce energy consumption not only in heavy industry and domestic uses but equally worried about the large energy consumption in ICT and operation electronicgadgets.

Hence green ICT implementation at these important places has to be developed as key factor to attain the cost effective solutions and sustenance of ICT as per the UN'S sustainable development goals (SDG'S, 2005) since India is an active member of UN and seriously trying to reduce all kinds of pollution to meet the sustainable development challenges.

Origin and Development of Green ICT

In 1990, the U.S. Environmental Protection Agency launched 'Energy Star'; a voluntary labeling program that is designed to promote and recognize the energy efficiency in monitors, climate control equipment, and other technologies.

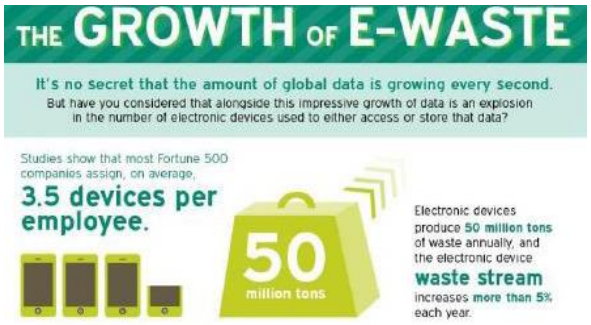


Figure: Statistics of E-waste

This resulted in the widespread adoption of sleep mode among consumer electronics. Concurrently, the Swedish organization TCO Development launched the TCO Certified program to promote low magnetic and electrical emissions from CRT-based computer displays; this program was later expanded to include criteria on energy consumption, ergonomics, and the use of hazardous materials in construction. Many government agencies have continued to implement standards and regulations that encourage green computing. The Energy Star program (1990) was revised in October 2006 to include stricter efficiency requirements for computer equipment.



Figure: UN certification for ICT and Sustainable development

The Organization for Economic Co-operation and Development (OECD) has published a survey of over 90 government and industry initiatives on "Green ICTs", i.e. information and communication technologies, the environment and climate change. The report concludes that;

- Initiatives tend to concentrate on the greening ICTs, only 20% of initiatives have measurable targets, with government programs tending to include targets more frequently than business associations.
- Many governmental agencies have continued to implement standards and regulations that encourage green computing. Some concerned organizations and agencies that took care in U.S are as follows;
- Climate Savers Computing Initiative (CSCI) started in 2007 is an effort to reduce the electric power consumption of PCs in active and inactive states. The CSCI provides a catalog of green products from its member organizations, and information for reducing PC power consumption.
- The Green Electronics Council offers the Electronic Product Environmental Assessment Tool (EPEAT) to assist in the purchase of "greener" computing systems. The Council evaluates computing equipment on 51 criteria - 23 required and 28 optional - that measure a product's efficiency and sustainability attributes of Products like; Gold, Silver, or Bronze, depending on how many optional criteria they meet.
- The Green Grid is a global consortium dedicated to advancing energy efficiency in data centers and business computing ecosystems. It was founded in February 2007 by several key companies in the industry – AMD, APC, Dell, HP, IBM, Intel, Microsoft, Rackable Systems, Spray Cool (purchased in 2010 by Parker), Sun Microsystems and VMware.

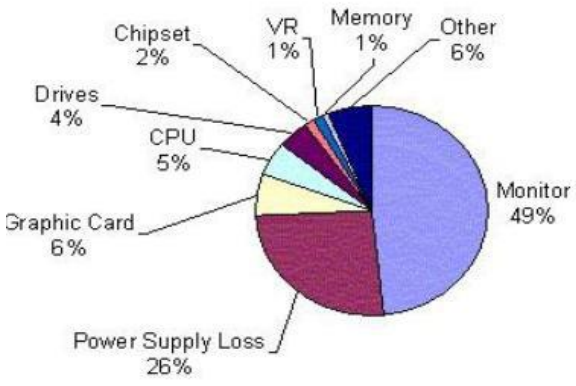
On the way to a low carbon economy, energy is of central importance. The European Union has set challenging targets until 2020:

■ reducing carbon emissions by 20%,

■ increasing the share of renewable in energy consumption to 20%,
■ saving 20% of the EU's energy consumption,

Green computing programs

There are a number of degree and postgraduate programs that provide training in a range of information which includes technology concentrations along with sustainable strategies in an effort to educate students how to build and maintain systems while reducing its harm to the environment. The Australian National University (ANU) offers "ICT Sustainability" as part of its information technology and engineering masters programs.



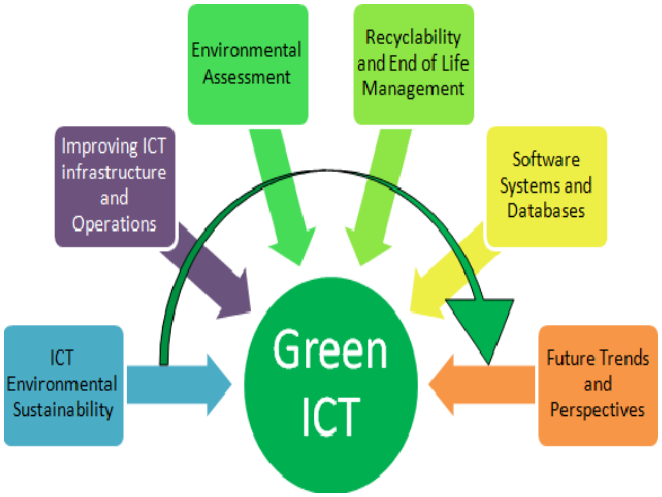
Green ICTand Sustainable Development

Education for sustainable development (ESD) promotes the development of the knowledge, skills, understanding, values and actions required creating a sustainable world, which ensures environmental protection and conservation, promotes social equity and encourages economic sustainability.

Figure: Computer Component energy consumption

Green technology is the practice of environmentally sustainableenergy (CNG, PNG, Biogas, Solar energy and Battery vehicles) and computing. Green IT aims to minimize the negative impact of IT operations on the environment by designing, manufacturing, operating and disposing of computers and computer-related products in an environmentally-friendly manner.Thefield of Green Technology encompasses a broad range of subjects from new energy generation and consumption techniques to be used in our daily life.

Green ICT comprises a vast area across many domains and sectors, including issues like;
■ Reduction of energy consumption
■ Increase of renewable in energy production
■ Reduction of the use of raw materials
■ Rational use of water
■ Decreasing the amount of waste and increasing the recycling rate
■ Decreasing pollution
■ Rationalize transport and logistics



Every one of these issues has myriads of implications in itself and offers many possibilities where ICT can support them, such as collecting and processing the required data, controlling and managing better production processes, and checking whether the modifications produced the wanted results.

Figure: Various roles of Green ICT for sustainable development

The importance and urgency of Green ICT has been recognized by politics and industry. Various international, regional and local activities on this subject are currently going on. Below the diagram shows the electronics companies going green for last two decades keeping in mind the issue energy loss and global warming.

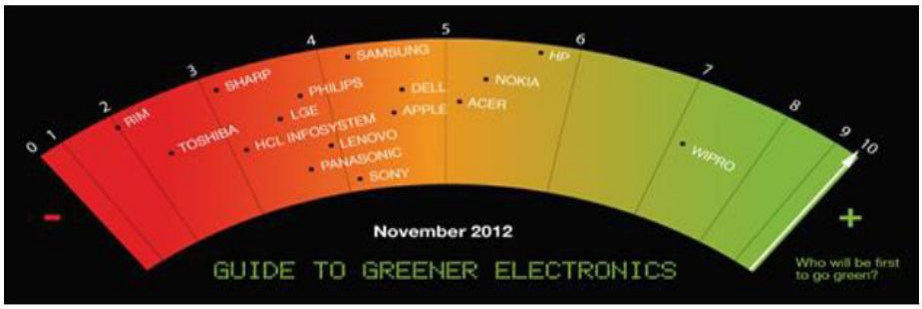


Figure: Company **s**howing inclination to greener electronics

Green India Mission

- As humanity endeavors' towards sustainable development, educating each individual on mother earth to take good care of the environment that nurtures us, is the most significant concern of the new millennium. India is an active member of UN and seriously trying to reduce all kinds of pollution, since the first declaration by UN on environment in Stockholm conference (1972). After that several governments' agencies and NGO's are working in this direction.
- The Decade of Education for Sustainable Development (DESD) launched by the United Nations in 2005 aimed at integrating the principles, values and practices for nurturing sustainable development. This required infusing appropriate processes in the school curricula. Article 51A of our Constitution has made it a 'fundamental duty

of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife'. Various education commissions, besides the National Policy on Education-1986 and Programme of Action-1992, have reiterated the growing need to address the environmental concerns.

- The Green India Mission (GIM) was envisaged as a comprehensive participatory Mission for greening India was launched in June 2010. The Mission adopted scientific and inclusive methods of implementing conventional forestation, saving our natural resources and reducing the excessive use of electricity and our natural resources by using decentralized governance frameworks necessitating community participation.
- Keeping the wider perspective of the environment and as per the UNDESD-2005, the curriculum development at the national level took cognizance and Education for Sustainable Development (ESD) was the core of the curriculum for each subject area developed by NCERT. The concerns raised in the RTE Act-2009 for all round development of children through education are also in line with the objectives of ESD.

Green IT Initiative in India

In response to the world revolution in the field of green IT, India is also moving towards embracing it with open arms. Adopting green IT and sustainability solutions are emerging as key concerns for businesses, investors and technologists across industries and policy makers in India. Amongst government policy initiatives also plans such as the; National Action Plan on Climate Change (NAPCC) which outlines the nation's strategy to manage greenhouse gas emissions and Indian Economic Survey and India's 12th Five Year Plan which sites Inclusion of Green IT shows the significance given to it by the Indian Diaspora. Given below are some of the guidelines which are set for the IT and the telecom industry in India to follow for a greener future:

Standardization – There is a need for interoperable open standards for all the devices including networking equipments which is need to standardize IT equipments and also benchmarks for data centers for a cleaner and greener environment.

Government Procurement – Government agencies should include the standards for energy consumption as the technical standards in government purchases, and with establishment of mutual agreeable standards for a greener computing environment between BEE and IT industry, it should be made mandatory in all the government purchases.

Setting up center of excellence – Government of India should set up COE (Centre of Excellence) in the top technical institutions and universities. The centers can become the testing grounds and prototypes/pilot evaluation stages for the green clean technologies.

Tax Incentives – Investing in the clean technology is a costly affair when the organization is an early mover/adopter. Tax incentives on the production of cleaner

technologies and also for the user of the same are needed for better adoption. Automobile industry in our country (2020) is giving more subsidies and tax benefitsin metro cities on purchase of electric eco-friendly cars and other commercial vehicles to reduce environmental pollution and earn more money.

Impetus on green computing

In today's world the driving force of computing has shifted from faster analysis, speedier calculations and solving of more complex problems to achieving energy efficiency, minimization in consumption of electronic equipments, minimization of e-waste and use of non-toxic materials in preparation of electronics. The practice of using computing resources efficiently is gaining serious momentum and thus the goals of reducing the use of hazardous materials, maximizing energy efficiency during the product's lifetime, and promotion of recyclability or biodegradability of defunct products and factory waste are being realized.

One should shift towards using smart phones, tablets, notebooks and other light duty computing devices for applications such as; surfing internet, chatting, gaming, social networking, downloading, desktop computing including documents, spreadsheets or presentation making or just watching photos and videos. Tablet based devices consume very less power and with the faster processors, more ram, faster wireless internet connectivity and larger memories that they have these days, they are ideal for managing day to day services, thus by doing so we are using less power and low pollution.

This radical change in perspective amongst the developers has led to a revolution in the field of computing technology and this revolution has been coined as green computing. Green computing is basically the study and practice of efficient and eco-friendly computing which will help a typical organization to reduce their energy footprint while maintaining required levels of computing performance.Adopting Green Computing Strategies make sense not only from an ethical or moral stand-point, but from a commercial stand-point also. There are umpteen business benefits achievable through the implementation of a green computing strategy such as cost saving, resilience, disaster recovery, business continuity planning and of course, public relations.

Ithas been envisioned for the telecom center too, with government initiatives especially DoT's Recommendation on adoption of Green Technologies in Telecom Sector, such as;

- At least 50% of all rural Telecom towers and 20% of the urban towers are to be powered by hybrid power (Renewable Energy Technologies (RET) + Grid power) by 2015; Further 75% of rural towers and 33% of urban towers are to be powered by hybrid power by 2020.
- All telecom products, equipments and services in the telecom network should be certified "Green Passport [GP]" by the year 2015. Telecommunication Engineering Centre will certify telecom products, equipments and services on the basis of ECR ratings.
- All service providers should declare to TRAI, the carbon footprint of their network operations. The Declaration of the carbon footprints should be done twice in a year.

- Service providers should adopt a Voluntary Code of Practice encompassing energy efficient Network Planning, infra-sharing, deployment of energy efficient technologies and adoption of Renewable Energy Technology (RET) to reduce carbon footprints.
- Service providers should evolve a „Carbon Credit Policy" in line with carbon credit norms with the ultimate objective of achieving a maximum of 50% over the carbon footprint levels of the Base Year (2011) in rural areas and achieving a maximum of 66% over the carbon footprint levels of the Base Year in urban areas by the year 2020.
- Service providers should aim at Carbon emission reduction targets for the mobile network at 5% by the year 2012-2013, 8% by the year 2014-2015, 12% by the year 2016- 2017 and 17% by the year 2018-2019.
- On a whole India is about to spend up to $70 billion in the year 2015 which is about double the amount of $35 billion which was spent in 2010 and $25 billion more than was done in 2012.

Thus, one can easily observe that India, which was once among the famous dumping ground of e-wastes in the world, has finally risen to the task of eco-friendly computing.

Conclusion:

As 21st century belongs to ICT and the Green ICT is for the sustenance of ICT in future and also it is an innovative way of using IT related gadgets and operations tosafeguard the environment. Education is a large sector where we are using ICT in many ways, thus consuming more amount of energy directly and indirectly, adding heat and radiations to our environment.Green ICT is of crucial importance for a sustainable economic development. The domains where ICT can help are vast, reduction of carbon emissions is only one example, equally important are issues like; reducing consumption of electricity and e-waste and maximizing the use of recycled materials. The lack of motivation and rational of adopting green policies are the real hurdles in implementation of Green ICT. This paper would help the general people to understand the various causes of global warming and policy makers in framing polices and strategies for ICT, which would finally bring benefit to their stakeholders, communities, states, nations and world.Collaboration between the different related sectors in our country as well as in worldto promote green ICT AND energy could be a paramount for achieving the UN's sustainable development goals (SGD's).

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Health Effects of Drug Abuse as Professed by Secondary School Students in Ilorin South Local Government Area of Kwara State, Nigeria

Ologele Ibrahim

Abstract

The study investigated the health effects of drug abuse as professed by secondary school students in the Ilorin South Local Government Area of Kwara State, Nigeria. The descriptive research design of survey type was employed for the study. The population of the study comprise all the secondary school students in the study area. A multi-stage sampling technique was used for the study. Two thousand five hundred three (2503) respondents were selected for the study with the use of simple, proportionate and convenience sampling procedures. Researchers' designed a questionnaire that had been validated by three experts in the related field was used for the study. A test-retest method was used to ascertain the reliability of the instrument and the result of 0.73r was obtained. Inferential statistics of chi-square was used to analyze the result of the stated hypotheses at 0.05 alpha level of significance. The result of the findings indicated that kidney damage, depression and untimely death were professed as health effects of drug abuse among secondary school students in the study area with (46.59 > 16.92); (53.99> 16.92); and (52.46> 16.92) at 0.05 level of significance. The researcher concluded that kidney damage, depression and untimely death constitute health effects as professed by the respondents in the study area. The researcher recommends among others that the Kwara State Ministry of Health should carry out an enlightenment awareness campaign through social media on the health consequences of drug abuse to an individual's, family and community members.

Keywords: Health- effects, Drug Abuse, Professed, Students, and Secondary School.

Introduction

The importance of the drug to man cannot be overemphasized; when the drug is taken under medical direction, it has the potential to relieve pain and suffering from an ailment and also use to prevent, manage and treat diseases of different forms. On the other hand, if the drug is abused, misused or used for other personal reasons beyond medical reasons, it can lead to series of ill health which can be physical, mental, social, psychological or emotional health problems.

Consumption of drugs and alcohol has increased all over the world. The age of initiation of abuse drugs is progressively falling. Alcohol and abuse is a risk for adolescent health problems which poses a threat to the health and safety of the family members and

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other members of the community. It is linked to a different type of morbidity and mortality (Ogundele, 2004).

Drug Abuse and Kidney Damage

The term acute kidney injury has replaced acute renal failure because smaller changes in kidney function without overt failure can result in significant clinical consequences and increased morbidity and mortality. Drugs causing intrinsic injury may be direct nephrotoxins, or they may stimulate an immune response. In some cases, drugs can cause injury through more than one mechanism such as tubular injury and interstitial injury (Burgess & Drew, 2014). Chronic kidney disease (CKD) represents an important cause of morbidity and mortality worldwide. The prevalence of CKD has been continuously increasing in recent decades, the prevalence of CKD seems to be comparable globally and tapers off at approximately 9–12% in the USA, Australia and Europe (Zoccali, Kramer & Jager, 2010).

Several drugs which are widely used in the general population such as non-steroidal anti-inflammatory drugs (NSAIDs) can affect renal function. NSAIDs are commonly known to cause acute kidney injury (AKI) through multiple mechanisms, accounting for 16% of all drug-related renal failure, Besides producing a reversible renal failure, NSAIDs are known to cause acute interstitial nephritis (AIN) with hematuria, proteinuria and flank pain as well as acute tubular necrosis (ATN). Rare mechanisms include renal vasculitis and acute papillary necrosis (Jamali, 2009). It is known that NSAID use, in general, can also increase the risk of accelerated CKD progression through both non-immunologic and immunologic mechanisms. Immunological reactions that develop during the acute phase may continue to take place after the initial kidney insult occurs. In general, recurrent episodes of NSAID-related AKI may lead to CKD or chronic exposure to NSAIDs may worsen unrecognized AIN that can evolve into chronic interstitial nephritis (CIN) with associated interstitial fibrosis or chronic papillary necrosis. NSAIDs are known to cause acute adverse effects on the kidney, but chronic renal effects associated with NSAIDs are less well-described. Phenacetin is the only NSAID known to be related to chronic renal effects because it was withdrawn from the market due to renal papillary necrosis leading to chronic kidney disease (Harirforoosh & Jamali, 2009)

Drug Abuse and Depression

Increasing levels of depressive symptoms among adolescents are associated with increasing levels of psychosocial dysfunction and the incidence of major depression and substance use disorders. Substance use dependence refers to a severe and persistent pattern of alcohol or other substance use which results in psychosocial or medical impairment, substance dependence (e.g. alcohol) syndrome is a cluster of behavioural, cognitive and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use

than to other activities and obligations, increased tolerance and sometimes a state of physical withdrawal. Harmful use is a pattern of psychoactive substance use that is deleterious to health, the damage may be physiological or mental (Lewinsohn et al, 2000).

Drug Abuse and Untimely Death

Substance abuse is a strong risk factor for suicidal thoughts and behaviours, alcohol use increases the risk of suicidal ideation which increases the risk of illicit drug use (Zhang &Wu, 2014). Substance use may facilitate the transition from suicidal ideation to suicidal behaviour (Bridge, Goldstein & Brent, 2006). Suicidal problem is associated with the use of a range of illicit drugs such as cocaine, ecstasy, hallucinogens and inhalants, but also with fairy commonly used marijuana, alcohol and tobacco (Wong, 2013). Illicit drugs have been associated with an increased overall rate of mortality, and with an elevated rate of several individual causes of death, four of which were estimated here: AIDS, overdose, suicide and trauma. In 2000, the median number of global deaths attributed to illicit drugs estimated by summing the four causes of death was 194,058. There were an additional 10 000 deaths from overdose above and beyond those coded as drug use disorders (added to unintentional injuries) or when coded drug use disorder deaths were higher than estimated overdose deaths. (Frischer, Green & Goldberg,1994).

The risk of premature mortality and morbidity from illicit drug use is dependent on dose, frequency and route of administration. Consequently, it is necessary to define what is meant by "use" when defining the exposure variable "illicit drug use". The mortality risks of illicit drug consumption increase with increasing frequency and quantity of consumption (Fischer et al, 1997). The United Nations Drug Control Programme (UNDCP) identifies "problem of drugs" based on "the extent to which use of a certain drug leads to treatment demand, emergency room visits (often due to overdose), drug-related morbidity including HIV/AIDS and hepatitis mortality and other drug-related social ills" (UNDCP, 2000). The most serious possible consequence of acute cannabis use is a motor vehicle accident if a user drives while intoxicated (Hall et al, 1994).

Need of the Study

The use of drugs covers countless centuries and continues to be very useful. All age groups of all societies use drugs for one reason or the other even to the extents of using it for the promotion of animals' health. However, despite the therapeutic benefits of drugs to man and animal, it is being abused by people especially the youths and the adolescents. These are the case in many societies in Nigeria as the rate at which adolescents in secondary schools abuse drug increasing every day. The researchers observed that the case of drug abuse among secondary school students in Ilorin South Local Government Area of Kwara State is not different from the aforementioned report, the researcher observed that the students use the drug for different reasons such as to make them feel good; to improve academic performance during examinations; for social activities and fun, to forget about problem at hand among other factors that encourage

the adolescents into drug abuse. The researcher also observed that some of these secondary school students in Ilorin South Local Government Area of Kwara State who indulge in drug abuse had experienced some health challenges such as hallucination, respiratory problems including heart attack, poor functioning of kidney, lung cancer, fidgeting, poor academic performance including dropout from school, mental health problems, different types of diseases as a result of the weakened immune system, untimely death among others. Ogundele (2004) argued that drug and alcohol abuse continues to be a major health risk for adolescents. Despite encouraging trends towards decrease drug use yet it seems to be on the increase. Drug abuse affects the financial capability and health of the user. Drug and alcohol abuse brings untold hardship which could cause full or partial disability to the users. People abuse may experience a progressive loss of control over social inhibitors, poor motor coordination, speech and vision imbalance.

Despite the efforts of stakeholders in the study area to curb the problem of drug abuse, the rate at which the students indulge in the act together with its effects is still on the increase. Although, the research agreed that much studies have been carried out on drug abuse in the study area but there is few or no study that focuses on the effects of drug abuse among secondary school students in the area. It is on these premises that the researcher investigates the health effects of drug abuse as professed by secondary school students in the Ilorin South Local Government Area of Kwara State.

The research hypotheses formulated for the study were as follows:

1) Kidney damage is not significantly a health effect of drug abuse as professed by
2) Secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria
3) Depression is not significantly a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria
4) Untimely death is not significantly a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria

Methodology

The descriptive research design of survey type was used for the study. The population of the study comprised all the secondary school students in the Ilorin South Local Government Area of Kwara State. The target population made up of all the two thousand five hundred and three students from the five selected secondary schools in the study area. A multi-stage sampling technique that made up simple, proportionate and convenience sampling technique was used for the study. At stage one, a simple random sampling technique was used to choose five secondary schools from the twenty secondary schools existing in Ilorin South Local Government Area. At stage two, a

proportionate sampling technique was used to select 14.2% of the population from each of the five secondary schools selected for the study. At stage three, a convenience sampling procedure was used to choose respondents who participated in the study based on the 14.2% of their population and three hundred and fifty-seven (357) respondents who partake in the study.

Table 1: Summary of the sample size selected for the study

S/N	Name of School	No of Students	14.2% sample
1	AIS, Ogidi	716	102
2	GDSS, Gaa Akanbi	421	60
3	GDSS, Oke-Aluko	414	59
4	Sheik Abdul-Salam	487	70
5	GDSS, Okesuna	465	66
Total	**5**	**2503**	**357**

Source: Researchers' developed

The Instrument used for the study was a researchers' developed questionnaire that was validated by three experts in related fields. The reliability of the instrument was established using a test re-test method, 20 copies of the questionnaire administered on twenty (20) respondents from Baboko secondary school in Ilorin West Local Government Area. Two weeks after, the instrument re-administered. The results were compared using the Pearson Product Moment Correlation. A reliability coefficient of 0.73r was obtained which was considered high enough and this made the research instrument reliable for the study. The researcher administered the instrument with the help of three instructed research assistants. Non-parametric statistics of Chi-square at 0.05 level of significance was used to test the hypotheses formulated for the study.

Results

The results obtained from the three hypotheses used for the study were shown in the tables:

Hypothesis One: Kidney damage is not significantly a health effect of drug abuse as professed by Secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria

Table 2: Kidney damage as a health effect of drug abuse as professed by secondary school in Ilorin South Local Government Area of Kwara State

S/N	Statements	SA	A	D	SD	Row Tot.	df	Cal. Val.	Tab. Val.	Remarks
1	Kidney damage due to excessive intake of drug abuse lead to lesser or no supply of oxygen into the brain	99 (47.0%)	92 (43.0%)	18 (9.0%)	3 (1.0%)	**212**				

2	Kidney damage results in difficulty in breathing due to excessive drug abuse	104 (49.0%)	88 (42.0%)	20 (9.0%)	0 (0.0%)	**212**				
3	Drug abuser due to kidney damage likely to have a loss of appetite	152 (72.0%)	48 (23.0%)	12 (5.0%)	0 (0.0%)	**212**	**9**	**46.59**	**16.92**	**Ho_1 rejected**
4	Drug abuser experience severe itching of the body as a result of build-up waste in the blood due to kidney failure	137 (65.0%)	61 (29.0%)	10 (4%)	4 (2.0%)	**212**				
	Column Total	**492**	**289**	**60**	**7**	**848**				

P< 0.05

Table 2 shows the calculated chi-square value of 46.59 which is greater than the table value of 16.92 at the degree of freedom of 9 and at 0.05 alpha level of significance, since the calculated value is greater than the critical table value, therefore, the null hypothesis is thereby rejected, meaning that kidney damage is a significant health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State

Hypothesis Two: Depression is not significantly a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria

Table 3: Depression as a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State

S/N	STATEMENTS	SA	A	D	SD	Row Tot.	df	Cal. Val.	Tab. Val.	Remarks
1	Depression influence a drug abuser to decide to commit suicidal thought of ending his/her life	113 (53.0%)	78 (37.0%)	14 (7.0%)	7 (3.0%)	**212**				
2	Depression as an effect of drug abuse leads to a change in the sleeping pattern of the abuser	110 (52.0%)	80 (38.0%)	19 (9.0%)	3 (1.0%)	**212**				
3	Depression leads to a lack of concentration in the academic performance of drug abuser	153 (72.0%)	45 (21.0%)	14 (7.0%)	0 (0.0%)	**212**	**9**	**53.99**	**16.92**	**Ho_2 rejected**
4	Depression can result in unnecessary anger and irritability towards	159 (75.0%)	49 (23.0%)	4 (2.0%)	0 (0.0%)	**212**				

	people									
	Column Total	**535**	**252**	**51**	**10**	**848**				

P< 0.05

Table 3 shows the calculated chi-square value of 53.99 which is greater than the table value of 16.92 at the degree of freedom of 9 and at 0.05 alpha level of significance, since the calculated value is greater than the critical table value, therefore, the null hypothesis two is thereby rejected, meaning that depression is a significant health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State.

Hypothesis three: Untimely death is not significantly a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State, Nigeria

Table 4: Untimely death as a health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State

S/N	STATEMENTS	SA	A	D	SD	Row Tot.	df	Cal. Val.	Tab. Val.	Remarks
1	Excessive intake of drug leads to the untimely death of the abuser	83 (39.0%)	106 (50.0%)	15 (7.0%)	8 (4.0%)	**212**				
2	The wrong combination of drug intake by an abuser result in the untimely death	101 (48.0%)	97 (46.0%)	12 (5.0%)	2 (1.0%)	**212**				
3	Overdose intake of a drug could be associated with an untimely death due to the excessive intake	148 (70.0%)	52 (24.0%)	8 (4.0%)	4 (2.0%)	**212**	**9**	**52.46**	**16.92**	**Ho_3 rejected**
4	The excessive temperature of an abuser due to the large intake of drug result in an untimely death	102 (48.0%)	88 (42.0%)	20 (9.0%)	2 (1.0%)	**212**				
	Column Total	**434**	**343**	**55**	**16**	**848**				

P< 0.05

Table 4 shows the calculated chi-square value of 52.46 which is greater than the table value of 16.92 at the degree of freedom of 9 and at 0.05 alpha level of significance, since the calculated value is greater than the critical table value, therefore, the null hypothesis is thereby rejected, meaning that untimely death is a significant health effect of drug abuse as professed by secondary school students in Ilorin South Local Government Area of Kwara State

Discussion of the Findings

The result of the first hypothesis tested for the study revealed that kidney damage is a health effect of drug abuse as professed by secondary school students in the Ilorin South Local Government Area of Kwara State, Nigeria. The result of the finding agreed with the view of Whelton et al (2001) which explained that the kidney is a major organ involved in the elimination of drugs. Illicit drug abuse is associated with an extensive number of psychiatric and somatic diseases, including chronic kidney disease (CKD). Since the 1970s; kidney disease has been linked to intravenous drug use (IVDU), mainly in the setting of heroin associated nephropathy, characterized by nephritic syndrome with rapid progression and focal segmental sclerosis on kidney biopsy. Also, Serrell, Ambuzs, Rahim and Larsen (2014) stated that almost all drugs can lead to kidney problems. Renal toxicity may occur in the form of idiosyncrasy or may occur depending on the accumulation of the drug in the body and/or kidney. Because of associated serious morbidities and mortality, renal complications can lead to clinical conditions that require urgent intervention.

The result of the second hypothesis tested for the study indicated that depression is the result of drug abuse as professed by secondary school students in the Ilorin South Local Government Area of Kwara State. The finding is in line with the submission of Sobocki, Lekander, Borgstrom, Storm & Runeson (2007) pointed out that depression is among the most common mental health disorders which may occur due to substance use, especially, alcohol use is common among students, in general, the presence of comorbidity of substance abuse with adolescent depression has been associated with greater impairment and stress, the comorbidity of depression and substance use carries a higher risk of suicide and greater social and personal impairment as well as of other psychiatric conditions. Also, Kaplan and Sadock (1991) opined that a large number of drugs may be capable of causing depression, among these are many prescription drugs, nonprescription drugs and drugs of abuse, a drug-induced depression, if severe enough to resemble a major depressive episode, should be diagnosed as organic mood syndrome, depressed type. Drug-induced organic mood syndrome and other organic mood disorders are a component of the differential diagnosis of patients presenting with depressive symptoms.

The result of the third hypothesis showed that untimely death is a health effect of drug abuse as professed by secondary school students in the Ilorin South Local Government Area of Kwara State. This finding is in line with the submission of Zhang and Wu (2014) opined that substance abuse is a strong risk factor for suicidal thoughts and behaviours, alcohol use increases the risk of suicidal ideation which increases the risk of illicit drug use. Also, the finding is in line with the opinion of Bargagli, Hickman, Davoli, Perucci, & Schifano (2006) who explained that the risk of premature death varies by many possible factors, including the type of drug, severity of use, the trajectory of drug use, co-occurring psychiatric illness, and other personal characteristics, including age, gender, race socioeconomic status, health status, or health behaviours, including tobacco and alcohol use.

Conclusions

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

1) *The health effect, Kidney damage is the result of drug abuse as professed by secondary school students in Ilorin South Local government Area of Kwara State, Nigeria*
2) *The health effect,t Depression is the result of drug abuse as professed by secondary school students in Ilorin South Local government Area of Kwara State, Nigeria*
3) *With reference to untimely death is the result of drug abuse as professed by secondary school students in Ilorin South Local government Area of Kwara State, Nigeria*

Recommendations

Based on the conclusions of the study, the following recommendations were made:

1) The Kwara State Ministry of Health should carry out an enlightenment campaign through social media on the health consequences of drug abuse to an individual's, family and community members.
2) More emphasis should be made by health care provider on the effect of drug abuse and avoidance of drug addiction to prevent depression.
3) The health educators and health teachers should organise seminar programme for secondary school students that will educate them on some of the health risks associated with drug abuse which include mental disorder, lung cancer, kidney malfunction and premature death and one of the best means of maintaining good health is to keep away from taking not prescribed legal and illegal drugs.

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Influence of Sports Personnel on Government Involvement in Organisation of Sports for Physically Challenged Athletes in Kwara State (Nigeria)

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Abstract

The little recognition and accord given to the organization of physically challenged sports in the country, particularly in Kwara State has become an essential issue of concern. This study therefore determined the influence of sports personnel on government's involvement in organization of sports for physically challenged athletes in Kwara State.

Descriptive research method was employed for this study, while purposive sampling technique was adopted to select one hundred and twenty (120) respondents that are sports personnel in Kwara State sports council. A researcher-developed questionnaire that was validated by experts was used to obtain the necessarydata. The reliability coefficient of 0.84r was obtained through test re-test method, using Pearson's Product Moment Correlation (PPMC), three null hypotheses were postulated and the collected data were analysed using chi-square at 0.05 level of significance.

The study revealed that: there is significant influence of government involvement in funding, provision of specialized equipment and recruitment of sports personnel on organization of sports for physically challenged athletes in Kwara State. All the null hypotheses were rejected, with cal. v. (109.73) > Tab. v. (21.30), cal v. (150.28) > Tab. v. (21.30), cal. v. (154.87) > Tab. v. (21.30) at 0.05 alpha level and 12 degree of freedom respectively. Based on the outcome of the findings, it was recommended that Kwara State government should be fully involved in funding for organization of sports related activities for the physically challenged athletes, and should adhere strictly to implementation of sports policies of the physically challenged athletes, as these will ensure adequate organization of sports for physically challenged athletes in Kwara State.

Keywords: Influence, Government involvement, Physically challenged, Organization

Introduction

Participation in sport is a right and not a privilege, sporting activities organized for all group of people, have been proven to be beneficial for physical and psychosocial wellbeing and community connectedness of every participant, it bridges the gaps created by disability, gender, religion, and socio-economic differences (Smith, 2009).

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Sathya (2017), defined sport as an institutionalized competitive activity that involves vigorous physical exertion or the use of relatively complex physical skills, by individuals whose participation is motivated by a combination of both extrinsic intrinsic satisfaction, associated with the activity itself and external reward earned through participation.

Engaging in sport is important in the life of a person with a disability, this is because of the rehabilitative influence sport can have not only on the physical body but also on rehabilitating people with disabilities into the society. Physically challenged athletes participate in three main disability groups, sports for the deaf, sports for persons with physical disabilities, and sports with intellectual disabilities, they participate in high performance as well as in competitive and recreational sport (Disabled Sport, 2016).

The term 'physically challenged' is defined as impairment associated with a person's speech, hearing, vision body, mental and emotions, which may be because of birth defects, disease, age, and accident. Department for International Development (2008) asserts that physically challenged are persons who have restriction or lack the ability to perform any activity in the manner within the range considered normal for a human being.

Organized sporting opportunities for physically challenged athletes range from recreational to highly competitive Paralympics sports, it has blossomed to include more than 17 international games, including three Olympic-level competition games targeting athletes with disabilities. The Deaflympics (for those withhearing impairments), the Paralympics (for those with other forms of physical disabilities such as limb loss, and blindness), and the Special Olympics (for those with intellectual disabilities).

The Paralympics is a major event physically challenged athletes participate in, it is one of the remarkable internally events in which physically challenged athletes from 125 countries compete in specific athletics contests (Paterson & Hughes, 2010).

Physically challenged athletes in Kwara State are classified or categorized by degree of impairment to ensure equitable competition. For example, athletes with visual impairment compete in three classes which vary in the amount of residual sight. Athletes with physical impairments such as spinal cord injury, cerebral palsy, or amputation, are evaluated and placed in a sport specific classification for competition. For competition, many sports, such as wheelchair basketball and table tennis, use functional or integrated systems which allow athletes with a variety of disabilities to compete with each other.

Organization of sports both for physically challenged and able-bodied individuals either at national, state or local government council level followed similar patterns and dimensions. For a successful organization of sports of all kinds, it requires the effective and efficient management skills and structures, the major responsibility of which lies principally with the National Sports Federation and State Sports Associations, Local

Government Sports Department of Committees, stakeholders', all their efforts have to be harmonized to achieve higher standards in administration and management of physically challenged sport (National Sport Policy, 2009).

Abayomi, Oyeniyi and Aina (2017) posited that the major ingredients for having a well-organized sport for the physically challenged include provision of facilities and equipment, personnel and funding. For effective sport organisation to manifest successfully deliberate policies must be evolved (Adetokubo, 2016).

Coakely (2001), observed that the nature and extent of government involvement in sports varies from one community and society.Government is involved for one or more of the following reasons: to safeguard public order, to maintain fitness and physical abilities among citizens, to promote prestige and power of a group, community or nation, to promote sense of identity, belonging and unity among citizens, to reproduce values consistent with the government ideology in a community or society, to increase support for political leaders and government, and also to promote economic development in the community or society.

Through observation of the plight of the physically challenged, and how they are faced with numerous challenges, especially daily survival, and being often neglected or stigmatized by the society, the state government has continued to show sensitivity to the plights of the physically challenged persons through the provision of welfare packages and other incentives to enhance their living conditions (Ahemba, 2017).

Adequate funding in any field of endeavour is of paramount importance, this is because the procurement of facilities and equipment, recruitment of qualified personnel, payment of better remuneration and incentives for coaches and players/athletes, engaging teams in international training tours can only be possible with adequate funding (Yusuf, 1992). The importance of providing adequate funds for sports programme cannot be over emphasized, this is because as Bucher (1979) stated, the services that are involved such as recruitment and training of personnel, purchase of equipment, construction of standard facilities, transportation and care of athletes all require large sum of money (Lawal, 2014).

Accessibility of equipment was among the biggest reason of facilities not being accessible and therefore people with disabilities may have had reservations about using the facilities (Cardinal & Spaziani, 2003). With regard to equipment barriers, three main areas emerged; not enough space between equipment; poor equipment maintenance; and lack of adaptive or accessible equipment (Rimmer 2004).

It is important to note the aforementioned criteria must include knee and toe clearance for people who use wheelchairs. Considering the protrusion and awkward spatial lines of weight machines, knee and toe clearance become imperative with regard to equipment barriers at fitness and training facilities. A lack of adaptive or accessible equipment links back to financial barriers. Rimmer (2004), suggested facilities invest in

adaptive equipment such as pool water chairs, Velcro straps for better grip on equipment, upper-body aerobic equipment for people with use wheelchairs, and strength equipment that can be used by people from a wheelchair.

Coaches, sports managers, stadium managers and organizing secretaries are some of the personnel required for the management of physically challenged sports development programmes. Coaches are responsible for the improvement of the level of skills of the athletes, there is no way the quality of participation of any nation in competitive sports can improve without having well trained and experienced coaches in various sports (Lawal, 2014). Thus, there should be recruitment of qualified sport personnel who are specialized in adaptive sport so that there would be better understanding between the coach and his athletes.

Need of the Study

The long history of prejudice, stigmatization and oppression experienced by the physically challenged in all walks of life still exist. Evidence suggests that the physically challenged face barrier in the basic social and recreational activities they need in many settings. In ancient times, few people rendered the handicap any help. Instead, people aggravated their conditions and viewed them as outcasts.They also considered them as an economic liability (Daniels & Davies 1975). The result was that the handicapped were driven away to die.

The phrase 'sports' should be all inclusive in order to achieve all round development for mankind, irrespective of gender, racial or socio-economic barriers. It is worth mentioning that most of the global sports associations have taken cognisance of the above fact and the more reason there are paralympics competitions.

WHO (2011), stated that children with disabilities and their families are confronted by barriers including inadequate legislation and policies, negative attitudes, inadequate services and lack of accessible environment.

Despite being more vulnerable to developmental risks, young children with disabilities are often overlooked in mainstream programmes and services designed to ensure children development (Simeonsson, 2000).In Nigeria today, sports stakeholders have come to realise the fact that all citizens irrespective of their challenges must be given a sense of belonging through participation in a well-organised sports competition. Suffice to note that, the international sporting world have given impetus to sports participation by the physically challenged with organisation of paralympics and other sports that takes care of this category of people.

With this pacesetting from different associations, it is equally observed that the physically challenged in Kwara state have not been given adequate recognition and attention they required. This may be due to factors like inadequate fund, provision of

special equipment among others. This among other compelling reasons spurred the researchers in carrying out this study.

Hypotheses

1. Government's involvement will not have a significant influence on funding for organisation of sports for physically challenged athletes in Kwara State.
2. Provision of specialized equipment by the government will not have a significant influence on organisation of sports for physically challenged athletes in Kwara State.
3. Government's recruitment of specialized sports personnel will not have a significant influence on organisation of sports for physically challenged athletes in Kwara State.

Methodology

This study employed the descriptive research design of survey type. The population for this study consists of all sports personnel working in the study area, whichinclude coaches, organising secretaries,sport administrators and stadium staff totalling 120 respondents. Purposive sampling technique was used to select all the 120 respondents for this study. A structured questionnaire was used to gather information for the study. Three lecturers in the Department of Human Kinetics Education, University of Ilorin, validated the instrument. The reliability level of the instrument was established through test re-test method, then using Pearson Product Moment Correlation (PPMC) with a correlation coefficient of 0.84 obtained. The questionnaires were distributed by the researchers and 2 trained research assistants. The data collected were analysed using inferential statistics of chi-square (X^2) to test formulated hypotheses set for the study at 0.05 alpha level.

Results

Hypothesis One: Funding by the government will not have significant influence on organisation of sports for physically challenged athletes in Kwara State

Table 1: Chi-square analysis showing influence of provision of fund by the government on organisation of sports for physically challenged athletes in Kwara State

S/N	Item	SA	A	D	SD	Row Total	df	Cal. x^2 value	Crit. x^2 Value	Dec.
1.	Government provide funds for orgaisation of sport for physically challenged athletes in Kwara state	10 (8.3%)	35 (29.2%)	52 (43.3%)	23 (19.2%)	120	12	109.73	21.03	Hypothesis Rejected
2.	Funds are allocated in the state budget specifically for the organisation of sport for	10 (8.3%)	46 (38.3%)	37 (30.8%)	27 (22.5%)	120				

	physically challenged athletes in Kwara state									
3.	Sponsorship of sports programmes is financed for the physically challenged sport like the able-bodies sport	11 (9.2%)	49 (40.8%)	41 (34.2%)	19 (15.8%)	120				
4.	Government disburse funds for payment of bonus and allowances to physically challenged athletes	12 (10.0%)	40 (33.3%)	44 (36.7%)	24 (20.0%)	120				
	Column Total	**43**	**170**	**174**	**94**	**480**				

P<0.05 alpha level

The table 1above showed that calculated chi-square value of 109.73 is greater than the table value of 21.03 of 12 degree of freedom at 0.05 alpha level, since the calculated value is greater than the table value the null hypothesis is rejected. This means that provision of fund by the government will have significant influence the organisation of sports for physically challenged athletes in Kwara state.

Hypothesis Two: Provision of specialized equipment by the government will not have significant influence on organisation of sports for physically challenged athletes in Kwara State

Table 2: Chi-square analysis showing influence of availability of specialized equipment by the government on organisation of sports for physically challenged athletes in Kwara State

SN	Item	SA	A	D	SD	Row Total	df	Cal. x^2 value	Crit. x^2 Value	Dec.
1.	There are available equipment specifically procured for physically challenged athletes in Kwara state	6 (5.0%)	54 (45.0%)	45 (37.5%)	15 (12.5%)	120				
2.	The equipment and supplies provided by the government challenged athletes are standard and of high quality	6 (5.0%)	38 (31.7%)	53 (44.2%)	23 (19.2%)	120				
3.	Purchase of equipment and supplies by the government has tremendously improved organisation of sports for physically challenged athletes in Kwara state	6 (5.0%)	38 (31.7%)	50 (41.7%)	26 (21.7%)	120	12	150.28	21.03	Hypothesis Rejected
4.	Availability of standard and quality equipment and supplies provided by the government has encouraged the athletes training and preparations for competitions	12 (10.0 %)	36 (30.0%)	46 (38.3%)	26 (21.7%)	120				
	Column Total	**43**	**166**	**194**	**90**	**480**				

P<0.05 alpha level

The table 2 above showed that calculated chi-square value of 150.28 is greater than the table value of 21.03 of 12 degree of freedom at 0.05 alpha level, since the calculated value is greater than the table value the null hypothesis is rejected. This means that availability of specialized equipment will have significant influence the organisation of sports for physically challenged athletes in Kwara state.

Hypothesis Three: Government's recruitment of specialized sports personnel will not have significant influence on the organisation of sports for physically challenged athletes in Kwara State

Table 3: Chi-square analysis showing influence of specialized sport personnel on organisation of sports for physically challenged athletes in Kwara State

SN	Item	SA	A	D	SD	Row Total	df	Cal. x^2 val	Crit. x^2 Val	Dec.
1.	Coaches recruited/ employed by the government for organisation of physically challenged sport are qualified, well trained and experienced	20 (16.7%)	58 (48.3%)	30 (25.0%)	12 (10.0%)	120	1 2	154.87	21.03	Hypothesis Rejected
2.	Enough sports personnel are made available for the organisation of sports for physically challenged in Kwara state	5 (4.2%)	43 (35.8%)	52 (43.3%)	20 (19.7%)	120				
3.	Regular training and retraining of specialist on physically challenged sports are provided by the government	5 (4.2%)	41 (34.2%)	51 (42.5%)	23 (19.2%)	120				
4.	There are provision of sports personnel's who are health practitioners to ensure safety during organisation of sports	10 (8.3%)	48 (40.0%)	38 (31.7%)	24 (20.0%)	120				
	Column Total	**40**	**190**	**714**	**79**	**480**				

P<0.05 alpha level

The table 3 above showed that calculated chi-square value of 154.87 is greater than the table value of 21.03 of 12 degree of freedom at 0.05 alpha level, since the calculated value is greater than the table value the null hypothesis is rejected. This implies that government's recruitment of specialized sports personnel will have significant influence eon organisation of sports for physically challenged athletes in Kwara state.

Discussion of Findings

The result from tested hypothesis one revealed that majority of the sports personnel at the Kwara state sport council believe that government's involvement in funding will influence the organisation of sport for the physically challenged in the state. In finding agrees with Akanbi (2012), who reported that the most powerful and pressing factor which needs government involvement is finance, a sit aids in successful organisation of sport. Also Ayinla (2012), affirmed that organisation of sport for the physically challenged cannot survive without adequate funding by the government.

The finding from hypothesis two shows that government's involvement in provision of specialized equipment will influence the organisation of sport for the physically challenged in the state. This result agrees with Ibraheem (2012), who asserted that proper organisation of sport for the physically challenged depends on availability of sporting equipment and facilities, in other to aid and improve the performance of physically challenged athletes. Bakinde (2005), also maintained that a good sport programme for physically challenged athletes function at full effectiveness only when they are supported by sufficient equipment and facilities that are in good condition. The government is therefore legally responsible for the provision of equipment and facilities to be used in organizing physically challenged sport (Lawal, 2014).

The finding from tested hypothesis three shows that government's involvement in the recruitment of specialized sport personnel will influence the organisation of sport for the physically challenged in the state. The report support Ayobami, OyeniyiandAina, (2017), who asserted that in organising sport for the physically challenged there is need for well trained, qualified, and specialized personnel. The personnel are there to organise and supervise sporting programme.Abel, Aderemi, Oluwatoyin and Nicholas (2000), stated that implementation of sports policy by the government will guarantee development of sport for the physically challenged in the country which will hopefully address the challenges in this form of sports.

Conclusion

1. Based on the findings of the study, the conclusions were made:
2. Government's involvement in funding will have a significant influence on organisation of sports for physically challenged athletes in Kwara state.
3. Provision of specialized equipment by the government will have a significant influence on organisation of sports for physically challenged athletes in Kwara state.
4. Government's recruitment of specialized sports personnel will have a significant influence on organisation of sports for physically challenged athletes in Kwara state.

Recommendations

Based on the findings of this study, the following recommended were made:

1. Government should provide adequate funds, and physically challenged sports organizations should also source for fund through activities like the sales promotion and gate takings etc.
2. Physically challenged sports organizations should solicit for the assistance of companies and other agencies in the provision of facilities and equipment along with the effort of government.
3. There should be recruitment of competent personnel who are qualified and trained in the sports council.

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Pedagogical aspects of Learning about Fractions

Dr. Roohi Fatima

Introduction

When students learn a mathematics-related subject incompletely or incorrectly, they experience problems and these problems are reflected in their future education lives, and if these issues are not overcome, incomplete or incorrect learnings turn into alternate concepts. A misconception is 'a product of incomplete comprehension, and in most cases, it is an incorrect application of a rule or a mathematical generalization.'The best clues to understand whether something is a misconception or only a mistake are the frequency and consistency of the mistake (Spooner, 2002). It is understood that the underlying reasons for misconceptions are not having learned concept knowledge and mathematical operation knowledge to an extent that they would complement each other, students' inability to acquire knowledge and skills related to problem-solving to the required degree, and shortcomings of students such as using the incorrect rules and performing operations carelessly. Misconceptions lead students to develop negative attitudes towards mathematics

Fractions occupy a significant place in the curriculum of mathematicsat the primary level or we can say that concept of fractions is among the most important concepts children experience during their pre-secondary school years. But it has been observed that when primary class students are asked, which topic they find most difficult, their answer is almost always – fraction. As a teacher educator, the author gets a chance to peep into the minds of elementary school children during the school internship programme of Diploma in Elementary Education. She observed that these students have many misconceptions related to the concept of fractions. This observation is backed by Brown (2013),in his study, he also indicated fractions as problematic, in the sense that students grasp the fraction as a symbol with the procedures and algorithms attached to it. May this be the reason why elementary school children find rational numbers so difficult. Moreover, the National Assessment of Education Progress (NAEP) conducted in 1972-73

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and again in 1977-78 (Carpenter, et al.,) suggests that children seem to be learning many mathematical skills at the level of rote memorization and do not understand underlying concepts. This further, points to the fact that fraction concepts are difficult for students to grasp and they often go through school mathematics without an adequate understanding and facility in dealing with fractions. Fractions form the basis of many later mathematical topics such as ratio and proportion, decimals and rational numbers. Fractions and rational numbers play a central role in the learning of advanced mathematics, so having a problem understanding fractions can bring about issues later in the learning process, which makes fractions a particularly important topic for the learning of mathematics.

Analysis of Fraction Numbers:

If we analyse the concept of fractions, we find that it has many interpretations such as;

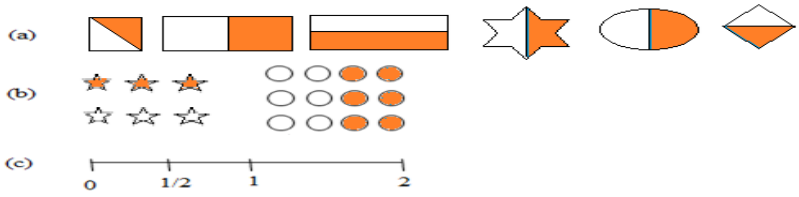
i. Part-Whole Interpretations
ii. Fractions as Ratios
iii. Fractions as Indicated Divisions

i. Part-Whole Interpretations:

The *Part-Whole Interpretations* depends on the ability to partition either an object (a continuous quantity) or a set of discrete objects into equal sized subparts or sets. In an object, the equal sized subpart is as per the length, area, or volume of that object. In this case, one single object should be seen as a whole, of which a fraction is a part, such as a chapatti, a sheet of paper, or a cutout in the shape of a circle or a rectangle or even a triangle etc. When the whole consists of more than one object – a dozen orange or banana, 12 one-rupee coins, 8 pencils, or 6 candies etc., then this whole is referred to as being discrete as it is made up of several discrete objects.

If we go through our school curriculum, we find that the part-whole interpretation is introduced in class 4 where the children have some primitive understanding of the meaning of half and the basic partitioning process. They can divide a chapati in two parts but not necessary in equal parts. Students normally explore and extend their understanding about fraction through the eighth grade and later in the school years, these understandings are applied in elementary algebra. Many students' difficulties in algebra can be traced back to an incomplete understanding of the fraction concepts.

If we see the pedagogy in case of fractions, we find that to represent fractions, the most commonly used models are geometric regions, sets of discrete objects, and the number line e.g., $\frac{1}{2}$ could be represented using a geometric region, a set of discrete objects or with a number line as shown in the figure (a), (b) and (c) respectively.



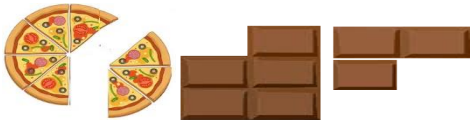
An important foundation for comprehending the concept of rational numbers is the part-whole interpretation. It can be used to show the relationship between unit fractions and non-unit fractions. For example, the fraction $\frac{2}{3}$(a non-unit fraction from a part-whole perspective, can be easily seen as comprising two one-thirds as shown in the following figures;



The unit and non-unit fraction's association also seems to make the transition particularly from fractions of a size less than or equal to one, to those of a size greater than one. For example, $\frac{4}{3}$ becomes $\frac{1}{3}+\frac{1}{3}+\frac{1}{3}+\frac{1}{3}$, or one whole and $\frac{1}{3}$ i.e., $1\frac{1}{3}$.

ii. Fractions as Ratios:

Another interpretation of fractional numbers is the *fraction as ratios*. Fractions as ratios conveys the notion of relative magnitude. When two ratios are equal, they are said to be in proportion to one another. According to Behr & Post, (1992), the use of proportions proves to be a very powerful problem-solving tool in a variety of physical situation and problem settings that require comparisons of magnitudes. For example, if we divide a pizza or a rectangular chocolate bar into two pieces in the ratio 5:3, it implies that the bigger piece is five-eighths of the whole pizza or bar while the smaller piece is three eighths.

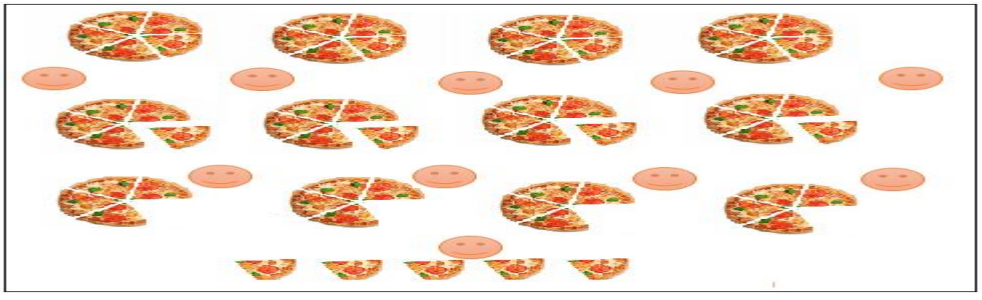


5:3

iii. Fractions as Indicated Divisions:

The symbol $\frac{x}{y}$is used to represent a rational number or even a fractional number. But it refersdifferent meaning in different interpretations e.g., in the part-whole interpretation of rational numbers, this symbol $\frac{x}{y}$ usually refers to a part of a single quantity. Whereas, in the ratio interpretation of rational numbers, this symbol $\frac{x}{y}$ refers to a relationship

between two quantities. Moreover, the same symbol $\frac{x}{y}$ may also be used to refer to the



operation of division i.e., $\frac{x}{y}$ is sometimes a more concise way of writing *x*÷y. This is the indicated division (or indicated quotient) interpretation of rational numbers. The important in the quotient interpretation is that of partitioning. For example, the problem of dividing four pizza equally among five children can be solved by cutting (partitioning) each of the four pizza into five equivalent parts, as shown in the following;

Need for the study

The author is a teacher educator, she gets a chance to peep into the minds of elementary school children during the school internship programme of Diploma in Elementary Education. She observed that these students have many misconceptions related to the concept of fractions. This observation is backed by the results of National Achievement Survey – Cycle IV (2017) conducted by Educational Survey Division of NCERT. This survey was conducted keeping the Learning Outcomes in focus and it was found that the learning outcome, '*Identifies and forms equivalent fraction of a given fraction*' of class V and '*Interprets the division and multiplication of fractions'* at class 8 were the least achieved learning outcome across the country.The lack of understanding of fractions may lead to problems that faced by elementary school children in learning of rational numbers. We know that fractions are the base of rational numbers and both of them i.e., fractions and rational numbers play a central role in the learning of advanced mathematics. That is why it is necessary to study the misconceptions related to learning fractions. For this, the author conducted astudy to see the misconceptions in learning of fractions. The focus of this study was to understand some basic questions related to the concept of fractions i.e., the key research questions, which this study aims to reflect upon, are;

1. Why are fractions problematic for students to learn and for teachers to teach?
2. Why students have misconceptions about fractions and what are they?
3. What are the common pedagogical approaches adopted by teachers with regard to teaching the topic fractions?

Objectives of the Study

The following are the objectives of the present study:

1. To study the important components in developing the basic concepts of fractions.
2. To study the misconceptions of elementary school students about fractions.
3. To study the common pedagogical approaches adopted by teachers with regard to teaching the topic fractions.

Methodology

For the present study, the researcher has adopted a qualitative research approach to find out the answers of the research questions or to achieve the objectives of the study. For this, first she analyse the whole concept of fractions in search of important components of developing the basic concept of fractions. Then she analyse the classwork and homework notebooks of students of Class V and of class VIII to gauge the misconceptions about fractions followed by a semi-structured interview of some students. Finally, she conducts a semi-structured interview with teachers of class V followed by class observations in search of pedagogical approaches adopted by teachers in teaching fractions. The present study was conducted in three phases:

1. Planning phase
2. Implementation phase
3. Analysis phase

Each of the phases is discussed below in detail.

1. Planning Phase

i. Population

The population in the present study comprised all the student of Class V & VIII who studied in Government schools of Delhi. And all the Mathematics teachers of government school, who taught Class V.

ii. Sample of the Study

The researcher selectsfive Government schools of South Delhi on the opportunistic basis as a sample for the study. From there, she analysed 100 notebooks of class V and 50 notebooks of class VIII and 26 students were selected randomly, for interview to know about misconceptions about fractions more deeply and interviewed 10 teachers who

teaches different sections of class V in the same schools to know about their pedagogy followed by class observations.

iii. **Tools of the Data**

For the present study the researcher used various tools for data collection as relying upon single tool does not help the researcher in fulfilling the objective of the study. Following tools and techniques were used by researcher for gathering the data;

a. Analysis of the literature related to concept of fractions.
b. Analysis of the classwork and homework copies of students of class V and VIII.
c. Two semi-structured interview schedules were used to gauge the understanding of students and teachers about fractions.
d. Classrooms' observation.

2. Implementation Phase

In the implementation phase of this study the following procedure is followed;

a. The researcher analyse the literature related to fractions (books, articles, researches etc.) to find out the important components needed in the development of basic concepts of fractions.
b. The researcher analyse the classwork and homework notebooks of students of Class V and of class VIII to gauge their misconceptions about fractions.
c. The researcher conducts an interview followed by observation with the teachers of class V, to know the reasons of failure of understanding of fractions and to observe their pedagogy in the teaching of fractions.
d. The researcher also conducts a semi-structured interview with some students of class V, to know the problems and misconceptions in learning of fractions after doing the analysis of their note books.

3. Analysis of the Data

The present study is qualitative in nature and the data was collectedthrough analysis of documents, classwork and homework notebooks, interview of the teachers and students followed by the observations of classes. So, for analyzing this data, researcher divides the content on the basis of objectives;

Objective 1: To study the important components in developing the basic concepts of fractions.

To achieve this objective researcher analyses the literature related to fractions (books, articles, researches etc.) to find out the important components needed in the

development of basic concepts of fractions.It gives detailed information about the important components of development of concept of fractions.

Objective 2: To study the misconceptions of elementary school students about fractions.

To achieve this objective, researcher analyzes the data available from the classwork and homework notebooks of students of Class V and of class VIII and the interview conducted with students of class V. The collected data was analysed to gauge their misconceptions about fractions and try to find out that why children have misconceptions about fractions and what are they?

Objective 3: To study the common pedagogical approaches adopted by teachers with regard to teaching the topic of fractions.

This objective analyzes the common pedagogical approaches uses by teachers in teaching the topic fractions and it also analyse the reasons of misconceptions about fractions, which have been developed in children i.e., why are fractions problematic for students to learn and for teachers to teach?

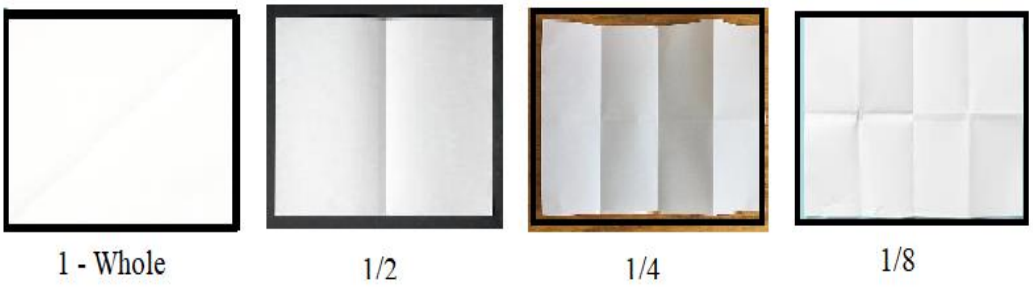
Each of the objectives is analyzed in details with the collected data. This analysis was followed by interpretation of data which leads to the findings of the study;

Findings of the Study

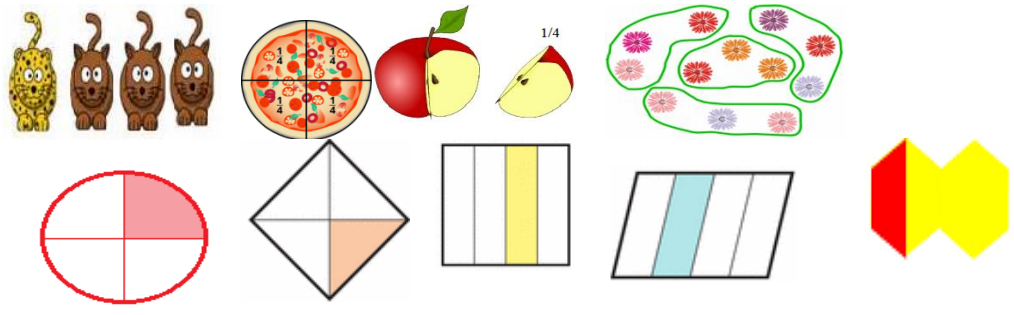
The objective wise findings of the present study were as follows:

Objective 1: To study the important components in developing the basic concepts of fractions.

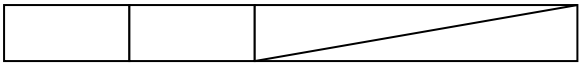
After analysingthe literature related to fractions (books, articles, researches etc.), the author comes to the point that *partitioning*is the basic skill to grasp the concept of fraction. According to Behr & Post, (1992), "partitioning or subdividing is a fundamental concept underlying children's understanding of fractions and the concept of a *whole* underlies the concept of fractions". The whole is considered as a unit, for example when we refer to 3/4 of anorange, then the orange is the whole or unit to which 3/4 refers. If we speak of 3/4 of a dozen orange, then the set of 12 oranges serves as the unit to which 3/4 refers. Thus, we can see that two types of whole have been pointed i.e., continuous unit (an orange) and discrete set (a dozen oranges). It becomes important that students are provided with experience in which they get the opportunities to partition discrete as well as continuous unit. For this, objects such as a sheet of paper may be folded initially into two equal parts, later into four equal parts, and then eight;



These early experiences with partitioning may be as important to a child's development of concept of fraction as counting is to their development of whole number concept (Behr & Post, 1992). The most important factor in partitioning is making the equal parts of a whole (continuous unit or discrete set). Students should be exposed to different objects of different shapes and sizes, for example, ¼ may be shown as;



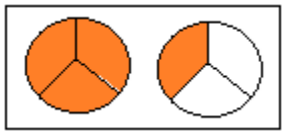
Moreover, for in depth understanding of the concept, a rectangle has been divided into four parts in a different way and students could be asked that 'does each one of the four pieces represent ¼ of the whole rectangle?



A fraction may be represented in multiple ways by using different partitioning models. This leads to flexibility in thinking in learners. For example, ¼ can be represented in various ways like;

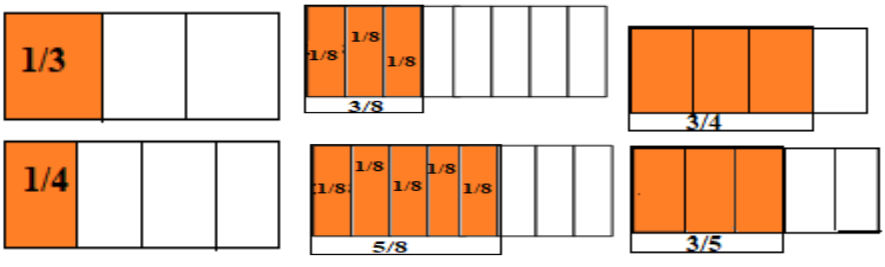


To give the concepts of fractions, greater than one, the realization that a single shaded part represents the fraction part (e.g., ¼ in the above example) is important when the idea of fraction greater than one whole(e.g., 5/4) is considered. Now observe the fraction 4/3 which can be represented as;



One must be understood to illustrate that 3/3 equals 1, or one whole unit. This will help the child realize that 4 one-third parts will cover more than one whole unit and will require the use of a second unit region.

To give the concept of fraction-order and equivalence,bypaper folding or drawing partition lines, children may be scaffold to visualize that 1/3 is greater than 1/4 though initially they may understand 1/3 to be less than 1/4 because 3 is less than 4. Through this approach, children observe the important relationship between the size of each part and the number of parts when two unit- wholes of the same size are partitioned into 3 and 4 parts respectively.



It shows pictorially the fact that 1/4 is less than 1/3. Further to compare 3/8 and 5/8, it is important for a child to understand that, 1/8 is an entity with a specific size and 3/8 is three 1/8ths i.e., 3/8 is threeparts of size 1/8, and similarly that 5/8 is fiveparts of 1/8. From the figure, the notion that 3/8 is less than 5/8 has a strong conceptual foundation, both by the logic of comparing three of something (1/8ths) with five of the same something.Understanding of the important relationship between the same size and number parts into which a whole is partitioned is very important in determining the order of the fractions such as 3/4 and 3/5 i.e., fractions with same numerators.

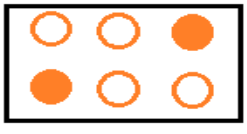
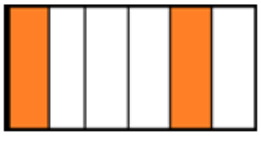
Objective 2: To study the misconceptions of elementary school students about fractions.

When the child begins the study of fractions, s/he is already equipped with a good understanding of whole numbers. In 3/4, both 3 and 4 have meaning. They initially understand them in terms of size, both in relative and absolute sense. The child has a sense of how big 3 and 4 are, and that 4 is one greater than 3.In a symbol such as 3/4 there are at least three important things expressed;

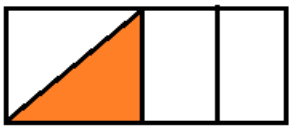
i. The size of the numerator 3.
ii. The size of the denominator 4.
iii. A relation between 3 and 4.There are at least two important relationships between 3 and 4; one is additive.This relationship is already known to the child i.e.,3 and 1 makes 4 or4–3 is 1.The other is a multiplicative relationship, that is $\frac{3}{4} = 3 \times \frac{1}{4}$ which is essential to understand that 3/4 is a single number, and that it has a size.

By analyzing the data available from the classwork and homework notebooks of students of Class V and of class VIII and the interview conducted with students of class V as well as the literature analysis the author foundsome of the student's common errors in working with fractionswhich may be due to their misconceptions about fractions. It was found that during the teaching-learning process, students form many types of misconceptions and these misconceptions leads to their committing errors. Some of the misconceptions are;

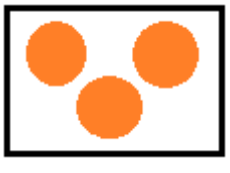
1. They cannot conceive that pieces constitute the whole and the numerator is a piece of the whole, and they cannot realize that both are related. They do not recognize a fraction when fractional parts are separated by space e.g., “this is not 2/6”

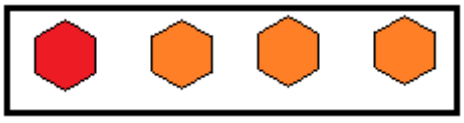
2. Mistakes in showing the whole by dividing it into pieces and failure to draw each piece identically. They do not recognize a fraction when fractional parts are not all the same shape e.g., “This is not ¼”



3. They confuse fractions and whole numbers by representing the denominator as a whole number “This is a third”



4. They see the numerator and the denominator in the fraction as separate, and they cannot notice that these numbers are related. Creates a fraction where the numerator and denominator are representing two separate whole numbers "This is ⅓"

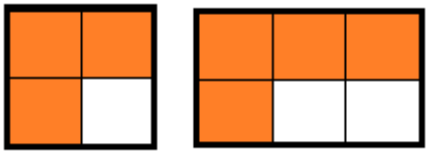


5. While comparing two fractions, they say the one with larger numbers is greater. And also, incorrectly judges that a mixed number is always greater than an improper number because of the whole number in front. "1 ⅔ is bigger than 5/4, because it has 1 whole in front".

Objective 3: To study the common pedagogical approaches adopted by teachers with regard to teaching the topic fractions.

From all the responses of the participants (10 teachers), their preferred pedagogical approaches may be categorized and discussed as follows:

- *Part- whole understanding of fractions.* A majority of the participants (8 teachers) believed that in order to develop a sound understanding of the basic fractions like $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{3}{4}$, etc., students must be made to work with variety of materials, objects and visual representations. Also, according to them, students should be familiarized with the meaning of these fractions in the context of daily life.
- *Comparison of fractions:* When introduced to the concept of comparing two fractions, initially some students commit errors for example, $\frac{1}{3} > \frac{1}{2}, \frac{3}{8} < \frac{7}{8}$. Here the student is identifying the greater fraction just looking at the greater numerator or denominator but is not looking at the fraction as a single number. In the study, most of the participants (7 Teachers) agreed upon the common errors committed by students while comparing fractions but very few could suggest remedies such as introducing the concept using visual representation of the fractions, learning materials, and contextual stories. When asked what could be the cause of such errors, they could not give any justified reason, but stated, 'students generally do not pay attention at the time of learning'. For example, in one notebook, in a question of comparing the fractions ¾ and 4/6, one student draws the following figure and answer that 4/6 is greater than ¾.



It can be said that almost all teachers were able to identify the misconceptions depicted by the researcher through this example. Also, when asked about the reasons behind such misconceptions, some of them were able to come up with reasons. However, when they were asked to suggest a remedy for overcoming such misconceptions, most of them explained the standard algorithm or procedure and said that students should be made to undergo sufficient practice to avoid such misconceptions. In this example, most participants could identify the fact that the student was looking at the unshaded squares of both rectangles while comparing the fractions ¾ and 4/6. The participants also pointed out that this student may not be aware, that in order to compare fractions, the whole' unit should be the same. When asked to suggest a remedy they said that the student should be taught the method of making common denominator through the LCM method for comparing the two fractions. Only a few suggested that students must be taught these concepts using visual representation, as this strengthens the learning of equivalence of fractions.

- *Equivalent fractions:* The majority of participants (9 teachers) felt that students have difficulty in understanding equivalence and in finding the equivalent fractions. They felt that students must be taught the procedural method of multiplying the numerator and denominator with a common number to get the equivalent fraction of a given fraction and they said that they explain the procedure several times in the class to enable students to understand the idea. Only a small fraction of participants expressed that visual representations should be used in explaining the concept of equivalence.
- *Ordering of fractions:* Many participants (7 teachers) suggested that the 'Least Common Multiple' is the most important method for ordering fractions. A few (2 teachers) recommended prime factorizations and only a small fraction of participants (1 teacher) suggested using estimation methods (such as comparing a given set of fractions with ½ or the nearest whole number). Though many participants per the LCM method for ordering a given set of fractions, they could not justify why the method works.

In conclusion, from the study, we may infer that, most of the participating teachers were aware of the common errors and misconceptions that students are prone to while learning the topic of fractions. However, it appeared that participants' procedural

knowledge was somewhat superficial as they were unable to delve into the deeper conceptual meaning behind the procedure or algorithm or they are not adequately equipped to provide remedial solutions. The overall findings suggest that the topic of fractions needs to be addressed very thoroughly through content development workshops. A greater proportion of time in such workshops should cater to developing teachers' knowledge in the topic of fractions and these sessions should be facilitated through multiple hands-on resources, discussion on students' misconceptions followed by remedial measures and problem solving.

Educational Implications of the Study

This study suggests the following:

- From the findings it can be seen that some teachers were not confident about concepts such as equivalent fractions, comparison of fractions and ordering of fractions. The responses given by them were mostly procedure based and hardly any teacher suggested alternative methods which highlight mathematical thinking processes such as estimation and approximation. It is found that, when teachers had deeper and more meaningful conceptual knowledge, they were able to suggest alternative methods for obtaining solutions to fraction problems. They also had the knowledge of appropriate pedagogical strategies for students. This highlights the need to provide the variety of representations of the concepts along with alternative methods to teachers in the in-service/ pre-service preparation programs.
- The observation of the classrooms revealed that teachers usually follow textbook prescribed methods while teaching their students. When asked to suggest a remedy teacher did not come up with many innovative ideas in for teaching the basic concepts or for justifying algorithms. Looking at this status, it is required that we strengthen good teacher educators and content experts for supporting the teachers (both in service and pre service) with resources, materials and multiple pedagogic approaches so that new ideas, pedagogical innovations can take place in the classroom teaching-learning processes.
- The observation of the classrooms also revealed that teachers do not prefer the use of visual representations of concepts in the form of diagrams, pictures or figures example, most of them clearly denied the use of visual representations for the teaching of different concepts of fractions because of lack of time in completing the syllabus. To tackle this mindset of teachers it is important that we provide exposure to visual representations of the fractions and fraction

concepts and convince them of their pedagogical benefits in professional development programs.

- Teachers demonstrated a lack of understanding when it came to constructing or developing contextual word problems or linking fraction concepts to real-life situations. They were not familiar with word problems based on multiplication and division problems of fractions. It is very necessary that we provide experience to the in-service and pre-service teachers regarding framing and developing word-problems, stories, or situations based on arithmetic operations on fractions.
- Professional development programs for pre-service teachers, in-service teachers and teacher educators must focus on and in-depth engagement with content as well as with pedagogical strategies. These programs should focus on visual representations of the concepts and meaning making through a variety of diagrams, figures, materials, stories, analogies etc., so that teachers apply these in their classroom teaching. Discussions on common misconceptions and errors must be taken up so that teachers may be equipped to device remedial strategies and reduce the scope of such misconceptions right from the beginning.
- In the classroom, students must be provided with opportunities to form stories, word-problems, visual representations based on the fractions and must be discussed among the students. Such classrooms exercises help in better conceptual knowledge development.

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