International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 08 | Aug 2020 www.irjet.net p-ISSN: 2395-0072

Assessment of Quality of Education of Science Course in Karnataka State Schools –Students' Perspective

Anuj M Thomas*[1], M. Shilpa[2]

[1, 2] *Dept. of Industrial Engineering and Management*
M S Ramaiah Institute of Technology, Bangalore, Karnataka, India

---

Abstract - *Most of the times, Quality of education is spoken of in an abstract way. Identifying the factors that strongly influence the quality of education and then analyzing the quality through these factors is the need of the hour. This paper is an attempt to understand and analyze the middle and high school students' perspective about the quality of education in science subject that is provided to them in the state of Karnataka, India. Based on the available statistics, Karnataka does a fairly good job regarding education; but the traditional methods used for assessing the quality of education seem to be outdated. The quantitative measures like enrollment ratio, promotion rate, retention rate, dropout rate etc. that exist in the literature, do not provide a clear understanding about the education quality. This paper helps to recognize the realms of education that need improvement so as to bring about overall development of students.*

***Key Words*: Science Education, education quality, students' viewpoint, survey analysis, questionnaire.**

1. INTRODUCTION

In the present world scenario, education is one of the most important aspects to child's development and success in life. An individual's ability to interpret the world is highly influenced by the education received. The method of incentivizing student's ability to memorize holds little to no application in the present technologically advanced society. The students tend to learn for the sake of passing each grade while education in reality should help in shedding light on practical aspects. A successful education should be capable of developing scientific temper in children. This is an absolute necessity to bring positive social, economic and cultural transformation for our country and the world at large. India has achieved a great deal of success in terms of its education system since its independence. The policy for national education established in 1968 played significant role to achieve this feat. Since then, less than ten percent of the non-urban area within the county has had to travel more than one kilometer to its nearest schooling infrastructure [1]. In spite of this, one can find a very large gap with respect to tutoring, computer instructions, livelihood training and ramps for disabled students, toilets and libraries. A wide divide exists as far as digital environment is concerned [2]. The Karnataka state in India is doing an excellent job in school education [3]. A survey questionnaire was used as a significantly reliable source of measuring the users' perceptions [4, 5]. Hence, a survey questionnaire has been designed after holding discussions with school authorities, teachers, graduated students, experts and also by referring to the available literature. The students of 5th grade to 10th grade were considered for collecting the responses. Most of the questionnaire was designed to consist of questions that were more generic in nature. This paper focuses on analyzing the quality of science course education provided for grades 5th to 10th in Karnataka state, considering the students' perspective. This was necessary since a more collaborative picture of the education system was a prerequisite to ensure that the analysis is not based on the existing quantitative values since these numbers indicate less about the quality of education and is not very accurate at giving a clear idea about the quality of education that the students receive and the teachers impart. One of the possibilities to be explored in this paper is an attempt to reach the grass root levels of the education system in the state of Karnataka, India and assess the quality. For this purpose, survey questionnaire is designed, covering all the important aspects of the teaching and learning process for students from grades 5 to 10, in discussion with some of the students, teachers, researchers, consultants and also by referring to the available literature [6, 7]. This questionnaire is well-crafted to ensure easy understanding by the students and Likert scale has been employed. Most of the questions are based on different factors that were found to be highly relevant to students' academic performance and future growth. Both qualitative and quantitative factors are considered for the study. This survey is conducted during the academic year 2019-2020. The questionnaire is circulated through e-mail to few of the students from higher grades, whereas the survey responses have been personally collected from lower grade students. In some cases, the questions have been explained to the students in the local language to ensure correct understanding. A total of 423 responses from grade 5 to 10 students have been collected following the sampling procedure. The survey responses have been analyzed to assess the students' perspective of science course education.

2. Review of Literature

As a preliminary attempt to understand the education system of the state as well as to get an insight on the international standards of education, an extensive literature review is done. The opinions among teachers and students regarding the quality of education was not a salient feature in any of the papers that were found. The literature

review has been carried out by referring to technical papers from refereed journals, the essence of which is collated and presented here. Education at all levels has traversed a long way in multiple directions from ancient period to the present digital era in the district [2]. The article talked about the different aspects of Indian education and the different data pertaining to the same. Majority of Government and private aided institutions are providing conventional education and private unaided institutions are interested in offering professional education. The Performance Grade Indicators were established and this could be used by the states or even the central govt. to understand the realms of education that need the most attention at the present and help create a redundant education system [3]. The article was aimed at helping the reader get an overall view of public education in the state of Karnataka. The key educational indicators like net enrollment ratio, retention rate, transition rate, annual dropouts etc. are discussed. Pupil teacher ratio, student classroom ratio is also discussed. There is a fundamental necessity for a sense of safety that the students need to feel so s to perform well in schools. This can be achieved only if the school infrastructure is designed in view of community surrounding the school [5]. The cited paper has successfully conducted an evaluation after the occupation of the school building so as to measure where the infrastructure of the school lies with respect to this sense of safety that should be provided to the students attending the school. The teachers are the middle level leaders at school. They are the most informed and important aspect to help improve the existing system of education. This needs to be understood by the higher authorities and the leadership qualities of the teachers in terms of taking initiative to improve the pre-existing systems in education should be prioritized [7]. The cited research has described how the way the parts assigned to these teachers need to be revisited so as to help them achieve this necessary skill that is found to be a prerequisite for improvement on the education system. It has been found that providing student with access to tuitions is a very effective tool to improve their educational performance. This also means that they have lesser leisure time that is necessary for developing other critical life skills [8]. The food habits of teenagers are highly susceptible to the types of foods that are available to them in the school cafeterias [9]. The authors had attempted to signify the importance of a school food related policy that could help in reducing the amount of food related diseases like diabetes, cholera etc. this paper also gives us an insight about what the students think about the kind of nutrition that is available to them in the school cafeterias of India. Data Enveloped Analysis is a very useful tool that has been used to understand the similarities between different organizations or systems [10]. The authors attempted at understanding if the unionization of the education systems of different states in the United States had any effect on the educational quality that was delivered by them using the DEA method. In the literature, there was an attempt to match the tutorial excellence of 28 Indian states so as to spot those which require immediate attention [4]. Multi-criteria decision-making framework was used for priority ranking of classes to enrich the evaluations and geometrical inferences. The paper was able to establish that adolescents need to understand the importance of food skills and develop good food rigging skills for achieving better health conditions in the future [11]. The paper cited was an attempt to understand the perspectives of teachers, students, principals and parents about the existing knowledge base that was covered in schools about this topic and to understand the significance school played in the development of the food skills among adolescent students. The Government's focus should be focused on other aspects from the area covered in the Integrated Child Development Services program, and more importance should be given to the reliability of the food supply, unbiased surveillance of the system, and its application. The Govt. should also look into increasing the funds provided for this program [12]. The authors had tried to gauge the transformations in the culinary preferences of youngsters from preschool to grade school. Less than 30 percent of the students go to schools other than those run by the state governments. Hence, it is the need of the hour to increase the standards that these schools are run with. Further, the difference in the execution of teaching methodologies between private and government schools are very evident and measures need to be taken to ensure that the quality of government schools reach up to the standards exhibited by the private schools [13]. The objective of this research was to understand the amount of significance the physical features of the school buildings had on the performance portrayed by the students. In parts of the world where educational entities work with more autonomy, the pressure for data usage to understand the need of students and the system varies greatly in comparison with other regions where there is a strict curriculum that is followed [14]. In the available literature, the authors had shown how there was a cross-section where the different kinds of educations meet and the extent of data driven making of decisions is present. The Principals of schools are a vital part of the system as they are expected to understand and ensure that the direction the schools take lie in line with the overall objective determined by that education system. In China however, the principals play an even more important role as they are expected to identify something unique about their schools and ensure that their school standout for this very reason [15]. The paper conceptualized instructional leadership by shedding light on the roles of the principals in China and how it affects the quality of the education and the direction the system takes in an independent manner within each school.

The hunger level of children was found to fall drastically with the settling in of deficiency of iron in them. The research worked towards understanding the repercussions of this effect and to evaluate how the iron supplementation biscuits faired in improving the health of children (6 – 12 yrs.) in rural areas of Shimoga, Karnataka, India [16]. A project named Samatha was deployed to improve the social and economic

status of lower cast girls. The paper explores the different aspects of their development such as high school retention rate and age at marriage. The findings from the research could be used to improve the educational development of these students and also help in creating better policies for improving their development and give them necessary guidance in the reproductive health fields [17]. In the literature, programs of the state are presented to indicate as to how government has been working to make education for all children a reality. From the research it was evident that the major cause for students' non-participation in the educational fields were found to be poverty and forms of economic deprivations [18]. There was also an attempt to understand how the students of a school has become teachers for the underprivileged students in the same school and the effect of this innovative approach in education undertaken by the school management. The students from 6th are compulsorily required to tutor underprivileged kids from lower primary classes [19]. In the literature, the researchers had aimed at providing the reader with a good repository of methods associated to then intellectual capital. The author believes that this is a necessity in the present scenario due to the current paradigm shift towards the big data analysis [20]. Methods of big data analysis were briefly discussed in the paper which could be used to understand which method needs to be used in case of big data for their analysis.

Rate of dropout is also discussed in the literature through various statistical analysis. The study consisted of separate questionnaires that were created specifically keeping in mind the necessity to create a behavioral questionnaire for the adolescent girls. The other questionnaire was developed for the parents of these children and this combination of data was used to conduct this study [21]. The researchers had attempted to understand the problem the student who were adolescent girls coming from a lower caste and set of families in the southern state of Karnataka. It had been found that the necessity for a digital source of information is becoming important in the present. This was possible too since most of the teachers are using digital forms of creating and storing data. This was a very useful method that can be employed in India since the deprived groups and girls need to be given importance in our country for their development [22, 23]. The author in this research was trying to quantify the extent of access that is available to the students that belong to the indigenous societies of India. It had been found that the students even in primary classes show significant improvement in academics when animations are introduced into their classrooms in India [24]. The introduction of school-based nutrition was found to improve the dietary choices by students and hence improve their health [25]. The literature also presents work conducted to find out if there are any relationships between the brain developments and television viewing in small children [26]. It was found that there is a significant improvement in the child's brain development in terms of the density of white matter and grey matter that grew in the frontal part of the brain which is considered to be related to their intellectual abilities [27, 28]. The literature has shed light on the prevalence of drug use like tobacco among school children. It was found that in the three regions that the study took place, the use of smokeless tobacco was abundant among both the genders [29]. This was found to be the reason for the early development of diseases related to tobacco use among the adults in those regions.

From the literature review, it was observed that there was a lack of studies that incorporated students' opinions to find the gaps in the education system. Such a study has not been carried out in India and this could be a first step at further analysis and understanding from the grass root level of education.

3. Need for this Study

India has made a lot of improvements in the education system along the years. Education at all levels has traversed a long way in multiple directions from ancient period to the present digital era [2]. But the Indian education system has a lot of catching up to do when compared some developed countries. The existing literature on this topic gives us quantitative values such as enrollment ratio and retention rates. These values only give us a bird's eye view of the problems and this paper is an attempt to understand the problems among students to gain insights about the most efficient changes that can be accomplished.

4. Conduction of Survey – Methods and Response Analysis

The survey conducted has been designed to recognize the realms of education that needs improvement so as to bridge gaps and improve the overall development of students. The questions were designed with the help of existing literature and with the input from teachers, mentors and school management members. The data collection was achieved through two means. Offline pen and paper method and online through google forms. The survey was successful in collecting 423 responses from students. The students of 5th grade to 10th grade were considered for collecting the responses. Both government and private school students survey was taken, this survey collected responses from students across Karnataka. The responses of students who are at the receiving end of the service has been directly recorded. Some of the major factors that were covered in the survey are as follows: Use of different teaching methodologies and the frequency of usage of some of the effective tools like animations, models and presentations; Application of practical aspects pertaining to the topics covered in class; Reasons for performing well in exams and science related subjects in particular; Necessity felt by the student for external source of tuition; Pre-class preparations by the students. This chapter of the paper provides the data collected and the analysis of the survey responses collected. The respondents are students, of which 18 of them are from grade 5, 49 from grade 6, 128 from grade 7, 54 from grade 8, 145 from grade 9 and 29 from grade 10. Not all students

opined their favorite subject as science; 32 % of the students had science as their most favorite course. To find out if the students think the teaching methods employed in schools are sufficient or if they need extra coaching, a question on requirement on tuition classes is asked. About 31 % said tuitions are not required and about 40 % vouched for extra tuitions in science course. Remaining students are neutral in their opinion. To understand if the student already has an outlook of scientific engrossment, a question is incorporated if they watched Television programs that promote scientific concepts. The response is shown graphically as pie chart in fig (1); it is noticed that the percentage of respondents who watch scientifically oriented programs on television on a daily basis is 20.9% and the majority of students view such programs on television occasionally.

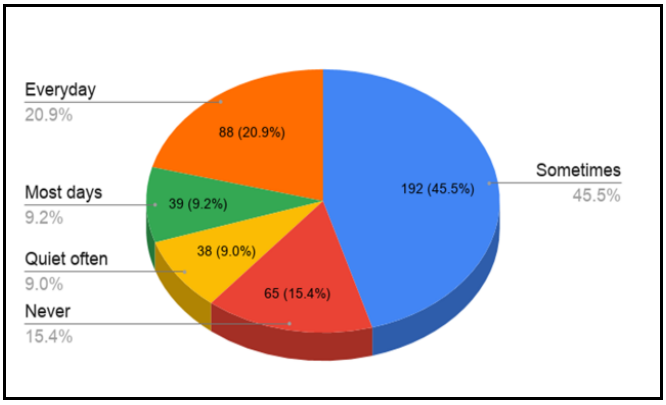

Figure 1: Pie chart for respondents viewing television programs related to science course

Regarding taking parent's help in doing with science homework and assignments, it is observed from the analysis that a significant percentage (28.6%) of students disagree to the idea of taking parental help; although about 32.4 % do seek parental help. When it comes to preparing for next science class, almost about 32 % of the respondents go well prepared, which is a good percentage. The next few aspects of analysis deal with medium of teaching, to conclude if the students have trouble following classes due to the language barriers. This is a crucial aspect of education in rural parts of Indian states where speaking English is not the norm. Majority of the respondents (73.5%) are acclimatized to the use of English as the language of communication in the classroom; this is true for all the subjects they study during an academic year. Also, the use of multiple languages for communication by the teacher can be seen as an advantage to the students, as this could help them in understanding the subject better. This is a clear indication that the majority of students in the state of Karnataka are receiving good communication skills that can help improve their employability. The analysis continues to the tools and techniques used by the teachers for teaching science course. The use of board is the most fundamental part of imparting knowledge in a classroom and about 71 % of the respondents opined that the teacher uses the board in almost every class.

To understand the frequency of using presentations in classrooms as an aid for teaching, a question on using presentation slides is incorporated, which is adopted by schools in the arsenal of teaching tools and has been found to be highly effective. Analysis showed that about 30 % of the respondents had every science class with presentation slides. Moving ahead, about 38 % of the students reported use of animations and models for teaching science course on daily basis, which is a significant change that brings about digital resources for pedagogy. This is shown in the below figure.

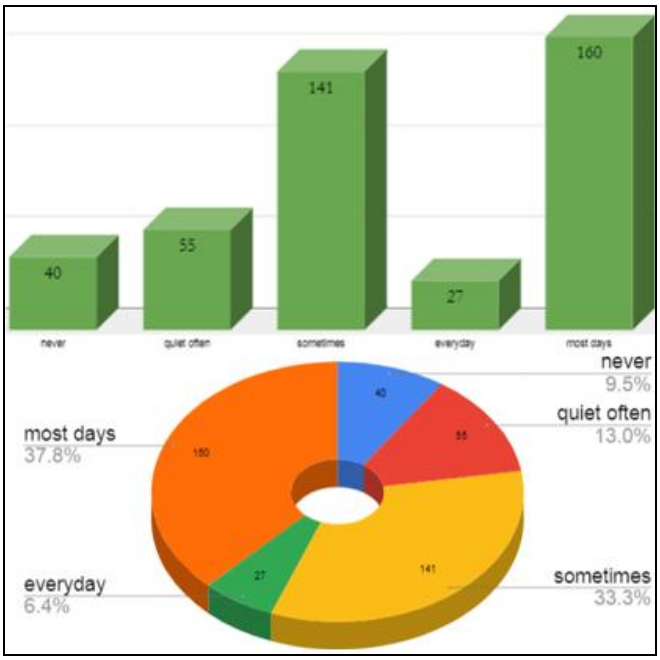

Figure 2: Pie chart and bar graph for use of models and animations teaching aids

The next aspect of analysis deals with use of practical applications of science course. From figure 3, it is evident that the majority of respondents believe the applications of the concepts taught in classrooms are explored. 19.6% (83 Students) reported that the topics are covered but the applications are not shared or explored as expected in the classrooms. 16.3 % (69 Students) believe that the applications of the concepts are discussed in the classrooms but the students do not get to practically explore those concepts.

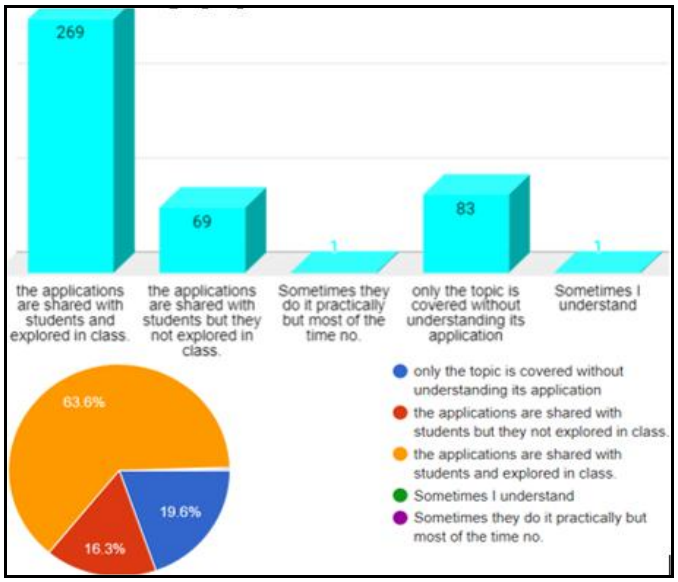

Figure 3: Opportunities for practical exploration of science concepts

Asked about the reason students do well in exams, about 60 % of the students vouched for logical reasoning and proper planning as the most important factor. According to them, a not-so-challenging question paper is the second most important reason for doing well and third most important reason being God's grace. The improved performance of students in Science course was attributed to four reasons: competition among students, interest in the subject, parents' expectations and teachers' expectations. About 52 % of the students indicated that interest in the science course is the most important reason among others; second most important reason being competition among students. This is depicted in figure 4.

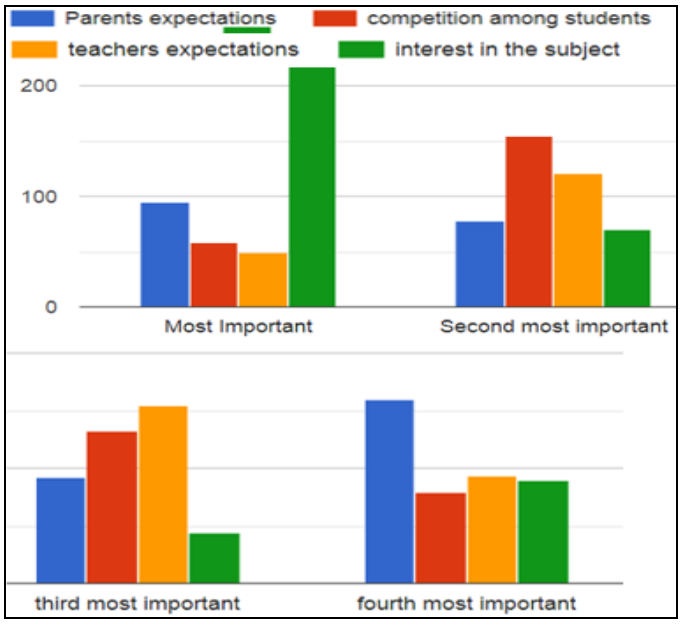

Figure 4: Reason for performance improvement in science course

It was felt necessary to determine if leadership and collaborative skills, which are important for science course too, were being learnt by the students during their school education and hence, this question was aptly included in the survey. The results are shown in table 1.

Table 1: Responses for learning leadership and collaborative skills

Do you think that the students are learning about leadership skills and collaborative skills?	Count
Both skills are encouraged and taught to every student	213
leadership skills are given importance	126
I don't think these skills are imparted	72
Collaborative skills are given importance	12
Total Students	423

It is interesting to note that about 50 % of the students indicated that they were taught both the skills at schools and about 17 % of the students pointed out that these skills are not being imparted to them. This is shown graphically in figure 5 which indicates about half of the respondents are happy with the current level of focus that is given to the activities that are necessary to build their leadership and collaborative skills.

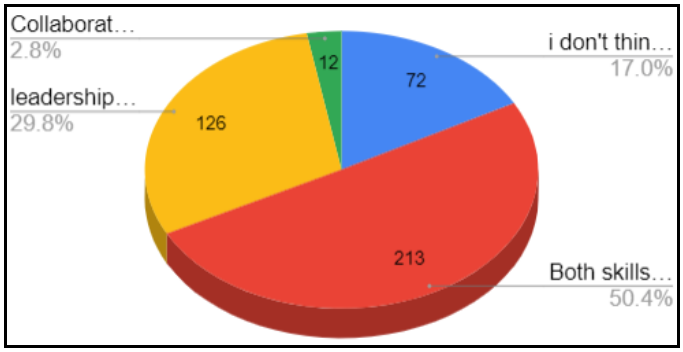

Figure 5: Pie chart of leadership and collaborative skills being taught in schools

Conclusions

This paper is an attempt to analyze the quality of science course education for grades 5 to 9 students in one of the Indian states namely, Karnataka. This attempt is unique as it considers only the students' perspective, which has been captured by using a survey questionnaire. The responses have been collected from the state government, central government and private schools from all over the state and the norms for the sample size are satisfied. A total of 423 responses have been received from the students and from the analysis it is evident that there are gaps that need mitigation in the present education system of the state: the interests of students can influence their outlook on the teaching methodology that is being currently employed. A majority of the respondents already have an inclination towards science and mathematics courses. Among all, a significant number of

students feel that the practical application of the topics needs improvement. Hence, it is possible to reduce this gap by supplementing practical methods while teaching science course. This survey analysis also indicates that a large number of respondents have access to television and are using such media to improve their science knowledge base. A large number of respondents also acknowledged receiving help at home to do their science assignments. Majority of the respondents are also preparing for classes and topics to be covered beforehand. This is a good sign as the respondents are taking matters into their own hands and active learning is found to be very effective. This is found to be very useful in improving the critical thinking skills among students. Proactive learning can also help students engage in their classes better even if they otherwise struggle with that particular subject. The communication gap when explored has been found to be minimal and teachers are found to be using multiple languages for the purpose of effective communication in some of the cases. The teaching methodologies employed have been positive in terms of effect but the frequency of usage of methods like animations, models and presentations is the main source of the gap that is present in the system. It can be hypothesized that this gap could be reduced by creating a digital repository which might be the most efficient solution in the current scenario. It is also found that the majority of respondents believe proper planning and logical reasoning are the main factors that affect the outcome of exams. Hence, it is recommendable to all the students to invest time on planning the preparations for exams logically. Collaborative skill development is also found to be an aspect that the students need to receive more emphasis on so as to improve their chances for success.

The crucial takeaway here is that the respondents have evidently expressed how the interest they have in the science course is the most important drive to achieve success. We have all been familiarized with the concept of teachers becoming a facilitator for knowledge. From this analysis we can evidently conclude that the most important aspect of this facilitation should be about instilling and nurturing this very interest in students.

REFERENCES

[1] Vidyashankar Gourishankar and Prakash Sai Lokachari, "Benchmarking educational development efficiencies of the Indian states: a DEA approach", International Journal of Educational Management, vol. 26, no. 1, pp. 99-130, 2012.

[2] D K Ramesh, "Secondary School Education in Karnataka State with Special Reference to Vijayapura District", https://shodhganga.inflibnet.ac.in/bitstream /10603/73581/12/chapter-%20iii.pdf, 2016.

[3] Government of Karnataka, "School Education in Karnataka 2018 – 2019", http://www.ssakarnataka.gov.in/pdfs/data/GoKReport 1819Final_230919.pdf, September 29, 2019

[4] Shankar Chakraborty, Debapriyo Paul and Puneet Kumar Agarwal, "Evaluation of educational performance of Indian states using PROMETHEE-GIS approach", Benchmarking: An International Journal, vol. 24, no. 6, pp. 1709-1728, 2017

[5] Sheila Walbe Ornstein, Nanci Saraiva Moreira, Rosaria Ono, Ana J.G. Limongi Franca and Roselene A.M.F. Nogueira, "Improving the quality of school facilities through building performance assessment - Educational reform and school building quality in Sao Paulo, Brazil", Journal of Educational Administration, vol. 47, no. 3, pp. 350-367, 2009.

[6] Asha Gupta, "International trends and private higher education in India", International Journal of Educational Management, vol. 22, no. 6, pp. 565-594, 2008.

[7] David Gurr and Lawrie Drysdale, "Middle-level secondary school leaders Potential, constraints and implications for leadership preparation and development", Journal of Educational Administration, vol. 51, no. 1, pp. 55-71, 2013.

[8] Pubali Ghosh and Mark Bray, "Credentialism and demand for private supplementary tutoring - A comparative study of students following two examination boards in India", International Journal of Comparative Education and Development, vol. 20, no. 1, pp. 33-50, 2018.

[9] Neha Rathi, Lynn Riddell and Anthony Worsley, "The role of Indian school canteens in nutrition promotion", British Food Journal, vol. 120, no. 1, pp. 196-209, 2018.

[10] Kathleen Overton, Seong-Jong Joo and Philipp A Stoeberl, "Benchmarking public school performance by unionized status", Benchmarking: An International Journal, vol. 23, no. 7, pp. 1626-1642, 2016.

[11] Neha Rathi, Lynn Riddell and Anthony Worsley, "Food and nutrition education in private Indian secondary schools", Health Education, vol. 117, no. 2, pp. 193-206, 2017.

[12] Gopal Chandra Mandal, Kaushik Bose and Slawomir Koziel, "Comparison of the effects of the food supplementation programs of ICDS centers and primary schools at Bali Gram Panchayat, Arambagh, West Bengal, India". International Journal of Sociology and Social Policy, vol. 34, no. 3/4, pp. 232-246, 2014.

[13] Jitendra Gouda Kailash Chandra Das, Srinivas Goli and Ladumai Maikho Apollo Pou, "Government versus private primary schools in India - An assessment of physical infrastructure, schooling costs and performance", International Journal of Sociology and Social Policy, vol. 33, no. 11/12, pp. 708-724, 2013.

[14] Amanda Datnow, Jennifer C Greene and Nora Gannon Slater, "Data use for equity: implications for teaching, leadership, and policy", Journal of Educational Administration, vol. 55, no. 4, pp. 354-360, 2017.

[15] Haiyan Qian, Allan Walker and Xiaojun Li, "The west wind vs the east wind: instructional leadership model in China", Journal of Educational Administration, vol. 55, no. 2, pp. 186-206, 2017.

[16] Bal D, Nagesh K, Surendra HS, Chiradoni D and Gomathy G, "Effect of supplementation with iron fortified biscuits on the hemoglobin status of children in rural areas of Shimoga, Karnataka", The Indian Journal of Pediatrics, vol 83, pp 82:259, May11 , 2016.

[17] Tara S Beattie, Parinita Bhattacharjee, Shajy Isac, Calum Davey, Prakash Javalkar, Sapna Nair, Raghavendra Thalinja, Gautam Sudhakar, Martine Collumbien, James F Blanchard, Charlotte Watts, Stephen Moses and Lori Heise, "Supporting adolescent girls to stay in school, reduce child marriage and reduce entry into sex work as HIV risk prevention in north Karnataka, India: protocol for a cluster randomized controlled trial", Beattie et al. BMC Public Health, pp 15:292, 2015.

[18] Dr. Avinash T, "A study on Karnataka state government initiatives and schemes for promoting primary education", International Journal of Academic Research and Development, vol 2, no 6, pp. 1141-1146, November 2017.

[19] Tamo Chattopadhay, "Bridging the social divides: a school-based model from India", International Journal of Sociology and Social Policy, vol. 35, no. 3/4, pp. 222-238, 2015.

[20] Giustina Secundo, John Dumay, Giuseppina Passiante and Pasquale Del Vecchio, "Intellectual capital in the age of Big Data: establishing a research agenda", Journal of Intellectual Capital, vol. 18, no. 2, pp. 242-261, 2017.

[21] Ravi Prakash, Tara Beattie, Prakash Javalkar, Parinita Bhattacharjee, Satyanarayana Ramanaik, Raghavendra Thalinja, Srikanta Murthy, Calum Davey, James Blanchard, Charlotte Watts, Martine Collumbien, Stephen Moses, Lori Heise, Shajy Isac, "Correlates of school dropout and absenteeism among adolescent girls from marginalized community in north Karnataka, south India", Journal of Adolescence, vol 61, pp.64-76, September 29, 2017.

[22] Gayatri, "Capturing intellectual capital with an institutional repository at a business school in India", Library Hi Tech, vol. 26, no. 1, pp. 110-125, 2008.

[23] K.M. Joshi, "Indigenous children of India: enrolment, gender parity and drop-out in school education", International Journal of Sociology and Social Policy, vol. 30, no. 9/10, pp. 545-558, 2010.

[24] Shreesha M and Sanjay Kumar Tyagi, "Effectiveness of animation as a tool for communication in primary education", International Journal of Educational Management, vol. 32, no. 7, pp. 1202-1214, 2018.

[25] Neha Rathi, Lynn Riddell and Anthony Worsley, "Secondary school student's views of food and nutrition education in Kolkata, India", Health Education, vol. 117, no. 3, pp. 310-322, 2017.

[26] Hikaru Takeuchi1, Yasuyuki Taki, Hiroshi Hashizume, Kohei Asano, Michiko Asano, Yuko Sassa, Susumu Yokota, Yuka Kotozaki, Rui Nouchi and Ryuta Kawashima, "The Impact of Television Viewing on Brain Structures: Cross-Sectional and Longitudinal Analyses", Cerebral Cortex, vol 25, no.5, Pages 1188–1197, May 2015.

[27] G. Gururaj and N. Girish, "Tobacco Use Amongst Children in Karnataka", Indian journal of pediatrics, vol.74, pp.1095-8, 2008.

[28] Jess Gifkins, "What Is 'Active Learning' and Why Is It Important", E-International Relations, https://www.e-ir.info/2015/10/08/what-is-active-learning-and-why-is-it-important, Oct 8 2015.

[29] Sweta Chauhan, Vishal Sagar and Tulika Chandra Ghildiyal, "A study of organizational supporting factors for acceptance of engagement in technology – enhanced learning", Vol.29, No. 12s, 2020, pp. 01-08.