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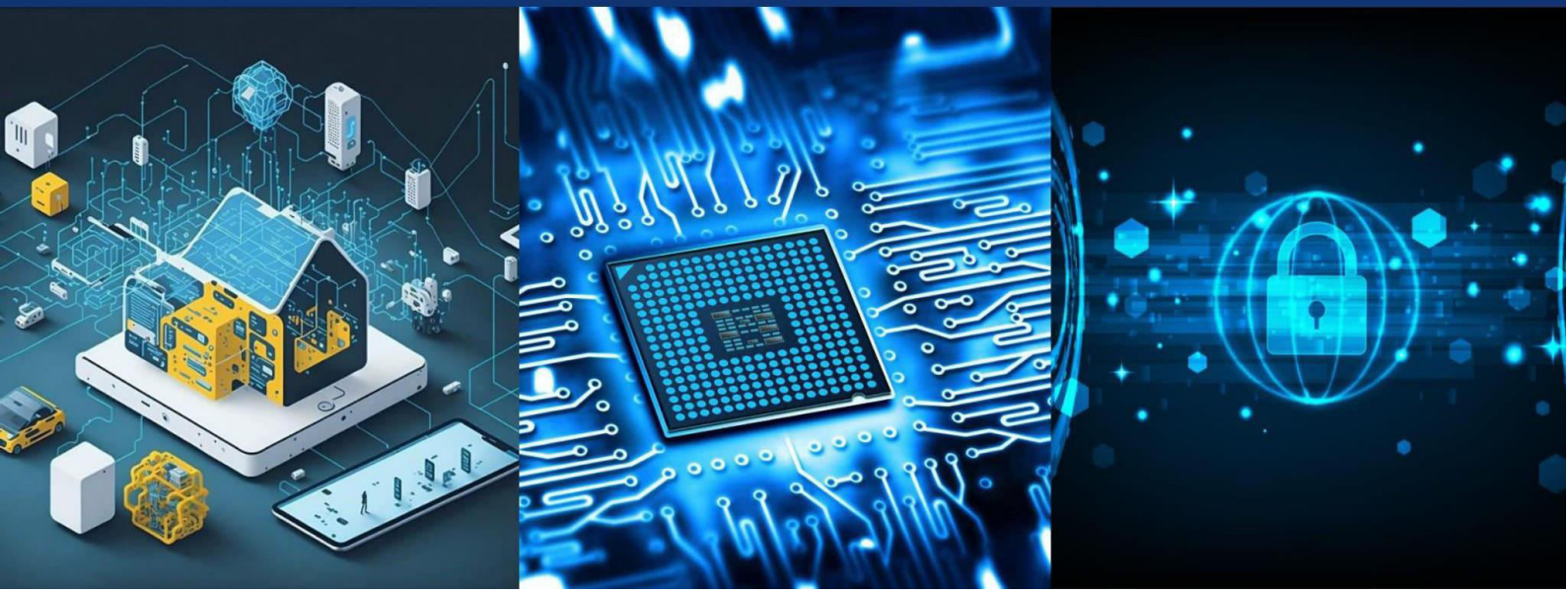

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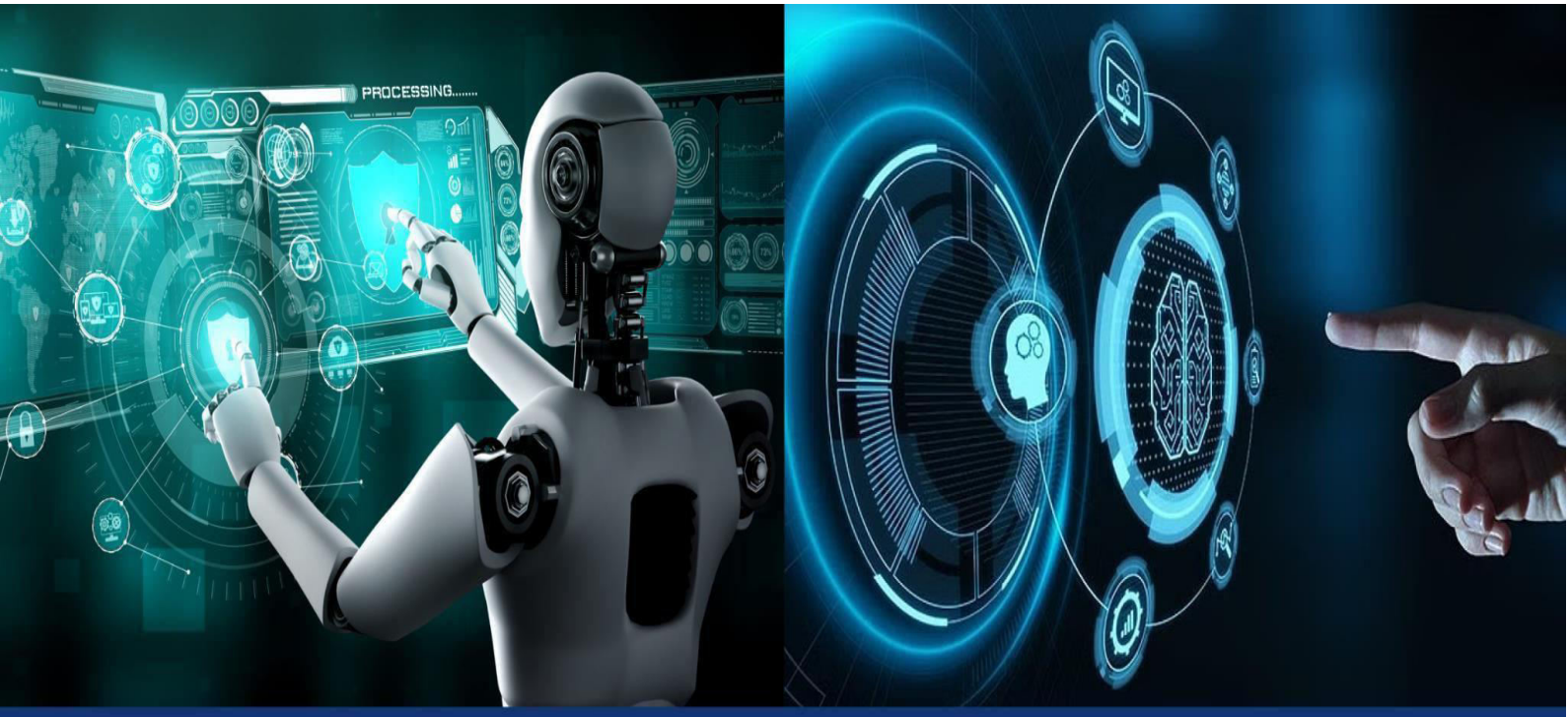

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Effectiveness of Computer Technology in Education System for Social Science

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ABSTRACT: Education is an important tool for the sustainable development of any country, Computer technology is an essential part of the education which started from the initial classes. Education departments are advertising for the promotion of computer technology among school-going teenagers in public schools as well as private schools. Students need to have an e-futuristic mindset. It raises questions about the effectiveness of promotional advertisements for computer education and the success of the computer program. The education policy of the government has appeared to provide computers in low-income areas and it has been supported by academia, educational institutions, and philanthropic discussions. This paper presents the results of a qualitative study of computer equipped schools. A comparative study was conducted in five government schools which are located in urban areas and five schools located in rural areas in five different blocks of Ranchi district, of Jharkhand state of India, Statistical analysis was done using student t-test, Chi-square test, and fisher-exact test.

KEYWORDS: Computer Technology, Promotion effectiveness, Adolescent, Awareness.

I. INTRODUCTION

Education is an important aspect of social development. Schooling plays a major role in ensuring the success of the development of any nation. The learning children of a country need to have good skills and have to be proactive with an appropriate e-futuristic mindset. In India, more than 30,000 public primary schools are running computer-aided learning (CAL) projects. The adoption of Information and Communication Technology (ICT) and Computer Science (CS) in school education has been an important topic of study and research in several countries [1-3]. There has been an increased push for computer science education across the globe, including the United Kingdom (Computing at School), Australia (Digital Technologies), United States of America (Computer Science for All), and Mexico. These efforts to introduce computer science ideas in the curriculum across the state of Computing Education in schools in the UK highlights the fact that the delivery of Computing Education is not up to the mark, mainly due to the lack of trained teachers and the necessary infrastructure [4]. Computational thinking is completely absent from the K-12 education despite its ubiquitous nature [5]. The Ousted report on ICT in schools in the UK mentions a decline in the number of students opting for the ICT subjects since 2007 with fewer girls choosing to continue to study ICT. It prompted the schools to boost students' enrollment in ICT-related courses. According to the National Science Survey of India, students pursuing careers in Sciences preferred math.

Compounding matters are the fact that most often the terms digital literacy, ICT, and CS are used interchangeably by educationists, teachers, and as a consequence, also by their students. It creates the illusion that CS is already being taught and integrated at the school level and as a result, efforts to improve the situation for CS education at school often end with giving more importance to digital literacy or ICT. In 2009, a subcommittee of the Central Advisory Board of Education (CABE) was set up under the Chairpersonship of the Secretary, Department of School Education and Literacy, Ministry of Human Resource Development (MHRD), the Government of India. This committee was entrusted with the task of suggesting: Guidelines for the use of ICT in school education, Strategies for teachers' capacity building in ICT usage, Promote computer education through advertising, and the appropriate level for the introduction of computer literacy among school students. It suggests the way for the National Policy on ICT in School Education, 2011. Realizing the importance of CS skills in education many countries began to introduce CS as the main subject from primary school curricula. For example, Germany introduced CS as a compulsory subject [6]. In the United States, the CS project aimed at training 10,000 CS teachers in 10,000 high schools by 2015 in New Zealand, new CS standards were introduced at the high school level in 2011, In India, CS school-going as elective subjects for senior secondary school students. This study focuses on adolescence attitude, awareness and effectiveness towards CS

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education because adolescence is more concerns for the developing future, various interruptions sidetrack serious life decision making them. It is required for young individuals to create an identity in this period; otherwise, confusion disturbs their life. Therefore, the need for directing them to holistic development arises. Student empowerment is one of the primary intentions to help students to gain the confidence, experience, and skills necessary to meet the challenges of an ever-changing world.

II. COMPUTER-AIDED LEARNING IN INDIA

Computer-aided learning generally covered by Studies of CAL projects in India [7], the success and failure of such projects depends upon the support of government and social or organizational factors. It also depends upon the learning impacts of children with no prior experience in computer knowledge. The social change about the learning of computers among children, the academic literature leans towards a more critical look from an education policy perspective. On computer learning issues, however, there are general concepts that establishing to improve learning computers is generally difficult and that there are two sides to learning outcomes in schools, the cognitive and social knowledge development for young children who are using computers [8].

A. Computer Science Education for Teachers

To be able to categorize and analyze the state of CS education across the world, I proposed a model as part of the teaching group "Informatics in Secondary Education" at the ACM-ITiCSE Conference in 2011. The quality of CS education not only depends on the support from Government and curricular content but also on the knowledge and capabilities of teachers teaching CS subjects. Hence, effective teacher training in CS is imminent. According to Ragonis, dedicated CS teacher preparation programs should be developed, and only teachers with formal CS backgrounds should be allowed to teach CS in secondary schools. It is not enough to have a generic Science teacher teach CS. Consequently, there have been efforts made to develop CS standards like the ACM/CSTA and the IFIP-TC3.

B. Discourses of computer education benefit among parents

Computers education and child benefit have focused on access issues across various income background people in society. However some work has focused on parents' attitudes towards computer education among their children, especially among the family belongs from middle-class [9-10]. Some work has been discoursing at the macro-level of state education policies with an eye on informing or critiquing policy initiatives. There is significant work that looks at computers learning interest in children within the family and school, much of this work has been more focused on computer-based games in the developed world. Finally, there has been important work on the adoption of technology by adults supported by children in India. Our study is based on the attitude, awareness, and effectiveness of computer education after advertising for computer education promotion in school going adolescent girl child, so the opinion of the games as valid learning technology is not relevant in our sample.

C. Information and Communication Technologies Development in India

India has probably been better represented in Information and communication development research in comparison with another country in the world. Some of the earliest and most optimistic prophecies of ICTs' transformative potential came from Indian researchers [11], and over time, the keenest critical looks at the type over ICTD research in India. There are many reasons of which required ICTD work in India the role of the technology sector in the economic development of growing countries like India since the 1990s and the indirect depending discourse of technology is an important part of the continued growth of social and technological development in India. Thus, ICTD work expanded in other types of projects in education from primary to higher education and it also works other sectors like service delivery domains such as transportation, tourism, and healthcare, agricultural productivity and microfinance. Despite the good response of ICTD in India still, there are many sectors need to be focused.

D. The key contribution of ICTD

Very few researchers' works on ICTD has been able to provide empirical evidence of poverty alleviation for students getting computer education as an outcome of injecting computer education and computer technological innovations in their lives. Funding priorities of governments seeking new interest to develop computer education or investing their philanthropic and research resources on emerging which helps to promote computer education. To approach these issues, we try to find out the response of rural parents with no experience of using computers to understand their uses in their children's lives. Our novel contributions here are in our descriptions of the places from where rural populations gain knowledge about their computer technology, and how these, in turn, impact the

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imagination of computer technology and the consequences associated with aspirations. We situate our analysis within existing conceptions of students, about the rural community and its relationship with the school and the teachers. Finally, this research brings out important issues in the perception of teacher knowledge and attitude toward computer technology.

III. MATERIALS AND METHOD

The present study is conducted by the age of the student and class of the student in which she is reading, comparative study conducted in five rural schools of Ranchi district under the Department of education (Jharkhand, India). The survey was conducted from January 2017 to August 2018 (6 months). Approval was obtained from the department of education and permission from different schools was obtained after explaining the detailed objectives of the study.

A. Research Design

We took five rural schools from Ranchi city, one school each from five selected blocks of Ranchi district. The schools are selected from the rural area of Bundu, Sonahatu, Chanho, Lapung and Ormanjhi blocks, were adolescents from surrounding villages come to study (strength of adolescent boys and girls in government schools was only 15-20 in each class). The study was conducted to find out the awareness, attitude, and effectiveness of educational advertising to promote computer education in adolescent school-going girls.

B. Sample and Sample Process

All adolescent girls between the ages of 11-17 years of age studying in these schools at least from last one year and residing in nearby the selected schools are willing for sampling were enrolled in this study. A sample size of 350 students was collected out of which 327 forms are found properly filled. The ratio of students was obtained with approximately equal inclusion from boys and girls by using the formula n= 4pq/d2 and allowable error of 5% (where p = prevalence of study, q = 100-p, d = allowable error). After eliminating those forms in which questionnaires are not properly filled, a total of 137 boys and 190 girls from rural schools constituted the final cohort. Adolescent students who are studying in school from the last year between the ages group 11-17 years included in the study.

C. Procedures

A lecture on computer education benefit was delivered in the school campus to all school-going adolescents after that pre-determined questionnaire was given to the students satisfying inclusion criteria. A predetermined questionnaire and effectiveness collected data of government facility, household characteristics, attitude, awareness, socioeconomic indicators, and school-going habits were checked through the result of computer tests conducted by the schools.

E. Data Analysis

The data was analyzed with the help of Microsoft Excel 2013 and the Graph is plotted in origin pro 8. Data were calculated and summarized as mean ± SEM, and categorical data of the sample were presented as proportion or percentage. The statistical analysis was performed by using excel t-test, Chi-square test and Fisher exact test was conducted to find out the significance of the difference in mean between two variables. Fisher-exact test and Chi-square test were used to find out independence/association. The p-value < 0.05 was considered significant.

IV. BARRIERS AND CHALLENGES OF INTERVIEW

The survey process was challenging for us as well as for the children. I feel it is important here to add a note on this because measuring the effectiveness of educational advertising is tough to know with filling questionnaires only. As being outsiders to the school asking questions about the school and government support to promote computer education is challenging to get correct information, we were the first people from outside of the school who are conduction such types of survey. We asked questions about educational advertising their awareness about computing education and support from school and parents. As our research proceeded, it was also clear that we were representations of those participants who turned to school with the usual response of there are consequently not only biases inherent in the study, but also an important element in students' expectations from the technology. One particularly difficult issue for us is to reconcile with the grimness of the prospects of computer education for the children. One uncomfortable question that we discussed was the student is not getting a specialized teacher for computer education.

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V. RESULT AND ANALYSIS

The mean of a study group of adolescent students was 13.59 ± 1.46 years (13.50 ± 1.34 years in boys and 13.65 ± 1.56 years in girls). The majority of students belonged to the age group of 13 to 14 years with 42.6%, followed by 15 to 16 years of age with 36.8% in girls and 50.5% in boy's students. The age group between 11-12 years old students contributes 27.8% in girls and 25.5% in boys. The analysis of awareness, attitude, and effectiveness among school-going adolescent boys and girls students after advertising for promotion of computer education, data are indicated in [Table-1].

In both boys and girls schools, between age group 12-13 years are showing a maximum increase in mean attitude coinciding with interest. The mean age of basic computer knowledge was 13.2 years. Most of the students achieved computer knowledge by 13 years of age (23.3%) followed by 14 years (12.8%) and 12 years (12.5%). Computer knowledge was one year before adapted by boys as compared to girls ($p<0.001$) [Fig.1]. However, the difference in understanding and interesting among girls and the boy's students was not significant [Table-2]. It was disappointing to note that only 24.7% of students were found to have normal effectiveness. The majority of the students (73.7%) both boys and girls students combined through advertising, about 25-35% of adolescent's school going to both boys and girls students are not aware, no attitude change and there is no effect in their computer knowledge. In class 8th, 9th and 10th computer knowledge in both the groups has been increasing gradually. Students in these classes are at the age between, 13-15 years, showing a maximum increase in computer knowledge. Most of the students achieved good marks in 8th, 9th and 10th class, in the 6th class average percentage of boys is 31% followed by girls is 83% but in girls is 85%, similar trends were seen in 10th result with a small margin of 2% percent girls get 88%, but boys in same class get 86%. There is a significant fall of In the 10th class boy, students obtain 65% average marks followed by girl students with 56%. In the 12th examination boy, students get 68% followed by 47% with a girl in the same class. In the current study, it is found that the majority of boys, 76.3% boys and 70.0% of girls belong to a nuclear family. The mother's literacy rate of boys' student is higher with 51.1% in respect of school-going girls. [Table-3].Out of 327 school going students, negligible (1.2%) students have a computer at home. However, more than three-fourths of the schools going students (89.6%) were using a computer in school, while the rest (9.2%) were using a computer from another source also. Interestingly, girls had a better status regarding the awareness and effectiveness of computer education as compared to the boys. In the present study, 24.7%, 25.6%, 19.9%, and 28.1% of students had normal effectiveness after promotional advertising for computer education. In this study; however, it is found that after a great effort by different agencies and government departments to promote computer education.

Age Group(in years)	Area (n)	Mean Awareness	Mean Attitude	Mean Effectiveness
11-12 years	Boys(n:34)	32.76±1.196	145.6±1.508	16.06±0.4532
	Girls(n:54)	32.76 ±0.0816	142.1±1.119	16.45±0.3175
	p-value	0.30	0.067	0.47
12-14 Years	Boys(n:60)	40.86±0.7138	155±0.9105	17.01±0.2048
	Girls(n:70)	41.00±0.6337	153.2±0.657	17.62±0.2360
	p-value	0.80	0.10	0.064
14-17 Years	Boys(n:34)	44.24±1.38	157.5±1.146	17.76±0.4448
	Girls(n:66)	44.50±0.608	156.1±0.7013	18.33±0.2768
	p-value	0.79	0.29	0.26
Total	Boys(n:137)	39.96±0.5581	153.3±0.7585	16.96±0.1937
	Girls(n:100)	40.00±0.6497	151.1±0.6316	17.53±0.1664
	p-value	0.88	0.02	0.02

Table-1: Mean Awareness, Attitude and Effectiveness of advertising on computer education on adolescent school going students in a different class at different age groups boys and girls {n=327} (student's t-test)

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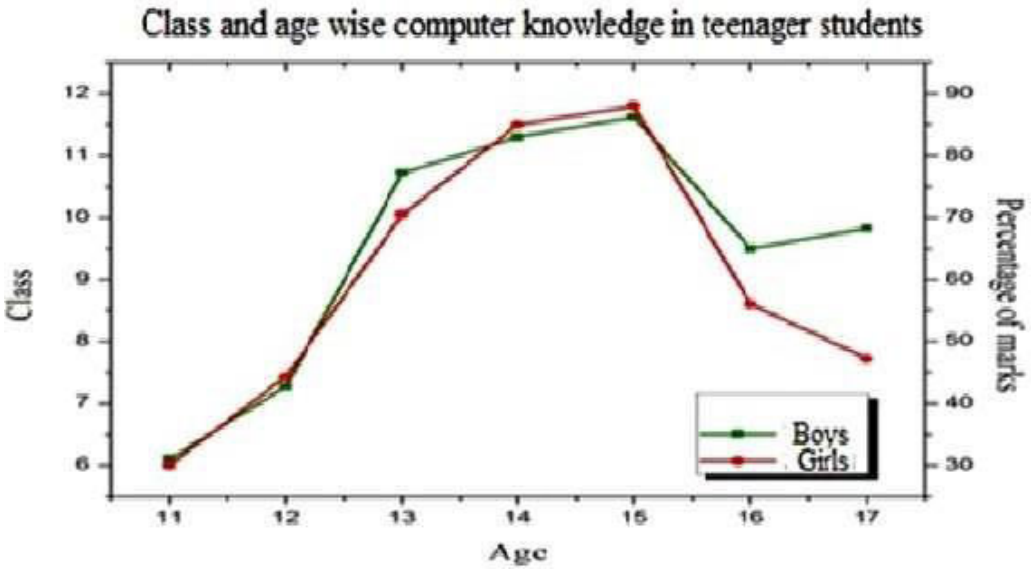

Fig. 1. Class and age-wise computer knowledge in teenager students

Age group (in years)	Area(n)	Understanding (%)	Interesting (%)
11-12 years	Boys (n:34)	6 (17.6)	9 (26.5)
	Girls (n:54)	17 (31.5)	12 (22.2)
	p-value	0.21	0.79
12-14 years	Boys (n:69)	13 (18.80)	16 (23.2)
	Girls (n:70)	18 (25.7)	9 (12.9)
	p-value	0.41	0.13
14-17 years	Boys (n:34)	10 (29.4)	12 (35.3)
	Girls (n:66)	15 (22.7)	15 (22.7)
	p-value	0.47	0.23
Overall	Boys (137)	29 (21.2)	37 (27.0)
	Girls (190)	50 (26.3)	36 (18.9)
	p-value	0.29	0.10

Table-2: Age-wise prevalence of understanding and Interest towards computer education in adolescent boys and girls students (n=327) (Fisher-exact test)

Maternal education	Boys (%)	Girls (%)	Total (%)
Primary School	21(15.3)	26 (13.7)	47(14.4)
Middle School	35(25.5)	22 (11.6)	57(17.4)
High School	24(17.5)	16 (8.4)	40(12.2)
Intermediate/Post highschool diploma	0 (0)	5 (2.6)	5 (1.5)
Graduate/P.G	6 (4.4)	0(0)	6 (1.8)
Profession/Honour	2 (1.4)	3 (1.6)	5 (1.5)
Literate	49(35.7)	118(62.10)	167(51.1)
Over all	137(100)	190 (100)	327 (100)

Table-3: Maternal education (Chi-square- 37.19, p-value <0.0001)

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Frequency of classes	Basic Computer			Advance computer		
	Boys (%)	*Girls (%)*	*Total (%)*	*Boys (%)*	*Girlsl (%)*	*Total (%)*
Daily	7(5.1)	18(9.5)	25(7.6)	28(20.4)	64(33.7)	92(28.1)
Twice in week	52(38.0)	45(26.7)	97(29.7)	56(40.9)	38(20)	94(28.7)
Weekly once	26(19.0)	40(21.1)	66(20.2)	19(13.9)	24(12.6)	43(13.1)
Once in forthnight	4(2.9)	1(0.5)	5(1.5)	2(1.5)	5(2.6)	7(2.1)
Monthly	7(5.1)	8(4.2)	15(4.6)	6(4.4)	4(2.1)	10(3.1)
Occasionally	38(27.7)	77(40.5)	115(35.2)	17(12.4)	54(28.4)	71(21.7)
Not at all	3(2.2)	1(0.5)	4(1.2)	9(6.6)	1(0.5)	10(3.1)
Toatal	137(100)	190(100)	327(100)	137(100)	190(100)	327(100)
Chi-square	12.21			37.89		
p-value	0.057			<0.0001		

Table-4: Frequency of school-going habit, Basic Computer and Advance computer knowledge

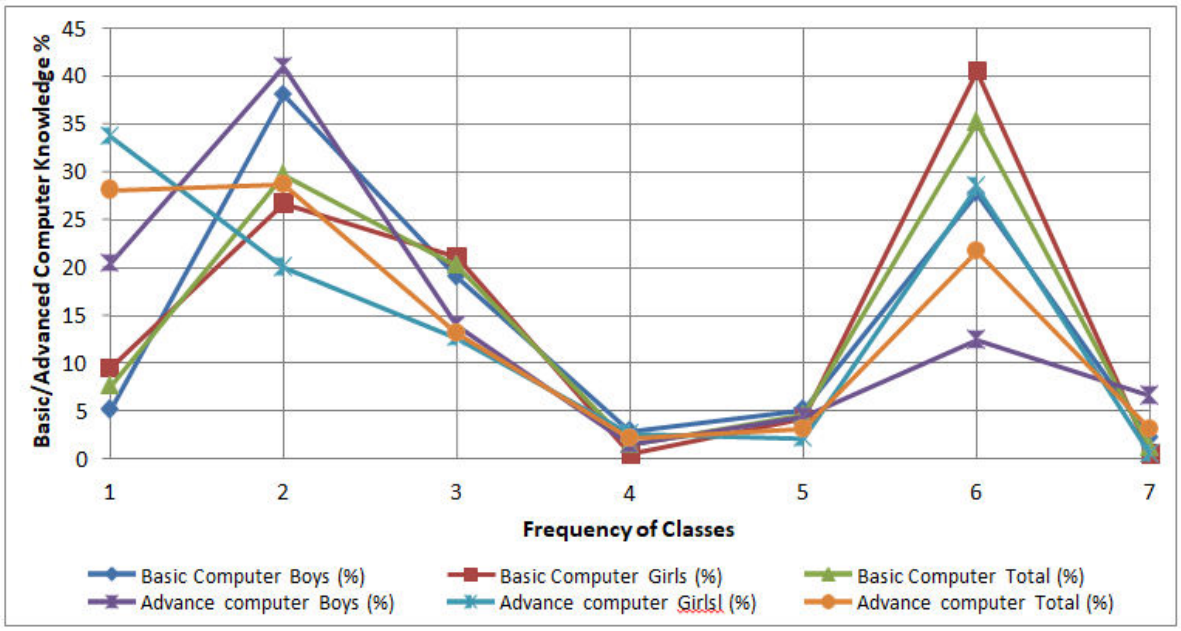

Fig. 2. Comparative analysis of computer knowledge percentage in teenager students based on the frequency of classes

In the 7th class average percentage of boys, students are 43% followed by girls students with 44%.In the 8th, 9th and 10th class overall good increase in computer knowledge is showing in the study. The unexpected result is showing in class 9th, and 10th with a small margin girl is getting a good result in comparison with boys. The study of the advanced computer is higher in Boys in comparison with girls [Table-4]. Fig. 2 shows the graph of computer knowledge percentage in teenager students based on the frequency of classes. In the present study, only 20% of students know promotional advertising for computer education. Most of the family's members do not know basic computer, and they are not showing much interest in gaining computer knowledge, but they are interested in making their children computer literate.

VI. DISCUSSION

Nearly one-fourth of India's population comprises of adolescents [12] and those school-going adolescents are the future of the nation. Hence, it is of utmost importance to improve computer knowledge in school going students. Moreover, adolescent girls are considered a deprived segment and boys have a different approach to computer education. The

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current study noted many interesting observations related to the issues above and tried to tease apart the impact of advertising for the promotion of computer education among school-going adolescent students. The analysis of school-going adolescent students in the present study was comparable to the observations made by Sawyer [13]. This may be explained by the fact that in the current study most of the students are from government schools where parents may provide fewer education facilities. Although the awareness was more in girls as compared to boys the difference was not significant. This can be attributed to the fact that these girls' students had not yet get facility as compared to their boy's counterpart. Nurassyl [14] observed the quality of the small school in computer education. The attitudes of students toward computer education were comparable to a study carried out by Kulik [15].

Other studies have also reported the occurrence of mental growth spurt between 12 and 15 years of age. Boys were significantly more mentally developed than girls, similar results were observed by Prabhakaran [12]. No clear-cut reason was found for this observation, but it may be possible that the boys gave more emphasis to advance computing education. However, boys and girls students showed a similar mean attitude at all ages. It was dismal to observe that in the current study majority of adolescent students (73.7%) were less awareness of computer education (Effectiveness<18.5) which again raises the issues related to poor parental and community attitudes regarding facility providing an educational environment in the house of school-going girls. This was also proved in the current study by the fact that maternal education was lower among the girl's family. A.E.Salako Emmanuel Adekunle has reported similar results (prevalence of less awareness ranging from 53.8% to 68.52%). The computer-assisted intervention was effective in the present study was comparable with the observations made by M. David and N.Gill.

There was a consistently increasing trend of low effectiveness from the age of 11 years onwards as finding in this study. The low effectiveness in the current study subjects was more as compared to the studies conducted by B. Saied. It was found that the mean effectiveness was significantly higher in girls as compared to the boy students except for 11-12 years age group. However, the applicability of effectiveness and its categorization for labeling less awareness in schools using the current criteria is questionable, and the authors propose that instead of using effectiveness <18.5 to label-less awareness, age-specific criteria for effectiveness should be used to categorize less awareness or more specifically understanding computer education. In the present study, the knowledge level of adolescents was also assessed by taking a computer test result. Interest in computer education, which is considered as an index for Knowledge and understanding computer which indicates lack of up to mark knowledge, were observed among the students in all the age groups in both area schools. Prevalence of both interesting and understanding increased with age except an interest in computer education in rural girls where a decrease in prevalence was noted by Susan [16], in his work responds to a need of computer science education research and practice for the school showed 39% of adolescents were not showing interest in computer education.

The prevalence of understanding computers varied between12% to 35% among school-going girls. In the current study, the understanding of computers was more prevalent among boys and interest in computer education was more common amongst girl's students. Attitude being denominator ineffectiveness may be the reason for more Understanding despite less interesting among boys. The prevalence of interest in computer education was higher than the prevalence ofunderstanding among school-going, students. The phenomenon of the higher proportion of interest may indicate that knowledge of computing is responsible for attitude was far below the required level. This could be attributed to the increased support for computer education in rural children and the hostile environment and school-going habits of boys children. Family culture and less support develop low understanding capacity in rural school-going girls for basic computer knowledge, irregular school-going habits develop a low interest in computer education in urban school-going girls. The current study sampled government schools in both rural and urban areas, and therefore, it is presumed that the economic status of the parents of children in these schools was very similar. Therefore, the facility from an economic perspective was presumed the same in both the groups. However, for boy's students, there is a secure facility for advanced computer education. Effectiveness is a good index to assess the current form of facility, support and promotional activities for computer education.

In the current study, the mean age of knowledge for computer education was (13.2 years) almost similar to the age of basic knowledge reported by cardinal [17] at the age of 13 years. It was also observed that boys achieved basic computer knowledge one year earlier as compared to girls. Peter [19], found that girls who gain one to one computing are to provide every student with a Personal computer basic knowledge is significantly higher, and her attitude for computer education is different, effectiveness than those of the same age who has less knowledge without getting such facility. Hakeem [20] found in his study that the knowledge level of girl children having access to formal computer education

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could not be expected to be very different from their boys' counterparts it depends upon the facility provided to them. Similar findings were observed by Arthur [21]. As explained earlier age of basic computer knowledge could be due to lifestyle issues typical of boys living and mostly attributed to support, concentrations and time giving for computer education and school-going habit of boys students has also been reported by Iflah [22] found effectiveness and improving socioeconomic status of boys students is said to affect the age of gaining knowledge. In the present study, it is indicated, that basic computer knowledge of girls is much better as compared to boys, but advanced knowledge of computers is high in boys. After the 10th class, the results on the computer is showing declining trends in both groups students, because usually in the middle class and low-class family students support their family in earning and family works which effect the computer study also.

VII. LIMITATION

Even though an appropriate sample was used in the study, the sample was still not representative of the whole population. This is because children studying in government schools may not be a true representative of the adolescent girl's computer education status of the country as most of these children are from the same group of status family. More studies with a larger sample size involving the general population of students in the age group from 10 years to 17 years drawn from the different community will, therefore, provide more accurate information in this regard.

VIII. CONCLUSION

The results of the current study, therefore, clearly conclude that in general there is a huge gap between optimal/ recommended and observed computer education growth, knowledge and school-going habits and facilities for government school-going adolescent girls in India, specifically in difficult terrains of Jharkhand and majority of an urban and rural school in India. It is unfortunate to note that despite huge expense on an advertisement for the promotion of computer education, facilities provided by schools and support from family, the rural school going girls have a lower attitude towards computer education. More studies will be required to find out the reasons for this observation, and specifically targeted strategies need to improve this situation of computer education in a government school. It can also be concluded that the age of basic knowledge is very much related to awareness, interest in computer education, promotional advertising and school-going habits. More advertising for the promotion of computer education, therefore, may increase awareness among school-going girls, into physiologic processes that will start showing a positive trend. The current study, therefore, adds to understanding the basic knowledge of computer and school-going factors causing growth in knowledge of children which represent a mix of good basic computer knowledge and less knowledge about computer

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