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The Application of Information & Communication Technology in Education Sector through Assisted Classroom Program

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Abstract. The paper deals with concept of implementing Information and communication technology in the education sector for the combined benefit of teachers and students. This motive has to be achieved in a massive scale with special emphasis on rural areas. Hence, the solution obtained after an industrious set of research and development was the concept of Assisted Classroom Program. This paper defines and elucidates the concept and need of this program driven educational process. The paper also explains how this approach has the potential to uplift the current standards of education which is at present heavily dominated by conventional practices. The proposed application of Assisted Classroom program can bring about a colossal change in the quality of education, especially in the rural areas. It has the potential to help teaches and student in order to teach and learn the lessons better and via a holistic approach.

Keywords - Education, E-Learning, Information and Communication Technology, Assisted Classroom Program

I. INTRODUCTION

Information and Communication Technology can be defined as the infrastructure and components which enables modern computing. Today, ICT has expanded in all sectors, but, the most notable of them is the education sector. Teaching and learning with ICT does not only benefit the students but also improves the teaching quality of teachers. With the help of technology, communication has become simpler and more effective. [1]Although there has been substantial progress in the last decade, the truth remains that India is lacking in the education front. The orthodox methods are not so advanced, if we compare to the global standards. Here lies the importance of incorporating Information and Communication Technology in the field of education.

Another factor which bolsters the use of ICT for learning is that it makes learning immersive and filled with fun [2]. The use of ICT opens a new window for children by making them learn via expediting things firsthand rather than reading it through a book. This theory elucidates the term constructivism, which can be defined as an approach of pedagogy where students learn by experiencing new things. The experience could be gather either by travelling to a particular place, performing an activity (physically or virtually) and gathering experience through digital media. Experts suggest that using this approach, student can learn better and it promotes the accommodation and assimilation of fresh thoughts and new ideas. This approach combined with blended learning could be a boon for students as it will now only help them leaning better but will also develop their cognitive thinking skills by making them zealous thinkers rather than fervent readers.

II. RATIONALE AND BACKGROUND

India, a developing nation, one which accounts for a major work force of doctors and engineers, one which can proudly take credit for the invention of 0, one where the youth is pushing the boundaries of innovation and entrepreneurship. But one astounding fact is that, most of the people in this country live in remote and rural areas where they have limited access to education. Imagine what this country of 1.2 billion people could achieve if all of its citizens had access to proper and holistic education.

If we take a quick glance at the major challenges India has, the lack of proper education would definitely make to the list. Now, again demarcating the country into urban and rural areas, it wouldn't be incorrect to state that the rural arear are worse affected by this malice. The allied challenges along with lack pf proper education include the meagerness of access to study materials like books, acute shortage of teaching staff, gender discrimination while providing access to education, paucity of infrastructure etc. All these shortcoming could be countered with the help of technology.

While conducting a survey in rural India, it was found that most of the people there weren't aware about the advancements of technology. Hence, the challenge here is spreading awareness about E-learning in rural areas and at the same time using this newly-created awareness to devise a methodology to be used in improving the basic classroom education in rural India.

III. METHODOLOGY

Internet, smartphones & tablets, various mobile-applications, social media are some of the outgrowing examples and sectors where Information and Communication Technology (ICT) is making its presence felt. It can also be safely inferred that ICT is grazing every facet of the society and this process in whole is resulting into a colossal change in the manner in which the society used to function. One more important fact which is observed here is like every other manifestation, the urban areas are benefitted to a supplemental extent than the rural areas. Hence, and exhaustive and robust strategy is required to usher an insurgency in pedagogy via making use of ICT in rural areas of India [2].

There are two basic methodologies which can facilitate the ICT driven learning process in the villages:

1. The first method could be the even and commensurate distribution of books and other succoring materials to students. This process could be followed by orchestrating online classes in the rural areas with the help of video conferencing at constant and unvarying intervals.
   The frailty of this solution could be too much interference in the form of technology could wean of the essence of classroom teaching.

2. Another option is something which is currently being implemented into some of the teaching initiatives taking place in rural arears of India. This method uses real time recording of lessons also known as video lectures, to be used for the process of pedagogy especially in places where there is an acute privation of teaching staff.
   The vice of this solution this the interaction between teacher has student which is very much responsible for the development of cognitive learning of student; can't take place in this setup.

The feasible solution could be combining the two ideas into a single entity. This gives birth to the concept of "Assisted Classrooms", which would contain the benefits of technology and at the same time maintain the essence of conventional classroom teaching. [3]

The idea also considers the fact that rural areas are scarce on the facets of e-learning technology. Since, the school and teaching staff are not well-equipped with gadgets and services required for the successful implementation of E-learning technologies, the prospective idea should accommodate that. [4].

IV. RESEARCH

In order to understand the practical implementation of ICT in a schooling environment, various activities and field visits were carried out. On 9th of November, 2016, IEEE members visited Ruchika High School in Bhubaneswar for the work of ongoing research project FINDIgATE (Finnish and Indian Education for Well-being), The KIIT IEEE members looked upon the basic structure of the methods employed for teaching of Pre-School and Primary school children. With the objective of looking across the welfare and at the same time, the demerits of the Indian education system, the team interacted with teachers and students likewise. Most of the observations were made on the connection between what the curriculum of the education system and what the children grasped. There were three sessions the team conducted to gather up their observations, which were –

1. Learning of rhymes (Lower and Upper Kindergarten) – With and without Audio/Visual implementation
2. Puppet Show (Upper Kindergarten) – With and without Audio/Visual implementation
3. Sensory Activities(Upper Kindergarten) – With and without Audio/Visual implementation
4. Science (classes 6-8) – With Audio/Visual implementation)
5. English (classes 1-5) – With and without Audio/Visual implementation

During August 2016, KIIT IEEE Student Chapter and Smart Village Living Lab, India bagged an Indo-Finnish research project titled "Finnish and Indian Education for Well-being" as a consortium project with three Indian Higher Educational Institutes (IIT Kanpur, Loyola University and KIIT University) and two Finnish HEI (Laurea University and Turku University). Under this project, about 10 Finnish students and three Professors visited India during 10th January – 23rd January. From the group, one professor and three students worked with the students of KIIT IEEE Student Chapter for the whole period.

KIIT IEEE Student Chapter carried out data collection part of the above project in partnership with Odisha Power Generation Corporation (OPGC) to take up appropriate technology assessment in 35 schools adjacent to its' plant at IB Thermal project at Banharpalli, about 300 km from the KIIT University campus. There was a Mega Learning Camp from 10th to 14th Jan 2017, in which students of KIIT IEEE worked hand in hand with the Finnish team for the combined benefit of 2500 students who participated in the event.

V. Development

During the data collection process, it was observed that the teachers in the rural areas are not well-equipped with the concepts of textbooks and hence they themselves face some amount of difficulty during the pedagogy process [5]. Now, it is practically impossible to remove or replace all the teachers in all of the village schools in India in a short duration of time. Also, even if we try to perform the replacing procedure; there would be no one to replace with as there is acute shortage of schoolteachers in India. The only option left is add a fragment of technology into the classroom which will make up for the current shortcomings [6].

Here, the concept of "Assisted Classrooms" comes into play [7]. Every classroom would be fitted with a computer and a projector. The computer will contain software and interfaces designed for the purpose of:

a) Providing a reference point and containing crisp notes for the teacher to help them at their job

b) Providing various multimedia entities such as Animations, audio clips, videos, Power Point presentations which would create a real life reflection of a concept into a student's mind. These entities would also help the students in visualizing the theoretical situations described in their textbook and hence develop a better understanding of a particular topic.

c) Providing access to various games related to their course of study used as a testing tool for a student's knowledge without creating a fear of being judged by someone.

d) Providing a medium through which the works of the teacher and the overall progress of the schoolchildren could be monitored by respective authorities.

d) Providing an interface for storing data (student ratio, their scores, day to day growth, learning capacity of a child) for researchers who want to explore further in the fields of Education with special emphasis on E-Learning.

VI. Related Work

The malice of impecunious condition of infrastructure continues to haunt the students and staff at almost every government school in the area [8].

To solve this problem, three separate approaches were contemplated by the KIIT IEEE Student Chapter not only to make students cavernously aware about various academic concepts but also to include 'out of textbook' knowledge in order to create a wholesome education package for them.

One of the approach included designing and developing various games which was developed using JavaScript and required a web browser to run. The games would be beneficial for teaching the kids about various science concepts and could also be used as a testing tool for a student's knowledge without creating a fear of being judged by someone. [9]

Another approach was to add digital modification to the conventional game of Lego. Lego are the small building blocks which are often used to boost a student's imagination. It can also be used for senior students as technical Legos are available which is used in Robotics [10].

On January 23rd the first phase of Project FINDIgATE (an Indo-Finnish project aimed at developing Finnish and Indian Education for well-being) was successfully completed which also targets to combat the malaise of insalubrious education standers. The data collection part was done and the next courses of actions were decided which was working on Technical Articles and Research Papers. The team is currently working on ICT interventions of E-Learning [11] and creating awareness on the Innovation and Sustainability aspects of learning. Additionally, more games and multimedia packages (PPTs, animation, videos etc.) are being developed which could be used on a colossal scale for the combined benefit of students and researchers.

VII. Conclusion

The prototype of this model was tested with a beta version of the interface made with PHP scripting language in a few local schools of Bhubaneswar, Jharsuguda and Patna. The interface has two major sections separated from each other via the use of different web frames. The first section contains videos, animations, Question and Answer based quizzes and assignments.

The second section contained information for teachers. This included a glossary of all terms related to the subject, short-notes for quick revision and suggestive teaching techniques for each chapter.

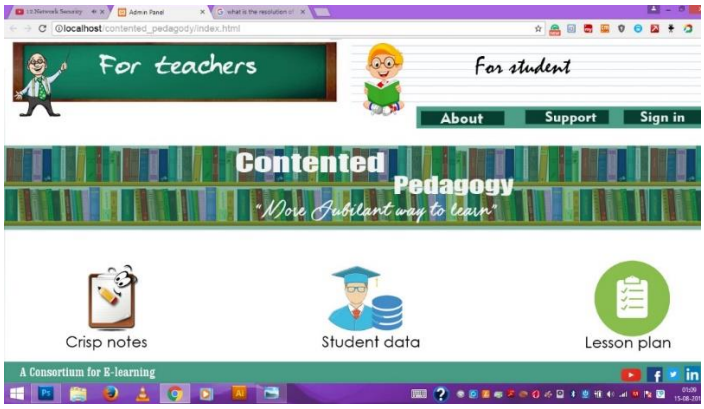

Fig. 1. The teacher's section of the Interface prepared for Assisted Classroom Program.

Fig. 2. The student's section of the Interface prepared for Assisted Classroom Program.

Hence, it was observed that the application of Assisted Classroom program can bring about a colossal change in the quality of education, especially in the rural areas. It has the potential to help teaches and student in order to teach and learn the lessons better and via a holistic approach. It's simple yet robust design is the reason, everyone would be able to use it without undergoing an extra training. This interface also ensures that the student learn while having a lots of fun along the way. This product has a potential to be used on the massive scale and can produce groundbreaking results in a very short period of time.

REFERENCES

[1] P. Pruet, C. Siang Ang, F. Deravi, N, Chaiwut : Malvertising – exploiting web advertising: 12th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON), 2015, Retrieved from: https://kar.kent.ac.uk/id/eprint/50577

[2] G. Beauchamp, J. Parkinson : Pupils' attitudes towards school science as they transfer from an ICT-rich primary school to a secondary school with fewer ICT resources: Does ICT matter?, 2008, pp. 103-118.

[3] M. Firmin, D. Genesi : History and Implementation of Classroom Technology, 3rd World Conference on Learning, Teaching and Educational leadership, 2013.

[4] R. Anand, S. Saxena & S. Saxena : E-Learning and its impact in rural areas: I. J. Modern Education and Computer Science, Issue. 5, 2012, pp. 46-52.

[5] R. Ziphorah : Information and Communication Technology Integration: Where to Start, Infrastructure or Capacity Building?, 5th World Conference on Educational Sciences, 2015, pp. 3649-3658

[6] C. Buabeng-Andoh : An exploration of teachers' skills, perceptions and practices of ICT in teaching and learning in the Ghanaian second-cycle schools, Contemporary Educational Technology, 2012, pp. 36-49

[7] H. D. Mehlinger, S.M. Powers, Technology and teacher education: A guide for educators and policymakers, (2002)

[8] F. Paraskeva , H. Bouta, A. Papagianna : Individual characteristics and computer self-efficacy in secondary education teachers to integrate technology in educational practice, Computers and Education, 2018, pp. 1084-1091

[9] M.Z. Ramorola : A study of effective technology integration into teaching and learning: A case study, University of South Africa, Pretoria, 2010.

[10] E. L. Baker, J. L. Herman, & M. Gearhart : Does technology work in schools?, Why evaluation cannot tell the full story. In C. Fisher, D. C. Dwyer, & K. Yocam (Eds.), Education and technology: Reflections on computing in classrooms, 1996, pp. 185–202.

[11] Development of interactive games, Worchester Polytechnic Institute, Retrieved from : https://www.wpi.edu/academics/departments/interactive-media-game-development/research