1. Introduction

Education has no longer remained as either the prerogative of institutions or the state, and even knowledge has crossed the boundaries of Gurus (teachers). Thanks to Information and Communication Technology (ICT) which has not only brought the revolutions in the education system but also changed the strategies for learning amongst the young masses. As one progress in the present century, almost every day new and advanced technologies are getting evolved and thereby the strategies for learning are also getting updated in the educational institutions. The role of teachers in the context of planning learning experiences in the classrooms is getting replaced with the updated inputs as supported by the ICT. The policy planners, education providers and other players in the system, including parents, also need to get themselves updated to the changing scenario. Traditionally, the teachers are supposed to be repository of knowledge in their respective fields and thereby can essentially facilitate the learning of the students effectively. This calls for self renewal of the teachers on a continuous basis to further strengthen this repository of knowledge. The educational institutions shall have to support for this cause to achieve its goals and objectives. It is in this context the open educational resources (OER) play a significant role to strengthen the education system in the developing world.

If one looks at basic principles underlies in Education for All (EFA) – Access, Equity and Quality in the context of school education in developing and underdeveloped nations, significant steps have been taken on access to schooling across the social groups. But not much has been addressed to quality of education available in the schools at an acceptable level. The 10th edition of the EFA Global Monitoring Report released in 2012 by UNESCO reminds us in the context of quality of education that “among the world’s 650 million children of primary school age, it is time for emphasis to all not only on the 120 million who do not reach grade 4 but also on the additional 130 million who are in school but fail to learn the basic” (EFA Global Monitoring Report: Youth & Skills Putting education to work, 2012, P7). It has been appropriately observed that there has been lack of teacher support; especially placing qualified trained teachers in the schools is one of the major obstacles to achieving the goals of EFA. It estimates that 112 countries, mostly middle and lower income countries, need to expand their teaching workforce by 5.4million at primary level by 2015, and India is not exception to this. Even if they are placed in the schools, they mostly lack the necessary subject knowledge, leave alone how to teach effectively in the classrooms. In addition to this, it has been found, and more true so in Indian context, that the continuous professional development of such teachers mostly tends to stop once they are stepped into the schools. It is, in this
2. OER: The Movement

The Open Educational Resource (OER) materials are the digitized version of the learning materials that are available freely and openly for learners, teachers and scholars to use and re-use for teaching learning and research activities. The basic objective of OER initiative is to have open movement worldwide to explore the effective and efficient systems to create, share and evolve open educational learning materials. The UNESCO has been strongly advocating placing OER into practice. The Free/Libre Open Source Software (FLOSS) movement, at the initial years, joined with OER on the issue related to concretizing how to create resources and those could be re-used and freely maintained. The basic strategy adopted by the FLOSS movement was mostly linked to (i) collective participation in development of content (ii) updating the content by anyone, (iii) contribution by many authors, (iv) defining learning outcomes (v) creation of support network and developing materials in a collaborative manner (vi) adapting ICT solution by the authors.

The history of Open Educational Resources (OER) goes back to 1994 when Wayne Hodgins first time had used the term “learning objects” in the context of instructional design for developing digital materials. He emphasized the importance of designing and producing the digital materials in such a manner as to be used easily in a variety of pedagogical situations. Subsequent to this, David Wiley in 1998 came out with the concept of “Open Content” basically for professional development of experts in the educational community. This idea became more popular by the inter-net users. The idea of “Open Content” was based on the basic principles of open/free source of software acquisition movement and was widely applied to open content and the creation of widely adopting open license for content.

Larry Lessing and others in 2001 developed the idea of “Creative Common” and widely circulated a set of flexible licenses to improve the Open Publication License and thereby increasing the credibility and confidence to the Open Content Community. Subsequently, the Massachusetts Institute of Technology (MIT) in 2001 also announced its “Open Course Ware” initiative to publish nearly every University course for free public access and for non-commercial use. It not only pronounced to encourage taking up such projects at the institutional level but also outsourced such activities leading the MIT brand to the movement.

Subsequently, in 2002 the term “Open Educational Resources” was first adopted at UNESCO’s 2002 World Forum on the Impact of Open Courseware for Higher Education in Developing countries funded by the William and Flora Hewlett Foundation. The forum resolved “Open Educational Resources are defined as "technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes" OERs are typically made freely available over the web or the inter-net. Their principal use is by teachers and educational institutions support course development but they can also be used directly by the students. Open Educational Resource includes learning objects such as lecture materials, references and readings, simulations, experiments and demonstrations as well as syllabi, curriculum and teachers’ guides.” (David Wiley, 2007)
The Working Group on Open Access (OA) and Open Educational Resources of National Knowledge Commission (NKC), Govt. of India while discussing through its report on issues related to access to and quality of higher education observes that easy and widespread availability of high quality educational resources that would drastically change the paradigm of teaching for the better and improve the quality of education in institutions. While perceiving the OER in a narrower perspective, it proposes to free and open digital publications of high quality materials organized as courses that include lectures, related reading materials, snapshots of discussions, assignments, evaluations, etc.

In India, major initiatives for creating open educational resources are mostly in the basic sciences and engineering areas. One of the major programs in India is the National Program on Technology Enhanced Learning (NPTEL) being carried out by seven Indian Institutes of Technologies (IITs), the Indian Institute of Science, and other premier institutions around the country and being funded by the Human Resource Ministry. While the NPTEL objective is to enhance the quality of engineering education by developing curriculum-based video and web courses for the students, it also provides an opportunity for teachers and students from rural areas to learn from these high quality lectures and improve the quality of teaching in their classrooms.

Another important open educational resource initiative is the Ekalavya project launched by IIT, Bombay. In this project, the content is developed in various Indian languages and is distributed through internet. The project has also developed an Open Source Educational Resources Animation Repository (OSCAR) and provides web-based interactive animations for teaching various concepts and technologies. The industries promoting on-line based education mostly have funded this initiative.

The third main Open Educational Resources initiative in India is the E-Grid educational resources. The primary objective is to develop and maintain pedagogically sound and refereed Educational Resources in identified subjects. Subject specific portals are developed and these are managed by subject experts within the program. This project is supported by the Ministry of Human Resource Development, Govt. of India through IIIT, Kerala.

In school education sector not much significant has been attempted in developing OER for students and teachers, except few sporadic initiatives. The National Council of Educational Research & Training, (NCERT), has placed its new edition of textbooks on its web portal for free download by children and teachers. It has also made accessible its audio & video programmes as a depository on the website and in webcast mode. But it serves only the limited purpose as the text books are mostly meant for the classroom transaction with limited option to promote self-learning.

National Institute of Open Schooling (NIOS), an autonomous organisation under the Ministry of Human Resource Development, Government of India, has brought radical changes largely due to the benevolent use of ICT. The changes are primarily of two types: i) offering on-line educational programmes and ii) using open educational resources (OER) where vast amount of educational material can be made available
OER has the advantage of making learning enjoyable, opens up possibility of accessibility to quality learning materials by all, and subject to continuous upgradation of contents by subject experts. Because of its accessibility by all, it has been envisaged that not only the learners of NIOS could be benefited, but also learners from conventional education sector also would have access to the same without incurring any cost. The NIOS has recently taken up development of OER in three areas of vocational education, viz., (i) Computer and IT, (ii) Tourism and Hospitality Management, and (iii) Rural Technology. The basic model used for creation of Open Resource is linked to the Role Based Education for Scenario and Situation Based Learning and Situated Development for Social Reconstruction and Transformation.

The Commonwealth Open Schooling Association (COMOSA), a body represented by the open schools in commonwealth countries under the mentorship of Commonwealth of Learning (COL), is committed to develop, adopt/adapt and share learning materials for its distance learners to address the diversified learning needs. It has recently adopted a policy related to OER in its recently concluded General Body meeting held at Seychelles for larger benefit of the ODL system. The first set of OER in school subjects were also launched and dedicated to the learners.

4. OER in the context of EFA:

With the use of complete ICT applications in networking and global connectedness, the OER becomes independent of any existing delivery modes and can be used suitably in face-to-face, distance or in any mixed or hybrid mode. With the total virtualisation and integration of real life working and living, this becomes a new mode, the trans-mode of education.

Existing curriculum is converted into role and function based blueprint, and each role is specified in terms of functions-processes and expected results. Each process is then described by activities that help in completing the process. Each activity is written with its context or situation and supporting information given for learning, teaching and evaluating. Thus, ultimately the curriculum is changed into role and activities to give results. Each activity needs knowledge, tools, and other resources to complete the activity.

The triangular linkages in development of OER are indicated as below:

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Curriculum

Role & Activities

SUPW ↔ OER
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This triangle maps activities with OER and curriculum; and curriculum could be covered by activities leading to Socially Useful Productive Work (SUPW). This
The ultimate goal is to develop and deliver quality vocational courses by developing Open Education Resources and delivered to students for playing various roles in the areas of their career choice and for obtaining their livelihood and place in society. The basic aim is to make the vocational education sustainable in ever changing skill development process by creating partnerships with institutions and industries, which need to be absorbed in the framework of National Vocational Education Qualification Framework (NVQEF) of Govt. of India. The process of OER development leads to following outcomes:

I) Creation of Open Education Resources (OER) in the form of role based small modules at different levels useful for all students at the Secondary School stage (Classes IX to XII), both pre-vocational and vocational education stages.

II) Creation of OER useful for job situations based on role based courses for Senior Secondary Schools (Classes XI & XII).

III) Creation and management of Course Teams and Study / Training Center Teams and organise their services for learners along with their continuous training and up gradation of vocational competencies and capabilities.

IV) Creation, management and maintenance of learner groups and their associates and communities of teachers / trainers and learners and practitioners for continuous and sustainable development.

V) Creation of network of provider institutions, teacher & trainers, users and agencies involved in the vocational education and employment and form their consortium or alliance for sustainable program development and deployment. NIOS with the support of institutions/organisations strives to achieve the goals in a partnership model.

VI) Creation of mechanisms for value conversion and wealth creation, quality assurance and interest based community formation for the management of public-private and community partnerships for the socio-economic development of the locality and local community in the context of globalisation.

5. OER and Open Schooling:

The entire efforts for developing exemplar OER materials rest with the following principles with the ultimate goals to empower the open schooling movement in the developing nations in the following context:

i. **Access and distribution of learning Resources:** OER helps in bringing collegiality and on-line co-operation among educators who share not only development of learning resources but also helps to increase the quality of learning resources that are available beyond the four walls of the classrooms. Since the learning materials are available at the public domain for use, which otherwise would have remained inaccessible.
OER offers not only an opportunity in building the individual but also of the institutions through effective networking. For example, the teachers have to search for potentially useful resources based on the most updated knowledge which further enables them to adapt and reuse and thereby significantly helps them to build their own capacity and also they can further contribute for updating the resource materials by providing necessary feedback out of their own experiences.

iii. **Collaborative Efforts:** The principle of OER is basically enhances in collaborating efforts in creating learning resources, more specifically in the context of developing countries. As the whole effort of collaboration is online, the materials can be infinitely customized, availability of appropriate free content license is used. Thus, this enables the developing nations to lead developments and contribute significantly to the knowledge community as active partner. These collaborative efforts facilitate in material development process and helps in empowering educators to demonstrate their potentialities.

iv. **Best Practices:** OER are basically stored in databases or repositories. Since level of documenting the resources are undertaken scientifically, hence there is an ample scope to store the best practices in the form of source form, which usually goes unseen. Even this helps both educators and the organization to demonstrate the practices in their local situation with suitable adaptation, if necessary.

v. **Research:** OER has strong component of research. Any resource material gets developed under the free content principles require to have strong basis of research. Since its primary goal and to create and host free content, multi-media learning materials, resources and curricula for all age groups irrespective of languages, a scientific method of approaching the material development process becomes a component of basic research. Similarly, the effective use of these materials and feedback generated helps in further enhances the quality of resource materials.

6. **Conclusion:**

Since courses offered by open schooling system are basically linked to empowering learners, it is largely follows the common curriculum to bring in equivalency with the formal schooling system for wider acceptability. The initiative taken by NIOS to bring the process into the open platform may help the institutions and individual not to replicate the curricular inputs. Under the existing ever changing socio-technological scenarios and work and market situations, the task of curricular practices in open schooling system would become much easier process linking education with work. The OER, thus, has become a movement worldwide for not only acquisition of knowledge in a digitized form but also has the significant characteristics to be repository of updated knowledge. No doubt this revolutionary initiative has come a long way in recent years for developing countries as blessing for increasing access to quality resource materials, which not only facilitates learning but also addresses the quality issues in school education, including open schooling, and more so linking education with livelihood.
1. David Wiley (2007) paper presented in the Expert Meeting on Open Educational Resources organized by OECD at Centre for Educational Research and Innovation of Utah State University Centre for Open and Sustainable Learning, USA.


4. Tom Caswell, Shelley Henson, Marison Jenson & David Willy (2008)” Open Educational Resources: Enabling Universal Education”, The Center for Open and Sustainable Learning, Utah State University, USA.
