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IMPACT OF ON-LINE EDUCATION ON HIGHER EDUCATION SYSTEM

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Abstract:

Education is the most important thing for any country to develop and prosper. Education moulds the character and intelligence of individuals. It also provides the talent and motivation to every person. The conventional education system at higher education level is analogous to brick and mortar type business system, where a student gets systematic education from college/University by personally attending required courses regularly (Full time/part Time). However, the conventional education system has many drawbacks and lot of improvements are expected in future days. One of the possible developments in next generation education system is online education. In this paper, we have discussed the online education system as next generation education system and impact of online education system in higher education on development of science & society. The types of online education models and their importance are discussed. The advantages, benefits, constraints and disadvantages of online education systems are discussed. The features some of the online portals are studied by considering some of the important online education models e.g., edX, Alison, NPTEL and UZity as case examples. Finally, the online education system is compared with a hypothetical system called "Ideal education system".

Index Terms: Online Education, Global Education Models, Factors Affecting Online Education & Impact of Online Education

1. Introduction:

Education is the most important thing for any country to develop and prosper. Education moulds the character and intelligence of individuals. It also provides the talent and motivation to every person. The conventional education system at higher education level is analogous to brick and mortar type business system, where a student gets systematic education from college/University by personally attending required courses regularly (Full time/part Time). However, the conventional education system has many drawbacks and lot of improvements are expected in future days. One of the possible developments in next generation education system is online education [1]. Online education has seen a rapid progress in the recent years, making it one of the most discussed subjects in the education domain. It has taken away some of the major limitations of the classroom based education, like location, accessibility, transportation and cost. The developments in education system using technology and pedagogy made the training system more effective and presently students are enjoying the experimental and choice based education systems at all primary, secondary and higher education level. Using the model of self-learning with the aid of audio and video information is becoming more popular and easily adoptable among the children [2]. For example, Children learn video gaming very quickly and focus on it hours together without need of intensive training. Even though school system is essential at primary and secondary level for peer group interactive learning, the higher education can be provided various online and distance education mode through TV channels, online education portals so that the young generation should be encouraged to work while doing higher studies. This kind of earn while learn models will support students financially so that they need

not wait to get financial support and hence dependent on their parents or the government.

In this paper, we have discussed the online education system as next generation education system and impact of online education system in higher education on development of science & society. The types of online education models and their importance are discussed. The advantages, benefits, constraints and disadvantages of online education systems are discussed. The features some of the online portals are studied by considering some of the important online education models e.g., edX, Alison, NPTEL and UZity as case examples. Finally, the online education system is compared with a hypothetical system called "Ideal education system".

2. Next Generation Education:

Competency-Based Credit System (CBCS) is a significant improvement in education model. It provides an opportunity to personalize the learning in higher education by means of providing a proper direction while choosing the subjects, and in assessment. Competency-based programs allow students to demonstrate academic competence through a combination of assessment and documentation of experience to gain academic credit. It allows students to progress at their own pace, incorporates the process of prior learning assessment, to offer a logical framework for improving knowledge, skills and experience as per the demands of the industry to the extent decided by the institution. A student need not necessarily have to take predetermined subjects required and elective courses to be taught by approved faculty members. Rather, it would mean that a student has demonstrated a defined set of proficiencies and mastery of knowledge and content.

CBCS model is much effective for students who carry out higher education through 'learn-while-earn model' due to the fact that they get practical experience in their interested area, which can be converted into academic credits along with the theoretical and conceptual understanding of the subject. CBCS also works well for adults who are returning to school to complete programs of study after few years working experience and in such cases it has the potential to reduce costs shortening the duration and time to the completion of the course. Competency-based course design requires more proper planning of the courses than what is currently done for conventional Credit Based System. Conducting number of assessments to continuously measure the student mastery in a chosen subject is labour-intensive. Instead of offering periodic assessments per subject per semester of a course in Credit Based system, competency-based system requires to provide hundreds of opportunities to each student to test their understanding the subject. Along with determining the competency in the subject, these assessments are required to determine how quickly they can move through the curriculum, a fundamental requirement of the CBCS model [3]. Earning college credit by virtue of life experience runs afoul of classroom experience, which many educators believe to be sacred. Designing and developing CBCS courses requires special tactics. Some institutions developed hundreds of formative assessments used to measure student progression to ensure that students have qualified the prescribed learning objectives and learning activities. In fact, this assessment capability of such institutions is going to be core capability to develop collaboration with other institutions only for effective assessment of human resources for industries [4]. The difficulty and constraints of CBCS model is preparing and supporting students learning at different paces due to their different capabilities unlike present classroom teaching. This has both pedagogical and administrative implications, as students learn same subject at different time based on their personal capability. How to provide this benefit

to the students while accommodating variable time-to-completion? But the main ingredients of CBCS model is student centric independent learning in his/her own pace. For this, institutions need to be able to register and process students on an ongoing basis. This is technically simple, but not as easy as we imagine due to the fact of embedded nature of administrative systems in our institutions.

Competency models recognize the value of experiential learning, in which students can develop and hone skill sets in real-world contexts. For instance, a student with a background in web design may be able to provide an institution with a portfolio that demonstrates mastery of computer coding or digital design. If coding or digital design is a discipline in which the institution gives credit, and the mastery demonstrated is sufficiently similar to that achieved in the classroom, then the institution may grant credit based on that portfolio. The logic of competency-based credit is compelling through individual learning or online learning or even traditional classroom based learning. Here, the process attaining the required level of competency can be different but reaching the level of competency is important. After all, colleges and universities hire most people to teach so that students learn. If students can achieve the desired learning in other ways, then why not provide them with the same credential as those who sat in the traditional classrooms with the traditional faculty members?

In future days, if more higher educational institutions adopt competency-based models, more and more students will earn degrees from such institutions by taking the courses where they have earned competency and perhaps interact minimally with professors.

3. On-Line Education Models:

There are number of models developed on how to deliver education effectively using many tested pedagogy. All of these models may not end up thriving in the long-term, but the following models have potential for attracting the learners. These models are differing in terms of course design, pedagogy and the channel by which information is created and transmitted:

- ✓ Traditional full time classroom based face-to-face programs
- ✓ Traditional part-time classroom based programs
- ✓ Non-Profit Online Programs
- ✓ Profit-based Online Programs
- ✓ Online Competency-Based Education Model
- ✓ Open Education Practices
- ✓ Massively Open Online Courses, or MOOCs
- ✓ Flipped Classrooms
- ✓ Self-learning
- ✓ Complete online competency based Higher education through Mobile Devices.

4. Importance of Online Education System:

The benefit from the students' point of view is accessing education services anywhere, any time and any extent of time. These features significantly save the valuable time of the student. The main advantages of online mobile education for the global students are listed as follows [5]:

Ubiquity: Through mobile devices, education applications are able to reach students anywhere at any time. On the other hand, students can get any course they are interested in, whenever they want regardless of where they are, through Internet-enabled mobile devices. In this sense, mobile education makes a service or an application available wherever and whenever such a need arises. Communication can take place independent of the students and universities location. The advantages

presented from the omnipresence of information and continual access to university courses will be exceptionally important to time-critical applications. Ubiquity is most supporting feature of competency based learning system.

Personalization: Huge number of education courses, services, and applications are currently available on Internet and the relevance of information received by users is of great importance. Since owners of mobile devices often require different sets of applications and services, mobile education applications can be personalized to represent information or provide services in ways appropriate to the specific students use. Additionally, personalized courses/content is paramount in operating mobile devices because of the limitation of the user interface. Relevant university courses must always be only a single "click" away, students can access required courses systematically where they have created competency to take assessment exercise.

Reduced Costs: This is due to availing and using various courses and services by number of students online. The course fee charged by service providers/universities is much cheaper than fees of conventional education systems. The heavy competition and the price war between mobile service providers also reduced mobile service usage cost. So, online based CBCS model allows students to qualify in prescribed subjects by taking assessments from service provider through online, which decreases the cost of availing degrees based on online based evaluation procedure.

Flexibility: Because mobile devices are inherently portable, students may be engaged in activities, such as working or travelling, while doing their study through their internet-enabled mobile devices. The skills and experience they learned can be used for online assessment to get relevant degrees.

Increased Comfort: Many students secretly hate the conventional education system because of punitive fees, inconvenient working hours and unhelpful university staff. In online mobile education system, due to quick and continuous access of interested and required courses from any global university, the service is available 24 hours a day, without requiring the physical interaction with the instructors. So, online CBCS model has advantage of independent student centric learning and earning degree online without physically attending classes.

Time Saving: The main benefit from the online mobile education system for student's point of view is significant saving of time by the automation of education services including access to study materials, video lectures, online assignment submission, online interaction/discussion with both instructors and peer students, online exam and evaluation etc. Since the response of the medium is very fast, the students can get their result soon after the examination. CBCS model imparted online also has this benefit.

Convenience: The ability and accessibility provided in wireless devices will further allow online mobile education system to differentiate its abilities from conventional education systems. People who want to study any course in any university will no longer be constrained by time or place. Rather, it could be accessed in a manner which may eliminate some of the labor of life's activities. For example, students waiting in line or stuck in traffic will be able to access course materials/take an exam through online mobile education applications. Students may recognize a special comfort which could translate into an improved quality of life. Similarly, online CBCS model is most convenient to get college degree for working class people.

5. Online Competency-Based Education Model:

Competency-Based Credit System (CBCS) is a significant improvement in education model by designing a new evaluation system. It provides an opportunity to personalize the learning in higher education by means of providing a proper direction

while choosing the subjects, and its assessment. Competency-based programs allow students to demonstrate academic competence through a combination of assessment and documentation of experience to gain academic credit. It allows students to progress at their own pace, incorporates the process of prior learning assessment, to offer a logical framework for improving knowledge, skills and experience as per the demands of the industry to the extent decided by the institution.

Competency-based Credit System (CBCS) works backwards within a course, starting with the desired outcomes through a learning objectives and relevant assessments, and then moving to the learning experiences that should lead students to the outcomes. Typically there is a desire to include flexible pathways for the student to achieve the outcomes. CBCS can be implemented in various modalities, including face-to-face classroom, online education and hybrid models [6].

In CBCS the outcomes are more closely tied to job skills or employment needs, and the methods are typically self-paced. Some of the critical components of CBCS are as follows:

- ✓ Explicit learning outcomes with respect to the required skills and concomitant proficiency (standards for assessment)
- ✓ A flexible time frame to master these skills
- ✓ A variety of instructional activities to facilitate learning
- ✓ Criterion-referenced testing of the required outcomes
- ✓ Certification based on demonstrated learning outcomes
- ✓ Adaptable programmes to ensure optimum learner guidance

CBCS may be offered on campus or off campus, in the classroom or online, accelerated or normally paced. The institutions offer CBCS define competencies that are expected of graduates and students demonstrate these competencies by successfully completing courses that relate to the required competencies. In some cases, institutions embed competency assessments into each course. Some institutions also offer the option of awarding credit for prior learning, through prior learning assessments.

In the case of online CBCS, the program moves into a self-paced model. Some of the characteristics of online CBCS programmes are:

- ✓ Fully-online
- ✓ Self-paced
- ✓ Flexible to allow for retaking of assessments until competency demonstrated
- ✓ Flexible to allow passing of assessments up front and not even need instruction / activities, thus allowing credit for life experiences or prior learning assessments (PLA).

Currently emphasis and growth in CBCS is driven by the desire to provide lower-cost education options through flexible programs – lower cost is the driver. The investment community is not playing as big of a role in CBCS as they are in Massive Open Online Courses (MOOCs) like NPTEL, edx, Coursera, Udacity etc. This unique competency-based model will allow students to start classes anytime they like, work at their own pace, and earn credit for what they already know. Students can demonstrate college-level competencies – no matter where they learned the material – as soon as they can prove that they know it. By taking advantage of this high quality, high flexibility model, and by utilizing a variety of resources to help pay for their education, students will have new tools to accelerate their careers [6].

6. ABCD Analysis of Online Education System:

The simple ABCD analysis model consists of listing advantages, benefits, constraints and disadvantages of the system [7 - 8]. For online education system the simple ABCD analysis is listed below:

Advantages:

- ✓ Convenience
- ✓ Choice based subjects
- ✓ No wastage of time
- ✓ Global quality
- ✓ Accessibility to global technology & education models
- ✓ Flexibility in time & learning
- ✓ Students from all over the world to service providers
- ✓ Acclaimed professors can reach global students.
- ✓ New courses, new pedagogy can be used to attract global students.
- ✓ Quality and brand based sustainability.

Benefits:

- ✓ Technology based innovations in examination system
- ✓ Earn while learn benefit
- ✓ Low fee opportunity
- ✓ High quality education at affordable or low cost.
- ✓ Learning courses are available at anytime, anywhere.
- ✓ International quality and international acceptability of certificates.
- ✓ Better earning opportunity for service providers.
- ✓ Better branding opportunity for service providers.
- ✓ By reaching global students, Professors can develop personal brand.
- ✓ New courses, new pedagogy can be popularized globally.

Constraints:

- ✓ Designing online courses in different subjects
- ✓ Identifying futuristic areas
- ✓ Finding and retaining suitable faculty
- ✓ Innovative examination and evaluation model
- ✓ Expenditure for online advertisement for marketing courses
- ✓ Checking the accreditation and quality of the programmes
- ✓ No human direct interaction unlike conventional classroom programmes
- ✓ Courses which need practicals are difficult even if run through simulations.
- ✓ Students may feel loneliness and sense of isolation if they are not working
- ✓ Less opportunity for interaction with teachers/instructors.

Disadvantages:

- ✓ Lack of credibility of online courses.
- ✓ Low acceptability from industries while offering job.
- ✓ More hard work due to intensive assignments and pressure to maintain deadlines.
- ✓ Students have to be responsible for their own learning
- ✓ Global competition in a given subject for the students.
- ✓ Personality development in not possible due to no direct interaction with classmates.
- ✓ Less creativity and innovating ability due to less interaction with teacher/instructors.
- ✓ High initial investment for service providers.

- ✓ Only self-motivated students get benefit, but unmotivated students fails to complete the course.
- ✓ Online courses focus more on improving knowledge but conventional classroom based courses improves soft skills along with knowledge.

7. Case Examples of Online Education System:

In this paper, we have discussed the impact of online education system in higher education by considering two next generation online education models e.g., edX, and Alison consortiums are discussed as case examples. ALISON - a service of free learning and certification through on-the-spot assessment making it possible to test anyone, on anything, at anytime, anywhere via the web. EDX - a non-profit online initiative created by founding partners Harvard and MIT. Finally, the next generation online education system is compared with a hypothetical system called "Ideal education system".

- ➢ **NPTEL:**

NPTEL (National Programme on Technology Enhanced Learning), India is a joint initiative of the IITs and IISc. Through this initiative, NPTEL offer online courses and certification in various topics. These Online courses**:** Free for all, Certification examinations are offered for a nominal fee. Presently as on the February 2016, number of courses ongoing are 47 with duration of courses: 4 weeks,, 8 weeks or 12 weeks. There are courses of 10 hours, 20 hours and 40 hours on different topics of different subjects. Each course contains video lectures, Assignments, and course end exams for registered participants. Participants can answer the assignments based on watching video lectures available for download [9].

- ➢ **ALISON:**

ALISON is an e-learning provider and academy founded in Galway, Ireland in 2007 by serial entrepreneur, Mike Feerick. Its stated objective is to enable people to gain basic education and workplace skills. The majority of ALISON's learners are located in the developing world with the fastest growing number of users in India. ALISON registered its 5 millionth learner in February 2015, making the online education provider one of the biggest MOOCs outside of the US. ALISON currently offers over 750 courses across certificate and diploma level in ten languages. ALISON is one of the world's largest free online learning platforms, providing 750 free courses at diploma and certificate level. The certificate level courses necessitate 1–2 hours study with the more rigorous diploma level offerings requiring 9–11 hours study on the part of the learner. ALISON note on their website that 'there is no time limit on completing a course, so learners can study entirely at their own pace' and that some of the courses such as the Microsoft Digital Literacy Program may take up to 20 hours to complete. One of ALISON's most popular courses ABC IT, a 15–20 hour training suite is cited by the New York Times as 'covering similar ground' to the International Computer Driving License without the cost of certification [10].

- ➢ **EDX:**

Founded in May 2012, by scientists from Harvard and Massachusetts Institute of Technology. Gerry Sussman, Anant Agarwal, Chris Terman, and Piotr Mitros**,** edX is a massive open online course (MOOC) provider. It hosts online university-level courses in a wide range of disciplines to a worldwide student body, including some courses at no charge. It also conducts research into learning based on how people use its platform. EdX differs from other MOOC providers, such as Coursera and Udacity, in that it is a non-profit organization and runs on open-source software. EdX has been developed as open-source software and made available to other institutions of higher learning that want to make similar offerings. On June 1, 2013, edX open sourced its entire platform.

EdX currently has 272 courses, 140 soon starting courses, 64 upcoming courses, 226 self-paced courses and 365 archived courses. These courses are further classified as Introductory courses (538), Intermediate courses (241), and Advanced courses (62). Out of these courses, 706 courses are available in English language [11].

- **UZITY:**

Uzity is a virtual learning environment and course management system developed by Foradian Technologies. It is a collaboration platform for students, teachers, administrators and management of an institution. Uzity helps in knowledge management of the entire institution and functions as a repository of course, information and collaboration data. It is developed by the same team who developed Fedena. Uzity helps to invite teachers and students to collaborate and learn the contents of different courses. Students can ask questions specific to each topic and the answers can be given by teacher or other students. It allows uploading learning resources of different topics related to the course and also let to share the resources of other courses in the same organization. Uzity gives full control of designing and implementing the learning activities of an institution [12].

- **Other Popular Free Online Courses:**

Business Insider, India, [13] in its article on The 10 most popular free online courses for professionals, has listed the following 10 online courses professionals in different areas from IT to management.

- ✓ **Learning How to Learn: Powerful mental tools to help you master tough subjects — University of California, San Diego:** In this course, Oakland University professor Barbara Oakley and Salk Institute professor Terrence Sejnowski use studies of brain chemistry to determine the best ways to approach a new subject, memorize facts, and deal with procrastination.
- ✓ **Mastering Data Analysis in Excel — Duke University:** In this course Duke post-doctoral fellow Jana Schaich Borg and director of the Center for Quantitative Modeling Daniel Egger teach students how to use Excel to understand the concepts behind uncertainty-reduction and information-gain predictive models that data scientists use.
- ✓ **Programming for Everybody (Getting Started with Python) — University of Michigan:** This is a Python course, from Michigan professor Charles Severance. It's part one of five, so consider this one if you're looking for a more thorough foundation.
- ✓ **Machine Learning — Stanford University:** For the people who wants to learn about artificial intelligence, this is right course to start. Stanford associate professor and Coursera cofounder Andrew Ng uses case studies and programming exercises to illustrate some of the ways machines learn.
- ✓ **R Programming — Johns Hopkins University:** This is a on line course in the Johns Hopkins data science package. It introduces students to the R programming language, which is the world's most popular language for data analysis.
- ✓ **The Data Scientist's Toolbox — Johns Hopkins University:** This course is offered by Johns Hopkins professors Jeff Leek, Roger D. Peng, and Brian Caffo to give an overview of what exactly data scientists do, as well as to introduce students to some of their tools: version control, markdown, git, GitHub, R, and RStudio.
- ✓ **Tibetan Buddhist Meditation and the Modern World — University of Virginia:** This course from University of Virginia professors David Francis

Germano and Kurt R. Schaeffer takes a look at multiple Tibetan Buddhist meditation traditions from historical, religious, scientific, and practical purposes. It's a multi-layered introduction to the roots of an increasingly secularized practice.

- ✓ **An Introduction to Interactive Programming in Python (Part 1) — Rice University:** Python is one of the world's top five programming languages and is used at organizations like Google, Yahoo, and NASA. It's a high-level language, but a novice can learn the basics relatively easily. Rice professors Joe Warren, Scott Rixner, John Greiner, and Stephen Wong keep the course interesting by having students use Python to build simple games like Pong and Asteroids.
- ✓ **Successful Negotiation: Essential Strategies and Skills — University of Michigan:** This course is taught by Ross School of Business professor George Siedel around the world and says his research-based class is useful whether you're trying to secure a million-dollar investment in business or to lower the cost of cable bill.
- ✓ **Introduction to Financial Accounting — University of Pennsylvania:** This course is taught by Wharton professor Brian J. Bushee including the basics of Accounting. By the end, participant will know how to confidently read an income statement, balance sheet, and statement of cash flows.

8. Ideal Education System:

Education at its best will effectively prepare students for the working world. An ideal education system would not only prepare students for the working world but would also prepare them to become empowered to transform the working world to better suit the needs of the people. An Ideal education system shall have characteristics which can be predicted and classified. Based on various factors which decides the ideal education system characteristics, a model consisting of the input conditions, output conditions, system requirements, and social & environmental conditions [14-16].

- ✓ The Ideal Education provides education to the entire world rather than a single neighbour-hood /Country and hence it has an unlimited global reachability.
- ✓ The Ideal Education offers courses of study, which enjoys an inelastic demand in the world market. (Inelastic refers to a Course that people need or desire almost at any price.)
- ✓ The Ideal Education provides all types of courses in all field of specialization and imparts knowledge, skills and experience to all people irrespective of their age, gender, previous qualification and country of origin.
- ✓ The Ideal Education system provides high quality education to everybody irrespective of their economic, social, linguistic and cultural background.
- ✓ The Ideal Education system need minimum instructors in identified courses and must utilize optimum service from them.
- ✓ The Ideal Education system operates on a low overhead. It does not need an expensive location, big campus and huge amount of infrastructure. Only a few Universities are required to provide quality education to the entire world.
- ✓ The Ideal Education system does not require major investments in equipments and other education & training. systems or repetition of large number of universities in every state and every country. In other words, it does not require huge capital.
- ✓ The Ideal Education system is relatively free of all kinds of government regulations or restrictions.

- ✓ The Ideal Education system is portable or easily moveable. This means a student registered for a course should get the service wherever he moves.
- ✓ The Ideal Education system satisfies its students intellectual needs. There are no constraints like compulsory subjects, minimum and maximum subjects.
- ✓ The Ideal Education system leaves enough free time to instructors as well as students. In other words, it doesn't require attention/study of 12, 16, or 18 hours a day.
- ✓ The Ideal Education system is one in which the income of the university does not limit by personal output (Leverage). In the Ideal Education system, one can train 10,000 students as easily as can have one."
- ✓ The ideal Education system students can take exams any time, any number of times and results should be declared immediately. There is nothing like losing a year due to failure in examination.
- ✓ The ideal Education system will provide services to its registered students anywhere, any time and any amount of time. i.e., it is ubiquitous.
- ✓ In ideal system, the technology is used in such a way that all pedagogies of education system should be delivered effectively.
- ✓ An ideal education system provides all students with not only basic knowledge but also social skills and good behaviours.
- ✓ In ideal Education system, the demand for variety of courses is higher than supply and the efficiency of the system is always 100%.
- ✓ In ideal Education system, the students have a choice on alternative in terms of course/service providers.
- ✓ The ideal Education system will be sustainable for long time.

Any education system which has the above properties is considered as ideal education system and the conventional education systems called brick and mortar systems have serious drawbacks/limitations in terms of the above properties [5].

9. Conclusion:

Online education has made rapid progress in the recent times, making it one of the most analysed and discussed subject in higher education system. In this paper, we have discussed the online education system as next generation education system and impact of online education system in higher education on development of science & society. The types of online education models and their importance are discussed. The advantages, benefits, constraints and disadvantages of online education systems are identified and discussed. The features of the online education portals are studied by considering some of the important online education models e.g., edX, Alison, NPTEL and UZity as case examples. Finally, the online education system is compared with a hypothetical system called "Ideal education system".

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