

A PRELIMINARY STUDY ON BUILDING AN E-EDUCATION PLATFORM FOR INDIAN SCHOOL-LEVEL CURRICULA

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ABSTRACT

In this study, we explore the possibilities of utilizing and implementing an e-Education platform for Indian school-level curricula. This study will demonstrate how the e-Education platform provides a positive result to the students' learning and how this tool helps in managing the overall teaching processes efficiently. Before describing the overview of this e-Education methodology, the current Indian education policies, and the curriculum implementation strategy in School-Level education will be discussed. We will extend our opinions on current state-of-the-art e-Learning methodologies employed in Finnish educational institutions and pursue a comparative study on Indo-Finnish education systems. In this paper, our views on the appropriateness of the developed platform (*ViLLE* e-Education Platform) towards Indian elementary-level curricula and its foreseen implementation impacts will be presented. At last, we will show that the chosen approach is green, environment-friendly, and highly aligned with the roadmap of reducing and eliminating paper consumption in academic institutions in the future.

KEYWORDS

Minimum Level of Learning, e-Education, e-Learning, Educational Technologies, Green and Environment-Friendly Teaching

1. INTRODUCTION

India is the most populous country (Demography of India, 2016), approx. 1.21 billion populations, distributed in 36 states and union territories. 40% of the population, i.e. approx. 480 million (more than 80 times population of Finland) are under the age of 19. The age structure demographics of India also illustrate that 31.2% of the population lies in between 0 to 14 years age group (Demography of India, 2016). The government of India has put a stronger emphasis on School-Level education. The Digital-India initiatives, recently launched by Prime Minister of India, has been foreseen to facilitate several e-services including e-Education improving the current digital literacy. Schools in India are continuously updating their course curriculum for digital literacy to keep up with accelerating technological developments. There is a national organization that plays a key role in developing policies and programs, called the National Council for Educational Research and Training (NCERT, 2016) that prepares a national curriculum framework. Each state and the union territory have its counterpart called the State Council for Educational Research and Training (SCERT). These are the bodies that essentially propose educational strategies, curricula, pedagogical schemes and evaluation methodologies to the states' departments of education. The SCERTs generally follow guidelines established by the NCERT, however, the states have considerable freedom in implementing the education system. Education in India is provided by the public sector as well as the private sector, with control and funding coming from three levels: central, state, and local. Under various articles of the Indian Constitution, free and compulsory education is provided as a fundamental right to children between the ages of 6 and 14. The economy of India is progressively growing, and national policy is to build a 'Digital India' within all the sectors (particularly Health and Education) of development.

In recent years, the impression of Finnish education system particularly in elementary-level has been highly appreciated by Indian media (*Ramrajya*, 2015). Moreover, a memorandum of understanding (MoU) between the consortium of Finnish higher education institutions and Indian Institutes of Technology

(*IIT_FinnishConsortiumMoU*, 2016) was signed during October 2014 for promoting mutual cooperation. Tot and Zivkovic (2011) proposed that with the advent of modern computer and communication technology, many computer-assisted educational tools have been developed and proliferated excessively in recent years in both the countries. Digital technologies are being incorporated in exciting and promising ways at all levels of education. E-Teaching, e-Content, e-Exam and e-Learning are now becoming the new trends for technology driven education systems. The research results by Kraidy, (2002) show that the current and next generation students are more likely to employ a digital media in their studies. To consolidate progress and to ensure scale and sustainability, educational institutions need to review their organizational strategies, in order to enhance their capacity for innovation and to exploit the full potential of digital technologies and the content.

The Department of Information Technology, University of Turku has developed an e-Education platform. The goal of this development is to realize and implement digitally the course curriculum effectively and efficiently and to strengthen current teaching and learning practices. In this study, we will demonstrate that the *ViLLE* platform that our department has created can be nicely utilized in the Indian school level education system for better learning outcomes.

Various literature (*Ketamo 2002, et al Silius 2014, Soni 2010, and et al Dattatraya 2015*) can be found on the Finnish and Indian education systems independently, but a close comparative study of both the education systems and e-Education platforms currently being employed in each of the countries are still being a subject of research. In this paper, we begin a preliminary study for building an e-Education platform for better learning outcomes in the Indian schools using Finnish educational technology. The paper is structured as follows. The next two sections provide an overview of the education systems of Finland and India respectively. Section IV illustrates a comparative study on *Indo-Finnish education systems. Anticipated Implementation Impacts and Live Statistics of Students' Submissions* are respectively described in sections V and VI. The concept of *Green and Environmentally Friendly Education* will be discussed in section VII. Conclusion, Acknowledgment, and the References are the subsequent sections of the paper.

2. OVERVIEW OF EDUCATION SYSTEM IN FINLAND

In the reports published in online MBC times (MBC Times, 2015) and fairepoters.net (Fair Reporters, 2015) during the year 2015 clearly, depicts that Finland has been classed in the top five successful countries in offering education to their citizens. According to MBC times report, in 2012, Finland was the world champion for providing the best education. A central objective of the education in Finland is to provide all the citizens with equal opportunities. One of the basic principles of Finnish education is that all people must have equal access to high-quality education and training. The same opportunities to education should be available to all citizens irrespective of their ethnic origin, age, wealth or where they live. Some of the features of Finnish education system (*Education in Finland*, 2012) are listed in bullet points as follows.

- Every pupil and student have the right to educational support.
- Special needs education is generally provided in conjunction with mainstream education.
- Educational autonomy is high at all levels.
- Quality assurance is based on steering instead of controlling.
- Assessment is part of daily schoolwork.
- Teachers are recognized as keys to quality in education.

The primary-level school education in Finland begins when a child becomes 7 years old. A child below the age of 7 years normally goes to pre-school (In Finnish: *Päiväkoti*) where kids mostly learn during playing and indoor-outdoor activities. The details on Finnish secondary, higher secondary and university-level education can be studied online (*Education in Finland*, 2012).

3. INDIAN EDUCATION SYSTEM

The report entitled as *Learning Indicators and Learning Outcomes at the Elementary Stage* (NCERT, 2014) published by NCERT in the year 2014 emphasizes that *Access, Equity, Quality, Governance* are the four core

priorities of education policies in the Indian elementary level school curricula. The present curriculum is not only prioritizing these four areas but also putting a great emphasis on improving learning outcomes at all levels. Various educational surveys, collected data over the years indicate that learning achievements of children in different subjects at the elementary stage such as languages, mathematics, science and social sciences are not up to the expected level. The reports (NCERT, 2014) of joint review mission for SSA (*Sarva Shiksha Abhiyan*- in Hindi) of last few years also mentioned that the learning levels of children are not up to the desirable level in spite of all the efforts made by the states such as timely availability of textbooks and other learning materials, training of teachers and teachers' support material, regular monitoring, and so on. The reasons behind the poor level of learning and not to achieve the expected level are not scopes of this paper. Instead, this requires an extensive research for the educational board of India. However, we emphasize here the use of electronic media, effective teaching tools, and up-to-date online course management system must enhance the learning levels of the children.

4. COMPARISON OF INDO-FINNISH EDUCATION SYSTEMS

The comparison of Indo-Finnish education systems is shown in Fig. 1. Six primary attributes- *education policy, keywords, fees, education objectives, structure and electronic media* are compared to both the education systems. High-quality education is the priority in the Finnish policy level whereas national progress, and national integrity is the preferences in the Indian education policy. Governance versus internationalization are the contrast keywords for Indo-Finnish education system respectively, which clearly depicts that India favors the good governance while Finland emphasizes on making the education more internationalized. There is no tuition fee at any level of the Finnish education system, but on the other hand, India has a hybrid system of tuition fees. The hybrid system implies that the tuition fee is not applicable at the elementary and secondary level in public schools, whereas, at higher educational attainment, at least the tuition fee is obligatory.

	<i>Finnish Education System</i>	<i>Indian Education System</i>
<i>Education Policy</i>	Providing equal opportunities for all citizens to high-quality education and training	Aiming to promote national progress, a sense of common citizenship and culture, and to strengthen national integration
<i>Keywords</i>	Quality, Efficiency, Equity and Internationalization	Access, Equity, Quality and Governance
<i>Fees</i>	Education is free at all levels.	In public schools, the education is almost free-of-cost while at private schools, there is a fee.
<i>Basic Education Objectives</i>	The objective of basic education is to support pupils' growth towards humanity and ethically responsible membership of society and to provide them with the knowledge and skills needed in life.	Education liberates human beings from the shackles of ignorance, privation and misery. It must also lead to a non-violent and non-exploitative social system.
<i>Common Structure of Education</i>	9+3+3 , Six years of primary school (Gr. 1 to 6), three years of secondary (Gr. 7 to 9), 3 years of higher secondary and 3 years of university education	10+2+3 , Five years of primary school (Gr. 1 to 5), three years of upper primary (Gr. 6 to 8), 2 years of secondary (Gr. 9 and 10) and 2 years of higher secondary and 3 years of university education
<i>Use of Electronic Media till secondary Education</i>	Usually, all schools employ electronic media such as smart boards, projectors, computers, iPad, internet access, and Television.	Average public schools still employ paper and pencil, though many private schools employ electronic media, however, the trend of using digital gadgets rapidly increasing.

Figure 1. Comparison of Finnish and Indian Education Systems, (Source: Some of the texts extracted from Documents on Finnish National Board of Education, Finland and National Council of Educational Research and Training, India)

5. ANTICIPATED IMPLEMENTATION IMPACTS

The Department of Information Technology, University of Turku has built *ViLLE*-Education collaborative tool for innovative and efficient teaching and learning for elementary-to-higher-level study. This tool enables instructors easily to create courses, their contents and automatically/manually graded assessed exercises of different types. All designed course materials such as activities, tutorials, and the teaching resources can be utilized, commented and evaluated by other teachers as well. Moreover, the platform automatically gathers data about students' learning behavior and creates statistics of the results automatically. This is an ongoing project at our department. Some of the features of the platform include course rounds management, student registration facility, and assignment management, adding and removing exercises, automatic and manual grading system, and student performance monitoring and course statistics. The features of this platform and foreseen learning impacts especially for elementary and secondary level students -are described briefly in the subsequent sub-sections.

5.1 State-of-the-art e-Learning Methods

Wilma is a popular tool for pre-school and primary schools in Finland. *Wilma* is capable of supporting coordination among children, parents, and the teachers. *Moodle* is another most popular e-Learning tools currently being used in Finnish higher secondary-level schools, polytechnics, and universities. *Moodle* stands for Modular Object-Oriented Dynamic Learning Environment. For online collaboration and the repository of study courses and materials, this tool works fantastically. As this is an open source e-Learning tool, many educational institutions have been employing it. Online web surfing can find more detailed information about Moodle. In the higher-level studies, most Finnish universities have developed their own e-Education tool, for example, Helsinki University utilizes their own e-Education tool, known as *GreenGoblin*.

At the Department of Information Technology, we are developing *ViLLE* e-Education platform. This platform is fundamentally based on the exercises submitted by the students, and this makes it distinct from other learning environments such as *Moodle* and the *GreenGoblin*. Most of the exercises are automatically assessed and they provide immediate feedback when submitted. The same exercises can be used in lectures, homework, and exams in a randomized fashion, however, in the exam mode, the feedback is disabled by default. For undergraduate university level education in IT, the exercises are divided into three broad categories: coding and computer science exercises, mathematical exercises, and general exercises. All exercises created by the editors are automatically shared with all other teachers registered into the system. Private materials can also be attached to courses, rounds, and assignments. In addition to automatically assessed exercises, it supports a variety of manually graded assignments and automated tasks, such as attendances, demonstrations, file submission, study journals and course assignments. Assignments assessed by the teacher (such as essays and class projects) can also be peer-reviewed by other students or colleagues. The details of the developed e-Learning platform are available online at villeteam.fi/en (*ViLLE Team Research* 2016).

5.2 Foreseen Impacts on Elementary-Level Students

The learning impacts are listed as below:

- The current edition of *ViLLE* platform includes several exercise sets for elementary-level courses and secondary-level courses. The exercise sets for elementary-level such as *recognizing number*, *number sorting*, *match pairs*, *number line* and *the drilling games* not only facilitate learning but also enhance the aptitude of a child. The children learn many things in a short period of time without thinking (by rote) more during his/her study.
- The chosen learning approach is such that children assume as if they are carrying out some kind of fun during their study. This does not put any stress on the children mind

- The easy-to-hard exercises such as *calculate in a row*, *expression exercise* and *calculating with whole numbers* in a mathematics course for grade 1 to grade 5 enable the children to grasp and understand required basic concepts in a very handy approach.
- The *ViLLE*-based teaching methodology will certainly give sufficient scopes for creative thinking instead of rote learning. The Indian national survey also reveals that rote learning is an evil education system (Ramyal, 2016) that does not meet the overall performance benchmark.

5.3 How *ViLLE*-Platform Enhances the Learning Outcomes?

The approach and methods that *ViLLE* platform is using for enhancing the learning outcomes are listed below.

- We have conducted an experiment *et al* Kurvinrn, where automatic assessment and immediate feedback was utilized to support the learning of mathematical concepts for first-grade students. After analyzing the result outcomes, we noticed that automatic assessment and visualization had a clear positive impact on the learning performances of the pupil.
- Likewise, we had performed another experiment using *ViLLE* platform *et al* Lokkila, where a threshold value indicating the corresponding skill level for each of the students was assigned. This threshold value provided by the platform gives the teachers an additional method for identifying the students who have not yet fully understood a topic and need further instruction.
- The *ViLLE* platform utilizes child-centric-approach for ensuring the minimum level of learning and to achieve the desired competence.
- The exercises at *ViLLE* Platform are enriched with the requirement of curriculum's basic objectives, and the load to a child is very limited. Hence, the children do not face any difficulty in learning Mathematics and other related courses.
- Finnish education system usually obeys activity based teaching and joyful learning strategy. The practice exercises built on the *ViLLE* platform are highly aligned with such teaching strategies.
- The course contents built on the *ViLLE* platform are standard enough irrespective of the course textbooks or the reference books employed and also regardless of professional competencies of the appointed teachers.

5.4 Live Statistics of Students' Submissions

Enhancing learning capability of a child is very crucial, and the learning outcome is directly proportional to the submissions into the e-Education platform. The feature like *live statistics of students' submissions* will be very advantageous particularly in the Indian context as this would visualize a pattern for average daily, weekly, monthly progress of the submissions, and moreover, these visual diagrams can be monitored remotely from a server room or from the control room. The visualization is something similar to 24 by 7 stock market data or environment monitoring system. Several manipulations can be performed on the server side to see the progress of a particular campus or a school's submissions. This feature will help a higher authority to monitor not only the submissions by the students but also identifying lack-of-submissions zone and the teacher's effort. A sample snapshot of live statistics taken on 19th May 2016 is shown in the Fig. 2. The dark blue color of bar chart represents the present submission while light blue symbolizes the past submissions. For example, in the upper left corner, the dark and light blue bars respectively denote today's and yesterday's submissions.



Figure 2. Live Statistics of Students' Submissions using ViLLE Platform

6. GREEN AND ENVIRONMENTALLY FRIENDLY EDUCATION

The recent trends show that the use of computers is genuinely replacing the paper-based operations in day-to-day life. The education system is also not untouched with this phenomenon. The modern computer-assisted educational system is becoming more sustainable and environmentally friendly, and this practice is progressively advancing as the time elapses forward. Paper consumption is one of the most direct and visible impacts to the environment caused by universities and academic institutions. Research (*Reducing and Eliminating Paper Consumption*, 2010) shows that one ton of A4 paper is equivalent to 3.47 ton of wood, which is equivalent to 24.29 trees. The number of paper consumption reduction and elimination initiatives in educational institutions is growing very rapidly. With the ViLLE platform, we have been using a paperless transparent and effective examination and evaluation system for the students. As an experimental data, we have saved 47×6 A4 size papers in a single examination. If one thousand students from all over Finland would use ViLLE based system in education, they could save 282000 pieces of A4 paper in average for one course. If we consider ten courses per year per student, then 2.82 million A4 sheets will be saved, drastically lowering the environmental impact. In a similar way, other resources such as energy and materials consumed to produce such an enormous amount of paper will be saved and the environmental impact in production, processing, transportation and disposal can be neglected.

7. CONCLUSION

Based on the above facts, we conclude that there is a necessity to implement an e-Education platform at Indian school-level courses for achieving expected level of learning among the children. After the implementation, at one side, the learning outcomes of the children will be increased while at the other side, managing the courses contents, teaching and evaluation will be much easier. The approach is green and environment-friendly. Hence the teaching and the learning using e-Education platform will be highly beneficial for the country like India.

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