

Edu-Vision 2020: “K-12 Schooling is Way to Futuristic Education”

Dr Sandhya Vyas and Prof Kamal K Vyas

Abstract

Today’s students have more choices in classes, better facilities and a wider variety of learning experiences than ever before. But the fundamental way in which most children are taught has not changed significantly in more than a century. Education has become considerably more expensive, it has failed to achieve a corresponding increase in performance. The tradeoff between the “Kind of Standardized Teaching” and “Personalized Instruction”, a student might receive from a teacher, are quite expensive. K-12 blended learning environment of digital learning world may be capable of breaking this trade-off by personalizing the learning experience as per individual student’s learning styles and pace, but without increasing the number of teachers. A bold prediction say that, If the current 20% annual growth rates in online learning continue, than one half of Indian students will be doing most of their learning online by 2020. This exploratory research paper reveals the “Basic Terminology” to “Advance suggestion” for implementing K-12 schooling in developing world like in India. The middle part gave a perception of present K-12 schooling status at Nation & International level.

Index Terms: Futuristic Education, Edu-Vision 2020, Pre K & K-12 School, Blended Learning, Technology in K-12, Tabletization, Adoption Strategy for Tabletization, Myths and Realities about K-12, Strategy for Rural Indian School.

Introduction

Vision building is a challenging exercise as it aims to construct future scenarios and link between the present & future. It is true that without vision, “Cultures, Communities and Civilization” perish. The construction of vision is a type of dreaming. In Education field the Vision formation can be done by using three areas [14], these are Knowledge Society, Knowledge & Strategy. Today in the Information rich world, Education is engine for development. Especially in Developing country like India, time to set a long term vision using international standards like K-12, ISO etc. After independence, Indian school education system needed extensive & immediate reform to get the pace to reach global standard. Planning & preparation for “K-12 Schooling” is first step towards Edu Vision 2020. Technology-powered individualized learning is indeed at Cross-road, as this type of learning drives a full-scale transformation of our education system, and K-12 is leading the Education system in realizing the opportunities that exist for individualized learning and in addressing the challenges that are part of such an important transition. Partnering with states, districts, parents, and students, K-12 is committed to making the vision of an individualized education [18] a reality.

1. Why K-12 in Modern Education System?

K-12 (pronounced "K twelve", "K through twelve", or "K to twelve") [1] is a designation for the sum of primary and secondary education. It is used in the United States, Canada, Turkey, Philippines, and Australia etc. P-12 is also occasionally used in Australia. The expression is a shortening of kindergarten (K) for 4- to 6-year-olds through twelfth grade (12) for 18- to 19-year-olds, the first and last grades of free education in these countries. In Australia P-12 is sometimes used in place of K-12, particularly in Queensland, where it is used as an official term in the curriculum framework. P-12 schools serve children for the thirteen years from prep until Year 12, without including the separate kindergarten component. In Canada P-12 is used commonly in place of K-12 and serves students from grade Primary through 12. The following list contains the most commonly found shorthand descriptors [1]:

- P-14: Pre-School to Two-Year Degree
- P-16: Pre-School to Four-Year Degree
- P-18: Pre-School to Masters Degree
- P-20: Pre-School to Graduate Degree
- K-14: Kindergarten to Two-Year Degree
- K-16: Kindergarten to Four-Year Degree
- K-18: Kindergarten to Masters Degree
- K-20: Kindergarten to Graduate Degree

2. K – 12 and Blended Learning

Online learning appears to be a classic innovation with the potential not just to improve the current model of education

• Dr Sandhya Vyas, HOD (S&H), BBVP, Pilani.
E-mail ID: profsandhyavyas@gmail.com

• Dr Kamal K Vyas, Director SIET (SGI), Sikar, India.
E-mail ID: kamalkvyas@gmail.com.

delivery, but to transform it. Online learning started by serving students for whom there was no alternative for learning—in the advanced courses that many schools struggled to offer in-house; in small, rural, and urban schools that were unable to offer a broad set of courses with highly qualified teachers; in remedial courses for students who needed to recover credits to graduate; and with home-schooled and homebound students. Nearly all these instances tended to be in distance-learning environments—outside of a traditional school building. It started in 2000, roughly 45,000 K–12 students took an online course. But by 2010, over 4 million students were participating in some kind of formal online-learning program. The preK–12 online population is now growing by a five-year CAGR of 43%, and that rate is accelerating in developed world. In true disruptive fashion, online learning is expanding beyond its roots in distance learning. Educators and entrepreneurs are increasingly creating blended-learning environments. A small but growing number of schools, however, are starting to introduce blended learning into their core programming for mainstream students.

3. Why Blended Learning at Primary & Secondary Level?

Several forces are accelerating this trend. First, bleak budgets coupled with looming teacher shortages are pushing schools to find cost cutting and creative staffing alternatives. Several blended-learning pilots already have documented cost savings in personnel, facility, and textbook costs, with equal or improved academic results. Second, National Attention to comparing individual student proficiency in core subjects, measured by statewide summative assessments. In US, the Common Core State Standards Initiative, which a group of governors and state officers (announced on June 1, 2009) launched the effort to provide a clear, consistent understanding of what students are expected to learn across the nation. Other factors have contributed to the migration of online learning into core programming for mainstream students Virtual content providers. Will the rise of online learning into brick-and-mortar schools be different from the appearance of previous education technologies? Calculators, overhead projectors, electronic whiteboards, and online textbooks all enhanced the classroom as add-ons, but they sustained rather than transformed the conventional structure. In contrast, online learning has the potential to be a disruptive force that will transform the factory-like, monolithic structure that has dominated schools into a new model that is student-centric, highly personalized for each learner, and more productive. In Education Research field, with significant confusion and multiple definitions around, what K–12 blended learning, sometimes called hybrid learning, one research[2] suggests a simple, Umbrella definition [2] -

“Blended learning is any time a student learns at least in part at a supervised brick and mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace”.

The above research [2] further suggested the six models of Blended learning, these are –

- a. Face to Face Driver
- b. Rotation
- c. Flex
- d. Online Lab
- e. Self-Blend
- f. Online Driver

4. Technology List

Content

- Better **incorporation of research** into content design. For example, do kids have to scroll down? Does sound help? Video or flash animation?
- A tool that enables **student feedback**, like a Pandora’s thumbs up
- **Immersive technologies** for students to experience math and science.

Devices

- **Tablet** or comparable device, once it is ready for a school environment.
- More **mobile computing devices**, such as netbooks and smartphones; otherwise, Internet access becomes a tethering.

5. Web Study

International Scenario: Schools such as Clearwater High School [3] in Florida have been busy testing a tablet and eReader pilot program by using the Kindle (a tablet by a company) in the classroom for the past seven months and are now looking for a solid answer to the question, “Can we go 100 percent electronic with the help of a tablet?” The school officials construct a five-year tablet proposal for the Kindle, iPad, and other similar devices. The proposal states that all students in grades K-12 will use only electronic materials by year 2015 for the betterment of the students’ education.

Instructional Technology Leader Dani Herro for the K-12 schools in the Oconomowoc Area School District in Wisconsin said US Tablet maker Amplify become the largest Tablets deployer in K-12 Education system. They claimed to transformed education. President Stephen Smyth of Amplify told “This is more than just a tablet. It’s a complete learning solution organized around the school day”. The tablet is bundled with customized application for school’s teachers & students along with AT&T 4G connectivity. Tablets preloaded with e-books & applications through which district education authority can control safe (at-home) browsing done by students 24X7. American Education Secretary’s report (FCC Report [4]) revealed that tablet learning is economic (can save \$3 billion a year). Experts believed that the transition from simple slate to Digital slate is worth. Tablets are especially suited for today’s fast-paced, modern learning environments and tablet versions of textbooks, with interactive and visual tools are most efficient & economic & technically viable [5].

New Jersey has long been a leader in pre-k [8]. The state’s program has some of the highest standards in the country, receives the necessary support to reach those standards and produces impressive results, both in terms of program quality and child outcomes. But state leaders knew that what was working for three

and four year olds could also benefit older children. They began to re-imagine what a state education department should look like. In 2007, New Jersey created a new Division of Early Childhood Education with the explicit responsibility “for preschool through 3rd grade programs for the development, implementation, and alignment of program components with a focus on standards, curricula, and assessment.” [8]. In doing so, the state also promoted the previous pre-k director to assistant commissioner for early childhood education, thus giving the division and issue more prominence within the Department of Education and ensuring that early education staff members became part of the agency’s early literacy effort [8]. The benefits of these changes in governance include developing new kindergarten guidelines that are aligned with the state’s successful “Preschool Program Implementation Guidelines” and promoting a consistent educational experience across these grades.

National Scenario: According to the "Indian Education Sector Outlook" insights on Schooling Segment, a report [6] released by New Delhi--based research and consultancy firm Technopak, illustrated that the total number of schools in India stands at 1.3 million. Of these, private schools account for 20%. Educomp's Dhar points out that only around 10% of the private schools have tapped the potential of multimedia classroom teaching whereas in government schools, it has barely made any inroads.

"The current market size for digitized school products in private schools is around \$500 million," says Enayet Kabir [6], associate director for education at Technopak. "This is expected to grow at a CAGR [compound annual growth rate] of 20% to reach the over \$2 billion mark by 2020. However, the market potential then might get as big as \$4 billion. Apart from this, the current market size for ICT [information and communications technology] in government schools is \$750 million. We expect this to grow five times by 2020. The number of students served by private sector school indicates a marked preference for good quality schools. This makes investments in good quality schools an attractive opportunity. The “O-Three” report [9] revealed that K-12 can be implemented in India by forcing through law and making it necessity for affiliation from state or central board (State board or CBSE, ICSE etc), this is the only way to penetrate K-12 in Indian School Education System.

6. Myths and Realities about Technology in K-12 Schools

We are in the midst of an explosion of digital technology, computers and all that going with them in K-12 schools. There are lots of myths [7] about Technology inclusion in K-12, some are explored here –

Myth #1: Putting computers into schools will directly improve learning; more computers will result in greater improvements.

Reality: Depends upon what purposes Computer serves and how well it is used positively.

Myth #2: There are agreed-upon goals and “best practices” that define how computers should be used in K-12 classrooms.

Reality: Unless these are articulated and clarified, and a consensus is reached, the diverging views can lead to conflicting expectations, approaches to implementing technology, and criteria for evaluating its impact, all of which can create barriers to moving forward effectively.

Myth #3: Once teachers learn the basics of using a computer they are ready to put the technology to effective use.

Reality: Educational goals must be clarified and that plans for purchasing, using, and evaluating the impact of technology must be developed to fit those goals. A technology-enhanced classroom may also have both different “Goals and Culture” from a traditional classroom. It is upto management to care about follow-up as per guidelines.

Myth #4: The typical state/central government technology plan is sufficient for putting technology to effective use.

Reality: We must fully integrate it into school’s Annual plans, special education plans, curriculum plans, professional development plans, and all the other plans formulated by schools and statutory body. Significant educational returns require that technology be viewed as providing tools to meet central educational goals, not as defining a new, separate set of goals.

Myth #5: Equity can be achieved by ensuring that schools in poor communities have the same student-to-computer ratios as schools in wealthier communities.

Reality: Recent studies [7] suggested that teachers in poor inner-city and rural schools have significantly less training to use technology than teachers in wealthier schools. The technical support systems are also not well funded, and the uses of computers in the classroom tend to be very different. Students in underserved communities are more likely to use computers for drill-and-practice and integrated learning system lessons, while students in other communities are more likely to use computers to support inquiry-based, project-based, and collaborative learning.

7. Wish List for K-12

a. Integration

- Either a single content provider, or a system that integrates all content so students have a **single log-on**.
- **A seamless system** that integrates curriculum data, assessment data, and student information data with security.
- **Adaptive technology for all grade levels.** Must be able to connect assessment data with curriculum modules, and connect those to state standards, then push out customized lesson plans for each child.
- A platform that **organizes the myriad Internet-based teaching tools and assets**.

b. Communication

- An improved **data interface between online teachers and face-to-face teachers**.
- A **better virtual meeting place** for students to do group projects.

c. Affordability

- **Connectivity** for students in impoverished areas.
- Core high school content in an interesting, interactive format that is less than \$200 to 250 per semester. Some of the **quality online content is more than twice as expensive** as a good teacher for a full class.
- **24X7 online help desks** instead of only during traditional school hours.

d. Policy framework

“Any policy about *procedure*, rather than *performance*, undermines the creation of a child-centered system.”

For Teachers

Government policies should surround the “highly qualified teacher” designation, which can prevent hiring knowledgeable content experts. Remove student-to-teacher ratio requirements.

For Outcomes

There should be transition from conventional to Common Core standards. The school boards be more patient with results for students who have dropped-back-in, because getting them on track takes time. A value-added model with fee privilege is better suited for India.

For Funding

Remove funding equations that are tied to students completing a certain number of hours rather than to facilities, expert advice and exposure to global education opportunity & services.

For Leadership

Appoint a dynamic leader to bring together the State funds and private companies to extend connectivity to all parts of the state.

8. Key Recommendations

As per case study [10] the experts gave some reasonable recommendations for K-12 implementation. These are –

- a) Policy changes should be limited if possible. When new rules, regulations, and other policy changes are necessary, the study [10] advises that careful consideration should be given in advance for their implementation along with possibilities like - how they are likely to affect current practice and system performance.
- b) Private schools need help in identifying materials that support standards as well as ideas for encouraging more-innovative use of surplus funds. Teachers need help in translating standards into practice. Institute should provide incentives to keep highly competent and experienced teachers.
- c) All students continue to undergo policy governed assessments. Finally, as a way to increase performance motivation. The Case Study [10] recommends that the governing policies should be revised so that performance has consequences for individual students.
- d) Reform initiative focuses on helping parents, make informed choices about which schools will best serve their children’s

needs. Develop a state/national level index that ranks schools according to student performance and other valued outcomes would help parent in decision making and inspire healthy competition among Private schools. Also, rewards should be for Private schools that promote the parent engagement strategies. Finally, activities like - Workshops for parents, new Curricula, Strategies for helping their children succeed academically, and aid them in understanding Parent-School Communications.

- e) Concerning School Board must rapidly act on restructuring Curriculum, one such work [16] have been done by Indian Boards.

9. Why Instruction based Model for Implementation of K-12?

In October 2004 Howard Research & Management Consulting Inc. was hired by Alberta Learning [10] to study the factors that influence and predict academic success of ESL(English as a Second Language) students, and to assist the Ministry with decisions related to curriculum development, resource allocation etc. The Case study [11] supports transitional programs (sheltered, pull-out, adjunct, inclusive) sustained for a period of five or more years, and classes that promote and are organized for interaction between ESL students, other students, and teachers. Research finding also indicates that full integration of ESL students into mainstream classes, if done too early, can be detrimental to achievement of ESL students. Further, research indicates that pull-out programs (several weeks to several months duration) are most beneficial to newcomer students who have little or no English, for ESL students who are older than their grade level peers, or who are at risk of dropping out of school. Case study [11] data indicate that integration of ESL students into classes with “pull-out support” is the most common model of instruction in current use, the goal was to move toward full integration of ESL students into mainstream classrooms. Sheltered classrooms are the norm in large schools with large numbers of ESL students in rural Alberta. Therefore, for the most part, current “Models of Instruction” at case study sites reflect best practice model.

10. Strategy for Tabletization

One Case study [12] revealed that French education system is making increasing use of digital environments to support education in schools. This began with fixed desk computers and has progressed to the installation of digital working environments. These are a form of intranet-based resources network that is dedicated to an individual school. It provides school management systems (for example, for assessment and absence recording) and allows users to share timetabling and homework assignments. Each classroom equipped with an interactive whiteboard to facilitate the immediate sharing of digital teaching and learning contents. French government has recently made increasing investment in technology to encourage schools to embed digital resources into education.

Decision Making

The decision to adopt Tablets in schools is also justified on another research [15,17] in which, all schools (which involved in experiment) the process of familiarization, appeared to enhance teaching style and the ability to use the Tablet in an innovative and creative way. Teachers were also helped by pupil engagement, and at each school teachers admitted that they learnt from pupils on all aspects of the Tablet like – apps (applications), shortcuts, storage, information and expressed some amazement at how quickly children learnt to use and utilize the Tablet. In all experimented schools, an increase in pupil-led learning was perceived by teachers to be a major benefit of one-to-one Tablets in schools. Teachers appeared to appreciate the immediacy of marking; it helped them to make informed judgments about pupils' understanding and learning, and it assisted in monitoring individual pupil's progress. Increased collaboration between pupils was evident through applications such as Facetime. There were some differences between the year groups, and teachers noted that Year 7 pupils appeared to have adapted best to the change in teaching style that Tablets had prompted. Government believes that it would be beneficial if the students have their own tablet because-

- They are ergonomic and easy to handle.
- They can easily fit into a student's schoolbag/backpack – if e-books are stored on the tablet, the weight carried may even be reduced.
- They can be considered an 'always connected device', in that they can be used anywhere – at home, in school, outside the classroom and for independent learning activities.
- They power up quickly once switched on, which makes them easier to use for activities.
- The learning material allows the student to go beyond digital books, using many applications (apps) and learning content specially designed for tablets.
- Content can be easily updated, so they can become an integral part of the students' learning across many school years.
- They can be used flexibly between student and teacher, with the teacher-centric control of the device to offer new activities, corrections or suggestions for new work.
- Experts also focusing on the Cloud-based Tablet Learning [5] to achieve the above goal. The learning content remains at all times the responsibility of the educators. Teachers involvement in introducing tablet learning has proved to be an excellent method of professional development. In fact, it has been suggested that the best way to introduce technology such as tablets into pedagogy is to start with those who are enthusiastic about using technology, and then they can act as advocates or champions to cascade this within an educational institution.

There are some interesting observations from above strategy -

- Almost all teachers reported that students having tablets made it easier for them to bring differentiation to the classroom. The more able students could work with minimal supervision and teachers could concentrate on students who required more assistance suited to their individual learning styles.

- Some reluctant learners have started to become more involved in their lessons now that tablets have been introduced.
- Some students have gained recognition within the class for their knowledge of tablets; they have shown increased confidence in becoming the class "geek".
- Parental involvement in their children's coursework and homework has increased now that it involves the use of tablets, despite some initial concerns. Parents feel that the technology has given them a sense of being able to contribute towards their children's education as it uses technology which is part of their lives.

11. Pilot Strategy for K-12 Implementation in Rural India

One of the most important foundations in life is education. Education not only makes children more confident about themselves and their abilities, it also opens the door to opportunities otherwise not available and makes children more aware of the world around them. With better information access available in rural areas now, many parents are aware of the need & importance for their children to be well educated. However, lack of quality teachers & crumbling infrastructure inhibits parents' dreams of providing quality education for their children. In India, before reaching the overall K-12 School Education dream till 2019-20, there is a need of Pilot Strategy for Pre K-12 launching in Rural India.

Pathway

1. Every Tehsil should be divided into Cluster of Villages as per road connectivity. The cluster should be managed by local State government driven school staff or nearby Private School staff.
2. Every village in the cluster can be equipped with e-Edu Centre (e-Shiksha Kendrya), all e-Edu Centre should function at-least few days in a week.
3. Every e-Edu Centre should be given 3G connectivity (through Mobile Service Provider or VSAT) & also equipped with Tablet (which can be customize) for any category of user.
4. The user can be classified into three categories –
 - a. Pre K-12 (in the age group of 3-5 yrs)
 - b. K- 6 to 11(in the age group of 6-13 yrs)
 - c. K-12 (in the age group of 14-18 yrs)
5. A nominal fee structure should be implemented as per common policy. The "K-6 to 11" & "K-12" centre should run multiple batches for earning more & more nominal fee.
6. The participation Certification necessity should be implemented as essential eligibility in higher education & professional field / job etc.
7. Financial Implications –
 - a. The success of the education centers lies on the ability to set up low-cost centers with minimal infrastructure and low cost study materials.

- b. Integrating the education centers with local branch operations.
- c. Develop Local Staff by giving training time to time.
- d. Provide Digital Library facility through cloud service.

12. Conclusion

We must re-imagine public education as a system that begins, not with kindergarten, but with pre-k, and builds on that foundation to raise performance in later grades. In K-12 implementation, tablet learning offers everyone the opportunity to enhance their knowledge and skills. Learners can study and teachers can engage their students, using new and efficient ways of teaching and learning. Case study findings of one-to-one learning with Tablet revealed many promising opportunities and technical challenges for both teachers and students. The positive impact of tablet integration on student learning includes active engagement, increased time for projects, improved digital literacy, and digital citizenship. With regard to instructional activities, the positive impact includes the implementation of student-centered activities and enhanced teaching practices with updated information. The challenges include a lack of teacher-selected apps and the need for more time to prep and conduct training. Faculty professional development has also played an important role on teaching practices. This study recommends continuous faculty development and student learning support through innovative approaches to transform one-to-one learning with tablet in the classroom. The K-12 can be reality only if –

- By creating a model for the industry with the broadest array of options across the individualized learning spectrum, providing an extensive portfolio of online curricula, academic services, and online learning solutions to public and private schools.
- By building a state-of-the-art learning platform on the principles of cognitive science, outstanding standardized content, the power of interactivity, and convenient, anywhere, anytime access.
- By investing hundreds of millions of dollars in state-of-art curriculum and learning technology from games to new media and other digital tools, recruitment and training of 21st-century teachers etc.

We recognize that we have a long way to go. Moving forward, K-12 is seeking committed player with strong partnership among them to realize the full promise of individualized learning.

References

- [1] [http://en.wikipedia.org/wiki/K%E2%80%9312_\(education\)](http://en.wikipedia.org/wiki/K%E2%80%9312_(education))
- [2] The Risk of K-12 Blended Learning, Profile of Emerging Models by Heather Staker, May 2011.
- [3] www.tabletpreview.com/default.asp?newsID=2074&news_tablets_apple_ipad_school_education
- [4] http://www.mobiledia.com/news/the_future_of_education_Tablet_V/S_Textbooks.
- [5] Architectural Aspects of Tablet Learning in Green Engineering Tech-Convergence Era, Dr Kamal K Vyas, Dr Sandhya Vyas and Amita Pareek, IJSER Vol 4, Issue 4, April 2013.

- [6] India's Education Sector: Moving Toward a Digital Future, Published: July 19, 2012, Web ref: http://knowledge.wharton.upenn.edu/india/article.cfm?article_id=4695.
- [7] Myths and Realities About Technology in K-12 Schools by Glenn M. Kleiman, Education Development Center, Inc.
- [8] Transforming Public Education – A pathway to Pre-K12, PEW, Sept 2011.
- [9] K-12 schools in India – Regulatory Overview, June 2010.
- [10] Implementation of the K--12 Education Reform in Qatar's Schools by Gail L. Zellman, Gery W. Ryan, Rita Karam Louay Constant Hanine Salem, Gabriella Gonzalez, Nate Orr, Charles A. Goldman Hessa Al-Thani, Kholode Al-Obaidli, Rand Publication 2009.
- [11] Review of ESL K-12 Program Implementation in Alberta, Howard Research & Management Consulting Inc, April 2006.
- [12] The Tablette Elève Nomade, Project, mEducation, Orange, www.projetten.fr.
- [13] Hippocampus Education Centres, Project Report, December, 2011.
- [14] Vision 2020 Education, J S Rajput, NCERT.
- [15] One to One Tablet in Secondary schools, An Evaluation report, Dr Barbie Clarke, Dec 2012.
- [16] Model Curriculum and Teaching Material for K-12 Indian Schools, Dec 2007.
- [17] A Case Study of Mobile Learning Pilot Project in K-12 Schools Chientzu Candace Chou, Renee Jesness, Journal of Educational Technology Development and Exchange, 11-26, Volume 5, No. 2, December, 2012.
- [18] 2013 K-12 Academic Report, Feb 2013.