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Education

SMART CLASSROOM PEDAGOGICS: IN QUEST TO REALIZE THE FUTURE GOALS OF EDUCATION

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ABSTRACT

Education is the ultimate paragon that humanity possesses to meet the challenges of present and future. Indeed, the shape of the future world would pivot on the firm shoulders of education. The ever-growing demand of 'Education for All' with huge diversity of culture and socio-economic upliftment in India, calls for the 'Smart Classrooms Learning'. Smart classroom is like a field, where smart educators assist their students to nurture into smart learners by means of smart learning content and techniques. It is a need of the hour and a stipulation for the sustainable development of education. This paper discusses literature studies with relevance to the instructive pedagogies and the emerging perspectives of education. The paper explores the fragmented components which act as learning obstructions, and aims to propose a solution for the unification of these fragmented components of learning. The paper posits for a smart classroom pedagogics to realize the future goals of education.

Keywords: Education for All, Future Goals of Education, Learning Obstructions, Smart Classrooms, Smart Classroom Pedagogic, Sustainable Development of Education.

INTRODUCTION

Education leaves its imprint on the society, by providing mankind with the greater awareness, sensibility to newer concepts and inculcating the capability for envisioning and wisdom. The wisdom and insight are not just needed in research laboratories, but are necessary for

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every aspect of life. Knowledge, thus disseminated during the process of education, leads to the continuous skill development, suitable behavioral changes and quality life. Education is, certainly, not the complete answer to every challenge that we face. But, in a broader sense, it must be the source of our most effective participation in visualizing and creating new associations in every sphere of life. The success finally depends upon the yields of educated minds, which play an important role in problem solving.

Education is not only limited to what children learn in schools, but it also includes the informal mode of learning which develops at home and while interacting with society as a whole. Hence the instructive pedagogies of today and tomorrow should be such that, it helps in engaging learners to look for the learning opportunities in their each engagement and to make them fitter to take responsibility for their own knowledge construction. This genre of learner is considered as a 'smart learner' in modern education system.

HUMAN COGNITION AND LEARNING FRAMEWORKS

Education serves our society in numerous ways. The aim of education is to make people better informed and prudent to own the responsibility for their lifelong learning. Education would certainly not solve the entire world's problem automatically but if delivered effectively, it will surely guide us all to address the problems in hand. Scholars have developed theories of human cognition, did experiments and revised them time to time to help researchers and educators understand the vital ways in which people attain and cultivate new knowledge, abilities and understandings.

1.1. Bloom's Taxonomy & Its Revision (Cognitive Domain)

The Bloom's taxonomy of learning objectives developed in 1956 at the University of Chicago, by a team of cognitive psychologists, led by Benjamin Bloom (1913-1999), is a marvelous logical educational framework (Bloom B. S. *et al*., 1956) that describes the classification of six different levels of human cognition: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (moving from *Lower order thinking skills* at the bottom to *Higher order thinking skills* at the top). Though, the original taxonomy was systematized into three spheres: Cognitive (intellectual Knowledge), Affective (Emotional Knowledge), and Psychomotor (Mechanical Knowledge).

The system not only provides a sequence of progressive contextualization of the material (Atherton J. S., 2013) for dealing with the topics included in the curriculum but also proposes methods of organizing different levels of learning, from beginning to the end. It was initially published as *"Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook 1: Cognitive Domain"*. Gradually, the system got wide acceptance among the educators in the United States and all over the world.

The taxonomy was further revised in 2001, by another team of scholars, steered by Lorin Anderson and David Krathwohl. It was published *as "A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives"*. The revised system represented the educational objectives as verbs (Krathwohl D. R., 2002) in contrast with the

objectives depicted as nouns in the original Bloom's Taxonomy, with the notion of application versus theories. Each cognitive level ascertains what students can do to meet their objectives. The first four levels of educational objectives remained the same in terms of hierarchy and substance. "Knowledge" converted into "Remembering", "Comprehension" became "Understanding", "application" became "Applying", and "Analysis" became "Analyzing". Figure 1 below, shows the transformation of Bloom's original Taxonomy into the revised taxonomy.

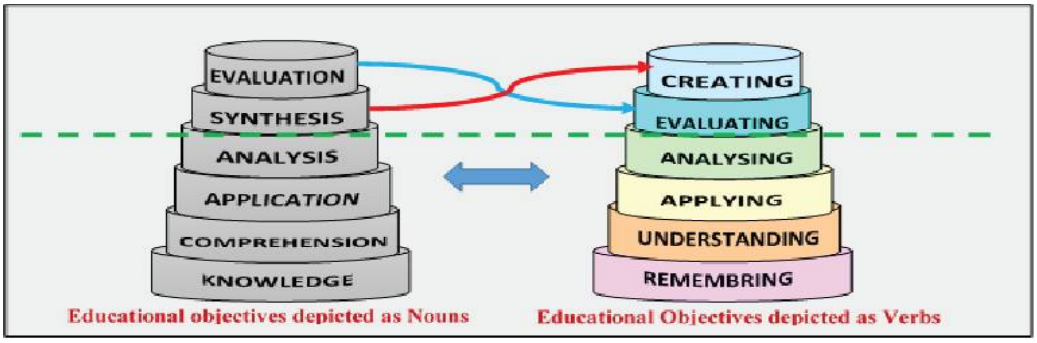

Figure 1: Bloom's Taxonomy and its Revision (Cognitive Domain)

The upper two objectives exchanged their places as well along with transfiguration from nouns to verbs. According to Bloom's Taxonomy, judgement (evaluation) should be done on the basis of synthesis of new functional structure, whereas its revised version advocates creating the new functional structure on the basis of evaluating the standards through testing and reviewing.

Even today, The Bloom's Taxonomy is most widely used method to define educational objectives (Munzenmaier C. *et al*., 2013), but the methods in which different teachers understand and practice the taxonomy have always remain debatable (*Hidden Curriculum*, 2014). For some, the system is to be followed as a linear recommendation, starting from remembering to creating, while others may put the top level higher-order thinking first and foremost, and the rest levels can be achieved as byproducts.

1.2. Bloom's Digital Taxonomy: 21st Century Collaborative Learning

In 2007, Bloom's work was reformed one step forward, when Andrew Churches introduced Bloom's Digital Taxonomy. The Bloom's original Taxonomy and the revised taxonomy, both advocated that learning is a sequential process where Lower Order Thinking Skills (LOTS) are to be performed first before proceeding to Higher Order Thinking Skills (HOTS). Before a student can ***understand*** a fact or a concept, he must ***remember*** it first. And before applying the knowledge of that concept anywhere, he must have understood it first. Similarly, to ***evaluate*** a process the students are required to have ***analyzed*** it beforehand. Each educational objective is built on the successful completion of previous one.

The Digital Taxonomy supports teaching the content in context with the real life problems that facilitates students to become problem solvers (Munzenmaier C., 2013). This creative process breaks the sequence and logically incorporates the fundamental objectives of learning.

When a student take up the task of problem solving, all the elements of Bloom's taxonomy find their places during the process. Here learning goes on while doing. Though a learner need to understand and apply the principles and concepts behind, analyze and evaluate the success of his design, the procedure and conception. However, he doesn't need to start at LOTS and then build fragmented pieces of knowledge following the taxonomy towards HOTS. By providing students with a well-planned task and inspiring him to do, the lower order skills of remembering and understanding become integral in the course of learning. By challenging our students to be investigative, evaluative or innovative, they develop understanding by means of problem solving. The real knowledge thus gained, will remain with them forever.

The Digital Taxonomy provides a framework for students to move from Lower order thinking skills to Higher order thinking skills. Much of the content, what is taught becomes outdated after a span of few years, but the thinking skills learned by the students make them a lifelong learner. The Digital Taxonomy was designed on the same belief. This effort was done with an intention to marry Bloom's cognitive levels to 21st-century digital skills (Churches A., 2009), which a student generally use while learning. The key to Bloom's Digital Taxonomy is the association of ways to use Web 2.0 technologies (current online technology for greater user interactivity, collaboration and enhanced communication) at each cognitive level of Bloom's revised taxonomy in order to accommodate didactics of today's generation. Table 1 depicts the Bloom's Digital Taxonomy and association of its learning objectives with the modern instructional tools & techniques; and digital activities which could be performed using these tools to achieve the respective objectives.

Table 1: Bloom's Digital Taxonomy by Andrew Churches

	Educational Objective and its Description	Associated Techniques	Possible Digital Activities (within these Techniques)	A few examples of web 2.0 Tools
L O T S	**REMEMBERING*** Retrieving, recalling or recognizing knowledge using memory to produce definitions, facts and other material.	Word Processing, Mind Mapping, Presentations, Internet Browsing, E-mails & Social Networking, Personal web publishing & blogs, Search Engines.	Recognizing, Listing, Describing, Identifying, Retrieving, Naming, Locating, Finding, Bullet Pointing, Highlighting, Bookmarking, Social Networking, Searching,	Microsoft Word, Pages, Open Office, Flash Cards, Google Documents, Moodle, Hot Potatoes, PowerPoint, Mind Maps, Google, Yahoo, Excite, Metacrawler etc.
	UNDERSTANDING Construction of meaning from different type of textual and graphical content.	Word Processing, Graphic Organizers, Web Publishing, Desktop Publishing, Blog Journals, Audio & Video tools, Search Engines, Social Networking Sites, Blog readers, RSS aggregators	Interpreting, Inferring, Summarizing, classifying, paraphrasing, Comparing, Explaining, Exemplifying, Advanced Searches, Boolean Searches, Blog Journaling, Twittering, Categorizing and tagging, Commenting, Annotating, Subscribing.	Microsoft Word, Pages, Open Office, Google Docs, Mind Maps, audacity sound recorder, Google, Facebook, Delicious, Adobe acrobat Reader, Mail, Safari, Blogger, News aggregators.

	APPLYING Applying learned knowledge and carry out procedures through products like models, presentations, Interviews, and Simulations	Illustration, Simulation, Sculpture or Demonstration, Animation & Screen capture, Presentation, Interview, Performance, Editing, shared document playing	Implementing, Carrying out, Using, Executing, Running, Loading, Playing, Operating, Hacking, Uploading, Sharing, Editing.	Corel, GIMP, Paint, Comic Life, Inkscape, Blender, Movie maker, Skype–Audio-video Conferencing, PowerPoint show, Google Presentations, Wiki editing, mmorpg's online games
H O T S	**ANALYZING** Breaking down the material or concept into parts, determining their interrelationships & relationship to the overall structure	Surveys and Processes, Database management, Relationships & Mind maps, Reports, Spreadsheets & data Processing, Checklists, Graphs and Charts	Comparing, Organizing, Deconstructing, Attributing, Outlining, Structuring, Integrating, Mashing, Linking, Reverse-engineering, Cracking, Media clipping, Mind mapping	Survey Monkey, Google Forms, Word Processing, Spreadsheet, Google earth, Google Maps, Fish bone mind maps, PMI, Venn, Word and Excel
	EVALUATING Making Judgements based on criteria and standards through checking and critiquing	Debate or Panel Discussion, Report or Evaluation, Investigation, Persuasive Speech, Critical Commenting, moderating, reviewing, posting, collaborating, networking	Checking, Hypothesizing, Critiquing, Experimenting, Judging, Testing, Detecting, Monitoring, Blog/Vlog commenting, Reviewing, Posting, Moderating, Collaborating, networking, Reflecting, Reflecting, Product (Alpha & Beta) testing, Validating.	Podcasting or vodcasting, mind maps, chatrooms, IM, video & phone conferencing collaboration tools like elluminate, blog entry, wiki entry, web page, Google Earth, Google maps, Flickr, sound recorder, discussion boards, bulletin Boards, chat rooms, messaging (text, audio, video), Twitter, Facebook.
	CREATING Putting the elements together to form a coherent or functional whole, reorganizing elements into a new pattern or structure through generating, planning or producing.	Media Production, Presentation, Story Creation, Programming, Planning, Blogging/vlogging, Modelling, Song making	Designing, Constructing, Planning, Inventing, Devising, Making, Programming, Filming, Animating, Blogging, Video blogging, Mixing, Remixing, wiki-ing, Publishing, Videocasting, Podcasting, Directing or Producing, Building or compiling Mashups	Movie maker, Adobe Premiere, iMovie, Powerpoint, Photostory, Google present, comic life, Visual studio.net, Lego Mindstorm, Scratch, Alice, Gantt project for Gantt charts and PERT charts, calendars and flowcharts, wordpress, Skype, Sketchup, Blender, Maya3D PLE, autocad, tinkercad, audacity.

***** *Remembering may occur as a discrete activity like learning facts and figures, as well as consequences of higher order thinking skills*

In Bloom's Digital Taxonomy, collaboration is added as an active element. "Collaboration is not a 21st Century Skill, it is a 21st Century Essential" (Churches A., 2009). It does not mean that learning can't occur in the absence of collaboration, but if it is done in collaboration with other people, it necessarily enhances the knowledge of all the learners involved. Digital

taxonomy possesses a room for collaboration in its numerous digital activities as an element as well as a device to achieve higher order thinking skills. 21st century students can be enabled with lifelong learning, if supplemented with the models of collaborative learning.

International Commission on Education for the 21st century also advocates collaboration as a principal element in all the four pillar of learning ("*Learning, the treasure*…", 1996). The first pillar '*Learning to know'* describes learning as a discovery and understanding of humankind, its existence and also let the learner experience the pleasure of knowing it. The second pillar, *'learning to do'* deals with application of what learners have learnt leading to skill development. The third pillar *'learning to live together'* deals with learning about diversity and similarity among the human races; and appreciating the same. The fourth pillar *'Learning to be'* deals with the holistic development of the learner including his moral, cultural and intellectual realms; development of reasoning, critical thinking, creativity, innovation, sense of commitment and accountability.

COLLABORATIVE LEARNING

Collaborative learning help students to get engaged in the process of creative thinking by means of **sharing each other's knowledge**. It reassures active student participation. All the students of collaborative learning environment get equal opportunity to contribute in the rise of their own as well as others' knowledge (Chandra R., 2015). Teachers, though have vast knowledge about the content and appropriate delivery mechanism of their subjects, but sharing the personal experiences and learning approaches, students bring to the classroom add to their knowledge as well. Collaborative Learning helps not only in sharing knowledge but also in **sharing the skills and expertise** of others. They start learning that each individual is different and is versed well with different ability. This learning brings respect and understanding in their relationships. The teacher acts as a **facilitator** and guides them to connect the collected information with their experiences and hence make new learning. Cultural and socio-economic diversity also enrich knowledge during collaborative learning. Due to the **heterogeneity** in grouping of students, their diverse backgrounds, languages, cultures, perceptions and experiences, all the factors aid in the tremendous growth of their knowledge. Figure 2 illustrates the participants of a collaborative learning environment and the factors influencing learning.

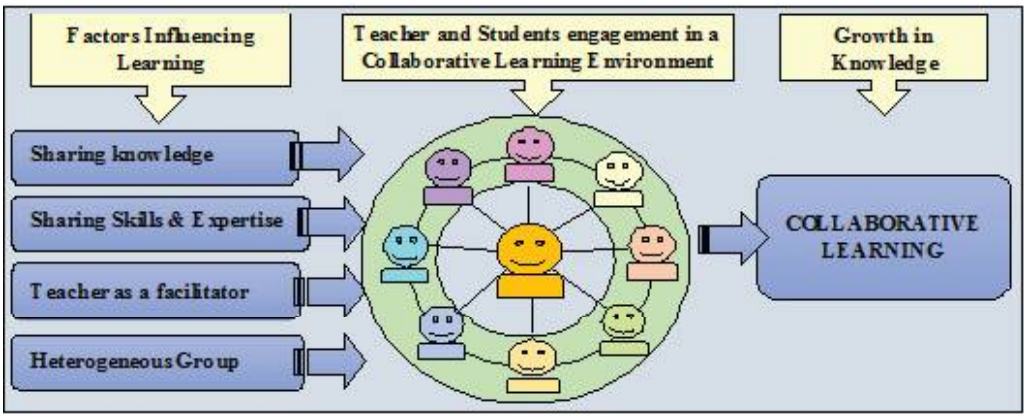

Figure 2: Collaborative Learning Environment

1.3. NETS for students – A guide to Technology Assisted Collaborative Learning

The International Society for Technology in Education (IETS) delineated the purpose of the use of technology in K-12 education to enable students to learn meritoriously and live efficiently in a progressive digital society by developing National Educational Technology Standards (NETS). IETS has developed, released and revised the educational technology standards for students, administrators and teachers. NETS provide the students with six NETS Performance Indicators (ISTE Standards for Students, 2007). Each Performance Indicator specifies the programme goals a student should be able to accomplish for gaining technological knowledge during a school year to meet NETS standards as depicted in Figure 3 below.

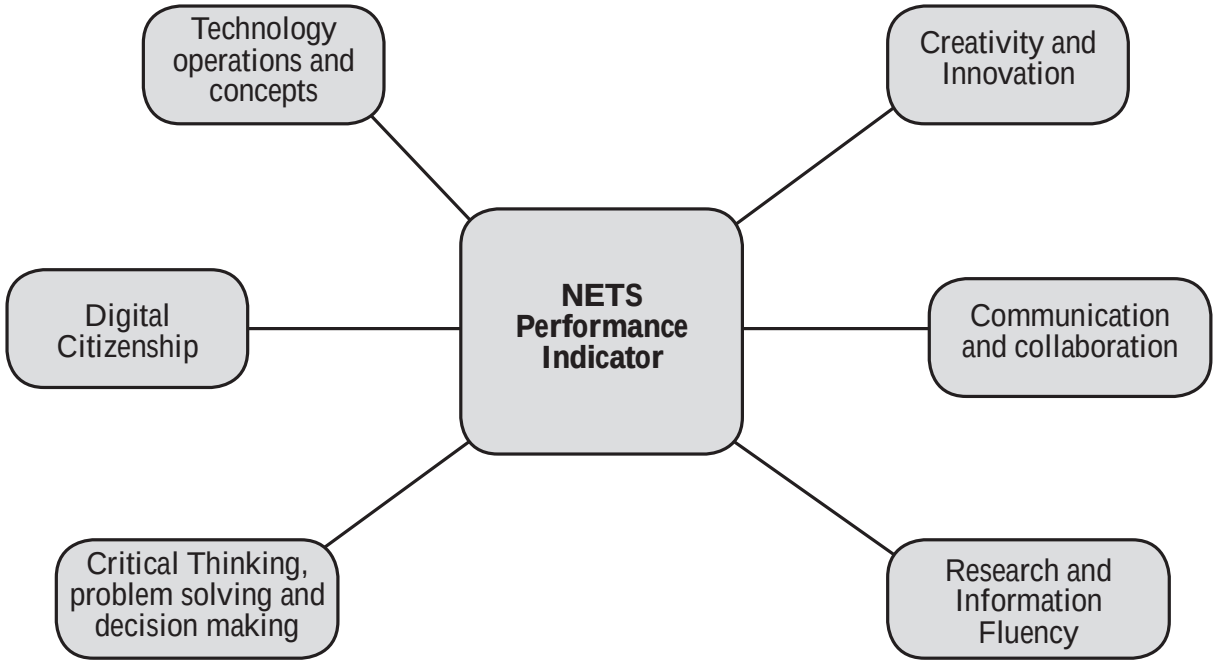

Figure 3: NETS performance indicators for students
(Re-illustrated on the basis of ISTE Standard for Students)

Programme goals of the 21st century learning can be met with the technologically assisted collaborative learning environment. This includes not only the technological support systems but the pedagogics of using this support system at the best as well. While considering the exposure of collaborative systems to students of today's world, we must ensure that the students are suitably oriented to technology-enhanced learning and they are not just left floating in the deep oceans of technology, with no direction at all. Digital natives of today spend more hours in playing video games, talking on cell phones, and watching television and considerably less amount of time in reading books (Prensky M., 2001). So, the key is, to educate them in the way they are fashioned and engage them with their own tools used in the context of learning.

1.4. Smart Classroom Pedagogics – A Key to Meet 21st century Education Goals

Smart Classroom is a smart concept for Smart Educators to facilitate their students to become Smart Learners. A Smart Classroom embraces state-of-the-art technology for Smart Learning. This includes Smart Learning Environment, Smart Learning Systems, Smart Classroom Management Systems and Smart Learning Materials. The Smart Classrooms are the workspaces for smart creators and collaborative learners. These are the Classrooms that rejoice design and innovation. Smart learners sculpted in the Smart classrooms learn by doing, they learn to overcome challenges and collaborate with each other; and develop confidence within that they can solve problems on their own. This way, they learn to become competent problem solvers guided by their own experience and drive and don't need to be told the step ahead.

1.4.1. Tools of Smart Classrooms

Smart class is a class of modern age; hence the tools used are also modern. Wireless networks, whiteboards, internet, projector, laptops, i-pads and other multimedia devices are the essential parts of smart classrooms. Apart from this, educational institutions have also started to adopt the newer Smart Classroom tools to empower hands-on learning. These are the 3D printers, robotics kits for students of all age groups, microprocessors, wearable computers, multimedia-enabled smart learning materials and new programming languages. These new tools give students the power to innovate and transform them from passive receivers of knowledge to real-life creators and reform the whole education system.

1.4.2. Smart Classrooms - Enablers of Collaborative Learning

The Smart Classrooms are on the way of becoming enablers of collaborative learning. Bloom's Digital Taxonomy also advocates collaboration in 21st century learning for improvised results and holistic development of the student. Smart classes should be the one which can provide the learner with interactive learning contents, just one click away. The one which could enable the students with constructive learning tools for all type of the educational activities, including one-to-one learning, group based learning, problem based learning, collaborative learning, mobile learning, facilitating learning through social and content interactions, using personal electronic devices, and virtual learning. Interaction with the peers during almost each type of learning approach is rooted deep in technology based instruction, which makes the Smart Classroom, an enabler of collaborative learning (Stephen S. Yau, 2003). The Smart Classroom being student-centred makes learner an active learner. The Smart Classroom should have the facility to accumulate, collect, calculate, and investigate the enormous data of learners so as to further improvise upon the pedagogical judgements. The smart classroom should be a wide-open learning environment that can stimulate students' enthusiasm for learning, engross students with innovation and collaboration, and give them practical learning experiences to make them authentic lifelong learners. Table 2 presents the features of Smart classroom of 21st century in contrast with the traditional classrooms.

Table 2: Smart Classrooms vs Traditional Classrooms

Features	Smart Classrooms	Traditional Classrooms
Infrastructure	Information Technology Infrastructure including smart learning equipment, sensors and wireless networks	Blackboard and chalk Teaching
Technology usage	Using Technology for teaching and learning	Teaching lessons on Technology
Spatial Design	Wide-open to accommodate students' Tablet, PCs and other digital learning resources, and facilitating movement for interaction	Table and chairs arranged in rows and columns accommodating school bags and books
Flexibility	Flexible enough to convert classroom into a theatre at one point of time and a research laboratory at another	A closed environment designed for teacher's monologue allowing no students' movement
Learning Material	Multimedia-enabled, interactive, digital learning material available just a click away	Available in form of text books and lecture notes
Type of Assignments	Constructive in form, helping students to gain experience and learn on their own	Subjective in form, asking students to cram the facts and figures to reproduce in exams
Teacher	Facilitator of learning, a mentor and a guide	Main source of Information
Teaching Methodology	Student-centred	Teacher-directed
Equality	Equality in opportunity for all students to learn	Survival of the fittest
Cooperation	Contribute to others' knowledge as well	Self-focused students, no cooperation
Response System	Electronic student response system, all students can respond together	Students respond one by one to the teacher
Type of Learner	Cognitive Learner, Self-confident, experimental and problem solver	Learning to score marks in exams, needs guidance at every step to move further
Type of Learning	Self-paced, practical, knowledge oriented, collaborative, project based	Theoretical, Result-oriented, Non-collaborative
Take Home	Higher order thinking skills, sense of responsibility and Lifelong learning attitude	Lower order thinking skills, academic grades

1.4.3. Role of a Smart Classroom Teacher

The role of Smart Classroom teachers is that of a facilitator of learning, a mentor and a guide. The classroom technology assists teachers in meeting with their day to day classroom challenges and enhancing students' knowledge and skills. Teachers are aided with instant access to interactive multimedia content and instruction materials mapped with the course of study. The Smart Technology also enables them to instantly assess and evaluate students' assignments and subsequent learning. The teachers are now on the way to ensure that every child in the class learns by means of his preferred learning style and pace. This helps in maintaining student's interest and involvement in learning. The teacher in the Smart Classroom helps and guide the students to understand the critical concepts through the facility of 3-Dimentional, interactive multi-media learning modules. The students thus learn by doing and active engagement.

1.4.4. General issues in Smart Classroom Learning and Proposed Solutions

The whole scenario of Smart Learning seems splendid, being equipped with endless possibilities for realizing the future goals of education, when the Smart Classroom features, tools, productive pedagogics and role of teacher as facilitator of learning are observed in the light of ideal management. But, in the real scenario, there is no system, which is infallible. Smart teachers and learners also face obstructions in teaching and learning (Guang Chen, 2015) and there is a need to regularly update the system according to the ever-growing demands. A few of these general issues and possible solutions are outlined below:

Cost Support System

The Smart Classroom tools and technology equipment are costly. It is challenging for an institution to purchase all the required equipment for setting up Smart Classrooms. There is an initial cost of purchasing and installing instructional technology, which institutions still bear to showcase themselves for the marketing of institution. But, the ongoing cost of maintenance, updation and repair of equipment also needs to be considered to keep the system running.

Access to All

The future goal of education can only be met if equal opportunities of education are provided to all. But, underprivileged educational institutions do not have access to technology and hence students of these institutions lag behind. Even if the basic infrastructure is provided in these institutions, students do not have access to it in an applicable manner. This huge split between different types of educational institutions needs attention and a way out. Only then, the aim of "*Education for all*" would be achieved.

Distraction

The ocean of technology and internet is so vast and deep, that it may distract the students leading them nowhere, however keep them engrossed in the gleaming networked information. Here the role of teachers as a facilitator arises. The students when provided with bundle of technology need to be guided properly on how to proceed to achieve their goals without getting distracted. A teacher can make students learn a lesson in a day, but if they are taught how to learn, they will become self-guided learners for the rest of their lives.

Lack of Teachers' Trainings

While technology can be a wonderful teaching tool, it is only fruitful, when teachers are made expert in using them in their classrooms. But, teachers often lack sufficient trainings on how to use technology proficiently in the classroom which often results in minimal use of available technology and hence waste of resources. The process of training teachers for technology integration must be initiated at the pre-service level and must be made mandatory to learn. Apart from this, their knowledge should be updated time to time, with the introduction of newer technologies by means of professional development programmes.

1.4.5. Structural Design Issues in Smart Classroom Learning and Proposed Solution

Along with the general issues of cost, access, distraction and trainings, the educational structure itself face design problems, as the components of learning in school and after school are often found fragmented and move in succession as separate entities, without supporting each other. Figure 4 illustrates the fragmented components of learning, which often lead to infuriating experiences and poor learning outcomes. The students, when dissatisfied with learning at school, invest in after-school supplementary digital products and personal tutoring methods, leading to monetary wastage due to duplication in teaching and further add to frustration.

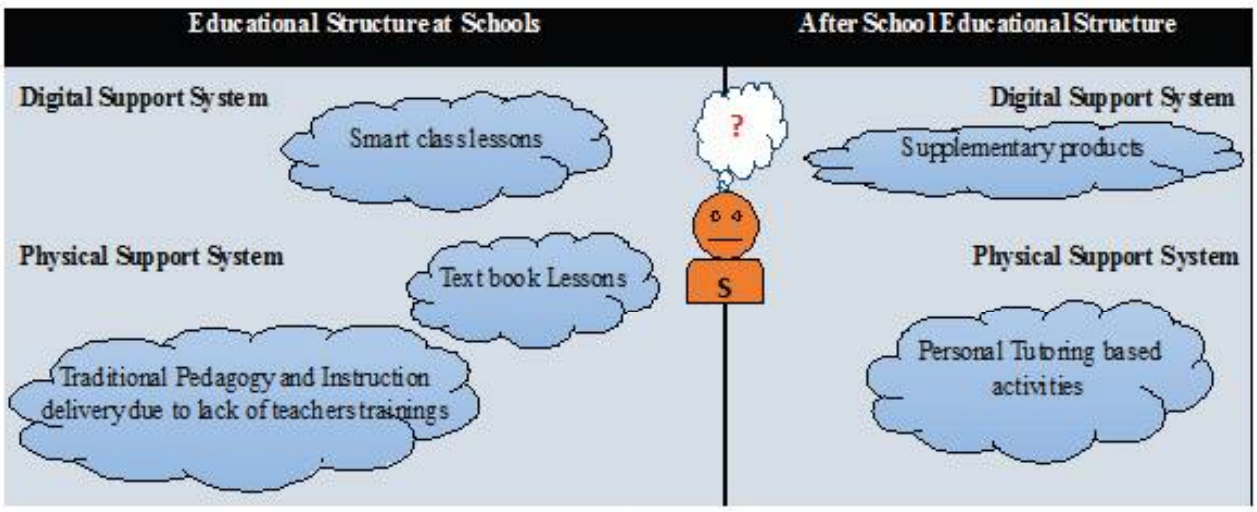

Figure 4: Fragmented components of learning

At schools, along with the Smart Class lessons, students are also asked to learn from text books, which are published in traditional ways and there is no direct association planned with the Smart Class lessons. Content of the textbooks is generally not updated time to time and related. Even the pedagogy of instruction used in classes by so called Smart Classrooms, is actually traditional in form. The reason behind this is the lack of teachers' trainings to use technology aptly in the classroom. Pedagogy and teachers trainings initiatives are usually not customized to their teaching capacity. Most Smart-Class technologies have become a marketing tool for improving student enrollments rather than for improving learning outcomes. Similarly, after-school tutoring and supplementary digital methods were opted by students to add on to

their learning. But, due to the fragmentation in learning components, schools have not been able to provide students with customized education. This has given rise to after-school tutoring systems as parallel learning systems, which doubles the education cost and overload students with assignments resulting in frustration rather than learning. Now the point of concern is, how to find a solution of this **problem**?

The **solution** lies in the unification of these fragmented components of learning. To make the Smart Schools function really smart, they need to have potential enough to tailor their learning resources as per the preference and need of the learner. The whole system has to be student centered, working in quest of his ultimate satisfaction with his learning resulting in his holistic development. Figure 5 illustrates the proposed unification of smart learning components.

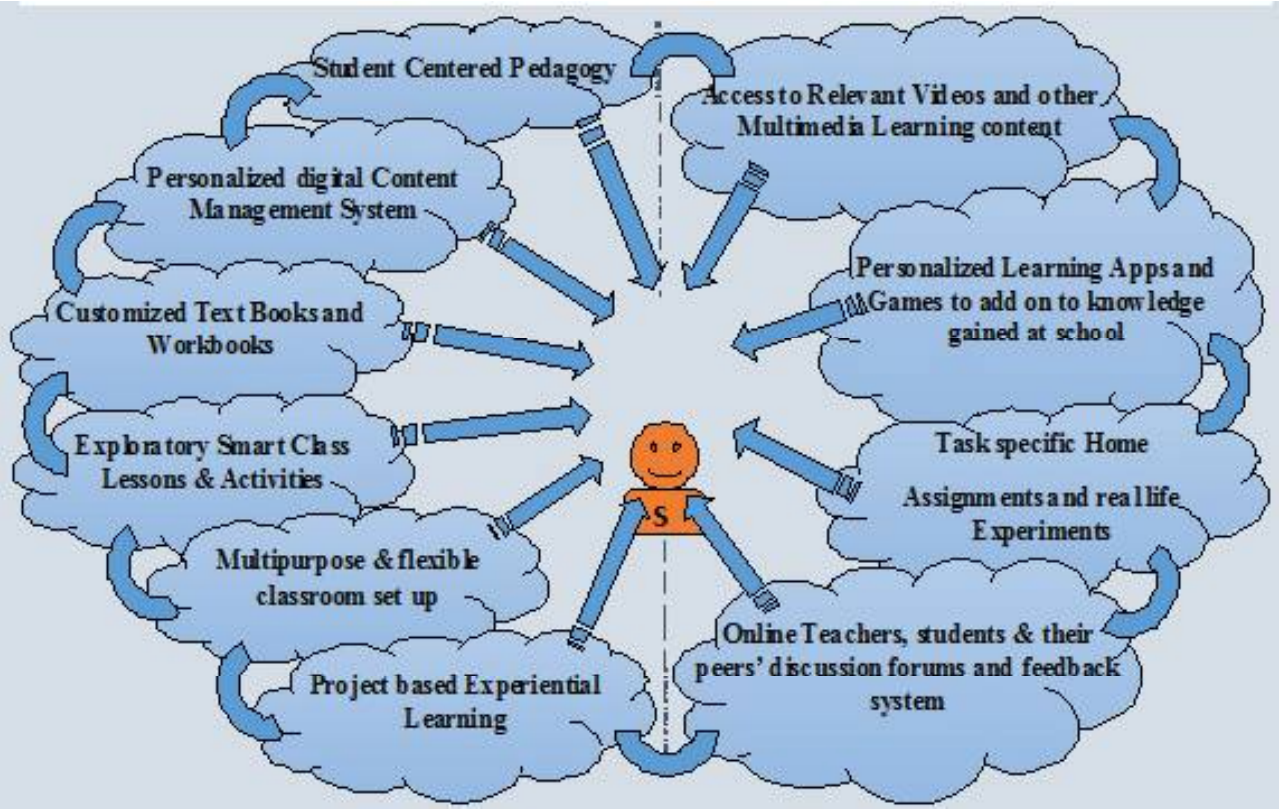

Figure 5: Proposed unification of smart learning components

Student-centered Pedagogy

No two students are exactly the same, but are expected to learn the same content in a teacher-directed manner. It is important to understand that each student has a natural inclination towards learning of some kind which is known as his/her preferred learning style. Identification of preferred learning styles of students can be done through assessments at school by teachers and by using standardized learning style assessment tools (Hawk T. F. *et al.,* 2007). It implies that if learning styles can be identified, student- centered teaching and learning experiences can be provided to help them effectively.

Personalized digital content management system

Digital content management system in the Smart Classes can be made personalized by giving open access to problem based open learning environments (Waseem M. *et al.,* 2014), connecting students to worldwide available learning content, subject-matter experts and mentors. Learning activities designed for all types of learners can also be made available for a specific concept at hand. This way, all students will be able to actively participate in learning process matched up to their own pace and preferred learning style already identified.

Customized Textbooks and Workbooks

The latest approach of customized textbooks and workbooks appears commendable, if designed in a close association with digital versions of instructional content delivered to students. The idea is, to tailor them in accordance with multiple pedagogical approaches and personalized trajectories (Allen C. Schulz, 2013) to match with different cognitive abilities, aptitudes, learning pace and retention level of the students in order to create personalized instructional path.

Exploratory Smart Class Lessons & Activities

Interactive multimedia based Smart Class lessons and their contiguous activities designed in exploratory form, will surely increase students' enthusiasm for learning. The multimodality of multimedia helps increase the comprehension and retention levels of students. The increased use of multimedia in teaching provide many opportunities to present multiple representations of content in form of multi-sensory interactive elements to cater more effectively to the different learning styles (Sankey M. *et al.,* 2010) of an increasingly diverse student body.

Multipurpose and Flexible classroom setup

A multipurpose and flexible classroom is a mandate to a Smart Teacher's aptitude to adapt to students' diverse learning needs. The classroom design must permit for a variety of learning environments and grouping formats catering to all type of learners, increasing student populations and varying new subjects. It must also allow students-teacher interactions and collaborative work, which are the vitals of 21st century learning (Hanover Research, 2011).

Project based Experiential Learning

Project-based active learning is one of its own kind where the instructor actually flip the classroom and the learning takes place outside the classroom by means of gaining experience while doing (Ramos P. H. *et al*., 2009). Not only the content knowledge is expanded significantly by this method, it helps in the rise of Higher Order Thinking Skills as well. The smart classroom projects are even more smarter and the essence of technology assistance make the students enquire more, explore more and attempt multiple times, before they actually reach to the results and create. Take home is a lifetime experience of self-controlled learning.

After- School Educational Structure

The methodologies of learning which a student adapt after reaching home from school also play very important role in his academic growth. The Smart Classroom learning, if extends its help to the student even at home in a unified manner, attract him to progress with his studies by

using personalized learning Apps and games to augment his knowledge gained at school, by accessing relevant videos and other multimedia learning content which stimulates his learning further, doing real life experiments based home assignments and interacting with teachers and his peers through online discussion forums and feedback systems. This way, no student will lead to frustration and ever try to find alternative after-school tutoring systems.

CONCLUSION

Smart Classroom pedagogics proposes the greater buoyancies of personalized and experiential learning, which is certainly a key to achieve the futuristic goals of education. When a learner starts learning, nothing can stop the process ever. But, it is also important to remember that even if the Smart Class system is equipped with world-class technological infrastructure like projectors, whiteboards, wireless networks, sensors, computers and i-pads; its successful implementation lies in the apt usage of technology by humans, be it teachers or students. Hence, the duty of Smart Teachers and Smart Students is to make the classroom 'Smart', not only by means of nouns (Smart Classroom tools) but also by means of verbs (exploring, collaborating, constructing, debating, annotating, analyzing and designing using the available infrastructure). Unless a **verb** is added to the **noun,** it remains a non-working entity. A similar approach was also advocated by revised Digital Bloom's Taxonomies, where **nouns** were replaced by the **verbs** to make learning a lifetime experience.

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