

## Paper Presentation

**Title** e- Mathematics using web based /offline software  
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**Abstract:** Mathematics is considered as one of the difficult subjects to understand by students. During my teaching career, *I came to realize that teaching methods affects the cognitive system to a major extent.* Various skills analytic thinking, arithmetic solving, logical reasoning etc. are to be taken care, which are an integral part of teaching the subject. At present students are not just exposed to what is taught in the classroom. Their attention is to be captivated by effective quality content. *To transform students from being just passive learners of receiving knowledge and information to active participants of a lively collaboration, various ICT tools, such as blog, networking sites, pod cast and off-line self learning e content prepared using eXe/Moodle, readymade CD's are being used to support classroom teaching. Also open source software GeoGebra is used for teaching geometry and algebra concepts.* Through this paper I would highlight my explorations, experiments and effective strategies, utilized in teaching of mathematics to secondary classes, using web based and offline e tools , software's and other gadgets.

**Keywords:** mathematics, open source, web2.0, e learning, digital, blog, pod cast, technology, ICT, education, teaching, learning, GeoGebra, pod cast

**Main Paper:** I joined teaching profession in 1994 with a mission of innovating new ways of delivering content to students, in accordance to their learning abilities. My aim as a math teacher is to make mathematics accessible to all, encourage students to have passion for learning the subject and create joyful independent learning environments. *I think it is the way in which the subject is introduced to students which matters a lot.* Being a teacher, I take care of creating quality content for understanding of subject matter to enrich young minds, understanding of students' cognitive, social, behavioral, physical, and emotional development, providing opportunities catering to students of all learning types, making instructional plans based on focused goals, working on pedagogical aspects of learning through exploration and experiments, developing pedagogical knowledge and skills and to use this expertise for encouraging each student to develop critical-thinking and problem-solving skills ,creating a classroom environment that facilitates joyful and interesting learning, devising formal and informal assessment strategies to evaluate student learning, to collaborate with students, parents, community members, and professional colleagues in order to support student learning and development. **Past 5 years were completely immersed**

in exploring, experimenting and enhancing my teaching learning of mathematics using hands on technology and ICT.

*(I) Integration of web based strategies for teaching learning mathematics: Using blog, social networks, pod cast, videos, and slide shows for teaching mathematics... (Expanding boundaries of Classroom...reaching 24x7)*

### (1) Blogging...



Technology has greatly impacted on the ways of teaching learning. I believe it has provided teachers with lots of new options to explore and utilize effectively in delivery of lesson content. Gone are the days when students use to copy from the blackboard and do mathematics just with a monotonous chalk 'n' talk. Time has changed, so are the ways of teaching and learning. *The power of internet is incredible and there is no dearth of web tools which may be used for effective teaching learning.* I am very keen in exploring, learning and experimenting new techniques. I wanted to reach to students beyond the boundaries of my classroom. Publishing on the internet does not require any technical knowledge and moreover it is free of cost. *There were so many restrictions in traditional teaching ways, the most predominant of which was time. At times I was not able to repeat a topic. This was bothering me too much as I was not able to help students. Also, when a student is not present in the classroom for any reason, the whole lesson could not be taught individually. In a traditional classroom there is a less scope of visualization of a concept too. Due to lack of visualization a disinterest in the subject was being created.* In the dawn of year 2006, I came to know about blogging in a workshop by a non profit organization CII Shiksha (<http://www.shikshaindia.org> ). Keeping a strong vision of upcoming generation needs catering to all students types I established my Class Blog for “Planet Infinity”, Mathematics Laboratory <http://mykhmsmathclass.blogspot.com> . In the mathematics laboratory, mathematics is taught using hands on activities involving paper folding, geoboard, unit cubes etc. In usual math period, half of the time got wasted in dictating the activity steps to be performed by students. *By integration of Blog in my classroom, students perform hands on in the laboratory and watch the steps through picture slides/digital photo stories/videos etc. posted on the blog.*



*I believe visualization of a concept is essential for better understanding. So, I used my camera mobile for this purpose. Initially I clicked photographs from my surroundings showing mathematics. E.g. Photographs of boards and banners having different geometrical shapes, leaves of a tree showing some patterns of numbers, 3 dimensional architectures etc. When I showed these pictures to my students then they easily correlated them to what they learnt in their textbooks. I found this to be a quite useful strategy for learning and relating to daily life.*

**An interesting incident...**Students were to make a math project during summer holidays. We were interacting through e mail. Some students find difficulty in making their math models. I used my blog to post required information for their work. It really helped them in making wonderful models. I gave it as a project assignment to my students to click photographs of each and every step of how they prepared their math models? I received an incredible response from them. They used their mobiles for clicking each and every step of the procedure of their project work. I have uploaded their work on my blog <http://mykhmsmathclass.blogspot.com/> . I would like to share links of some incredible work done by them. Here are the links:

[Making a dodecahedron](#) ,[Making of Platonic Solids](#),[Making of a GeoBoard](#)  
*With pictures and explanation, now math activities are more fun.*

I have created some short videos of short cuts in mathematics using my mobile like [this one](#). It is quite useful and helpful for students as well as teachers. Also videos created by mobile are easily transferred to computers and uploaded to blog. Here are the links of videos <http://handsonmathematics.blogspot.com> . Blogging has added a new dimension to teaching learning. I love experimenting with pictures/figures for teaching/learning mathematics. In the process “Figures Speak” <http://figurespeakmathematics.blogspot.com> was originated. In this blog I am uploading thinking figures in mathematics which say some unique mathematical result or a figure which helps in visualizing a math concept. Before setting my class blog, in the dawn of year 2006, I started with “Mathematics Learning- Sharing strategies of teaching learning” <http://mathematicslearning.blogspot.com> .

My class blog *has been ranked at II Place as “Best Education Blog” under Bloggers Choice Awards, awarded as “Thinking Blogger Award”. Also it is registered in International Edublogger’s directory.*

**(2) Pod casting...recording voice lessons** I have created pod cast house for students <http://mykhmsmathclass.mypodcast.com> . In my math laboratory, using my laptop, I recorded voice of students sharing on their math projects, then I uploaded them on pod casting website. Through this strategy students gained a lot of confidence. They learned to express themselves.

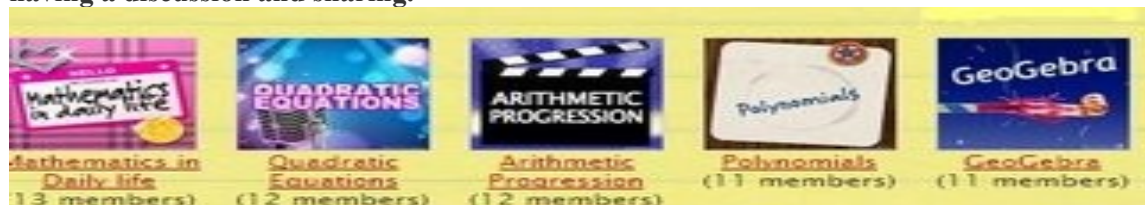
**(3) Social Networking...**My first exposure to networking, collaboration, sharing etc started through CII Shiksha e portal (<http://eshikshaindia.in>).After realizing the importance of networking, I thought of setting up a platform for students where they can interact, share, discuss and engage in learning mathematics in a purposeful manner. In the month of April 2008, I created a social network for my students of grade 10, “KHMS e Mathematics” <http://mykhmsmathclass.ning.com> .

**How I planned the whole thing and how it is going on?**

Firstly I planned the whole project on a paper and cross checked it for all pros and cons. I created a class poll in which I asked my students on having computer machines, internet connection, how much time they spend on learning through computers etc. Then I took review from some selected parents regarding the use of internet by their ward in education .Afterwards I asked my students to create their e mail ID's in a special format which highlights their name, class/sec and roll no etc. I took one and half hour session in our multimedia room in our school with each of my section and explained to them how to create an account, add to a group, start a discussion, to comment , to reply , to upload a file etc on the Ning. For each of my class/section I created a special group.



For each and every chapter we are learning in the classroom, there is a separate group for having a discussion and sharing.



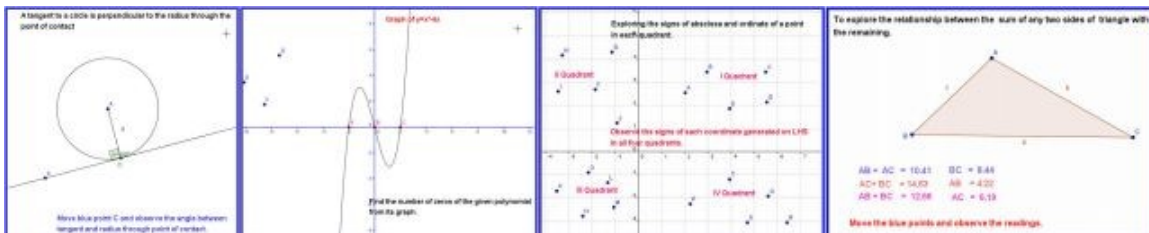
In each class/section, further I have divided the students in groups like group1\_xb , group8\_xg etc , for having project discussion and submission. A very special feature of this

network is its Query section, where students post their queries in mathematics and I provide them the solutions of problems in mathematics through written text , mp3 audio files, videos etc. Learning and sharing is my motto. I have created a network for teachers “Passionate Teachers” <http://passionateteachers.ning.com> which is a platform for collaborating, sharing, discussing education related issues and new ideas of teaching 21<sup>st</sup> century students. Through this platform I am connected to around 100 teachers from all across the globe who are experimenting, learning and sharing about their work.

***(II) Offline Strategies: Using CMS (Moodle, eXe), Photo story lessons, using GeoGebra for teaching geometry and algebra.***

**Self learning e modules...**There are students in the class who do not have internet facility at home. I have created *offline self learning electronic modules in mathematics using Moodle and eXe* (self authoring tools) for students of grade IX and X. This strategy has helped students of all learning types as it contains learning material for average as well as fast learners. The offline content includes audio and video explanations of basic concepts. Students take this e content in a pen drive/CD and learn/revise the chapter at home. The lesson opens in a website form and structured in order of learning with proper links. *Now, parents also can help their wards in learning at home as they can have access to authentic e content provided by concerned teacher.*

**Learning geometry using GeoGebra...** Students are not so comfortable in learning geometry. After exploring open source software *GeoGebra, which is free and easily downloadable*, I created interactive learning resource material for grade IX and X for learning geometry and algebra. Many other tools like Cam studio (for making video screen cast lessons), Irfan view (for using images), audacity (recording voice) etc were also used for making interactive lessons. Students enjoyed practicing, verifying geometrical proofs through GeoGebra. All GeoGebra lessons are integrated in eXe also.



*The response of students in learning geometry using this tool was incredible. The phobia for*

*doing geometry questions is no more there. It also helped in developing interest in the subject.*

Through digital photo stories students were able to visualize a concept.

### **Learning Outcome of both strategies (web based/offline)...**

The whole idea is Learner centric catering to needs of all students type average/mediocre/higher achiever. The process has encouraged learners to be a part of teaching learning process till the end. Web based networks have enhanced writing competencies and solving skills of students. Through this strategy lots of opportunities for self expressions and ideas have been generated. There is a scope for consistent analysis for improvement. Collaborative learning environments helped in improving behavioral and social aspects too. Visualization of concepts become possible using videos, animations etc. Anytime, anywhere flexibility has expanded the boundaries of classroom. It has indeed solved the problem of drudgery of repetition in the classroom. Now students can learn the lesson according to their convenience. These strategies helped in captivating student's attention and improving learning abilities.

*My work has been appreciated by organizations like CBSE, CII Shiksha and many schools all over India and abroad. I am writing articles for magazines like Teacher plus, Linux for you, Shiksha newsletters etc. I was interviewed by a crew from France on using open source and its consequences. Also teams from various news channels like Aaj Tak , News X and CNN IBN visited my school for interviewing me and my students on using blog for teaching learning. A half an hour programme was telecasted "internet ki pathshaala" on India TV Aaj Tak which also included my experiences on using blog for teaching. **National Best e teacher award conferred to me by our ex-President A.P.J. Abdul Kalam is the most***



*coveted award to remember.*

**I am glad, as my mission is to transform educational trends and create joyful learning platforms for students so as to see happiness on every child's face. This is the only reason I am continuously exploring, learning and sharing.**

**Thanks**