Incorporate ICT in Mathematics Education

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Abstract-The process of incorporating ICT in educationsystem is very much possible and there are some elements operating in parallel, in partnership and cyclically. The chain of steps varies from one activity or circumstances to the next to make it more effective. The process is thus really incremental and relies on clearly defined objectives to succeed in improving the effectiveness of ICT use in education. This paper presents some of the points to assist educators in better integrating ICT with their teaching methodology, and primarily allowing them to offer superior quality education programs to Mathematics students. An introduction to the theories and principals of ICT integration is presented through some examples. The integration of information and Communication Technology in preparing and testing learning activities and managing teaching tasks is a difficult process yet should subject to a set of guiding parameters. Also, a minimum level of capability is required on the elements of both educators and students. These parameters and competencies comprise the pedagogical principles required to effectively integrate ICT in Mathematics.

Index term: Mathematics Education

Keywords: ICT, Proposition, pedagogy,curriculum.

I.   Introduction:

ICT is largely focused on computer education, Computer literacy, it means efficiency in computer. Formal education in most countries has been slow to adopt technological innovations. I concern with learners, they are low in performance motivation and negative attitude towards Mathematics. Through ICT I would like to engage students and promote development of problems solving skills. We should focus on collaborative learning. The proposed concept may be achieved with ICT in curriculum. Still there are number of challenges to have to be overcome before digital technologies can be effectively incorporate. These include curriculum coherence, inappropriate pedagogical practices, inadequate teacher's preparation and professional development and lack of appropriate infrastructure**.** Pedagogical matters are crucial to a future where ICT use is integrated into the teaching and learning of mathematics here I have tried to illustrate some example with ICT in Mathematics.

II.   Methodology

Technology has been used in Mathematics, as internal being used to enhance collaborative and ICT enhances efficiency of Mathematical thoughts, enable learners to make propositions and immediately test them in non threatening environment. ICT also offers multiple mathematical presentations that enhance generality of Mathematical concepts and provide opportunities for counter examples unlike in paper and pencil environment. Technology also enhances curiosity that may drive inventions. (Ref.No.3)

The size of class must be small. Children learn differently. The need for a system separate from that of the school is because children cannot get the individual attention required. If the class size is 25 children, it helps individual attention as well as small group activity.

Tutor Certification. A methodology and content can only be as successful as the person delivering it. At School selection process weeds out more than 90% of applicants. Thereafter training is provided to ensure that delivery will be sound.

Continuous Monitoring. We should track ongoing performance of each student through central correction of assessment. Our tutors and us work together on problems in learning and work out ways to bring up the level of each student.

The challenges for Mathematical educators is how and when the computer applications and other ICT are incorporate in the schools and college curriculum.(Ref. Personal Teaching Experiance of 12 Years)
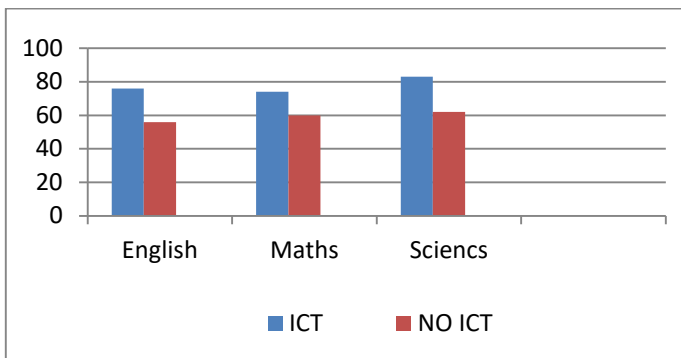
III.   Related work

I took survey of 100 students of primary school and observation shows that learners are more comfortable with white board.

Subject	ICT	No ICT
English	76%	50%
Mathematics	75%	63%
Science	86%	64%

Table III.1

Above table can be represent in bar graph as given below,
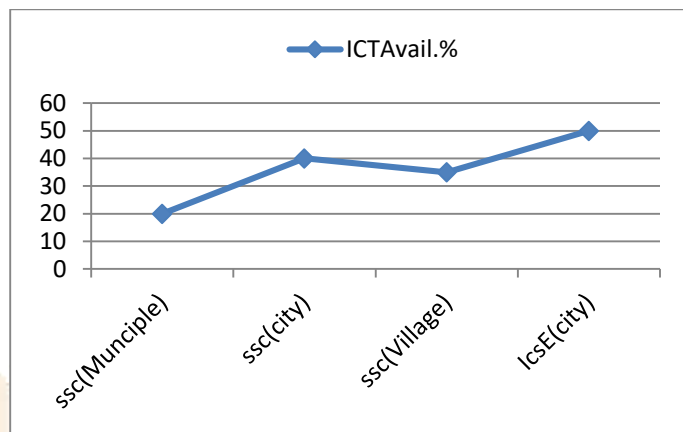
Board	
SSC board(Municipal)	20
SSC board (In City)	40
SSC board (In Village)	35
ICSE Board	60

Table3.1 gives the proper percentage of result for primary school learners inspected in last six months.

School with ICT resources tend to achieve better results than the schools without ICT Resources.

This also clears that there is an improvement in the standard.

(Ref. Personally Visited in Schools like BMC (SSC Board) in charkop Village, Kandivali.,Pawar international(ICSC) board in Borivali,Veer Bhagatsing school in Malad)

IV.   ICT Resources

The below flow chart shows how ICT Resources changes results.

IV.1   Table for ICT Resources availability

Board	Percentage %

V.   Requirements

Computer studies have found their way into the formal curriculum, but in most educational practices their existence is embryonic, mainly due to lack of computers, connections, and staff expertise. Exceptions are mainly clustered in resource centres, schools, and teacher training institutes. Most successful in the implementation of ICT in practical use are a few.

- In India ICT should mentioned as a curricular issue, without however finding its way into syllabi, textbooks, and classroom practice other than in a separate subject like Computer Science.
- Electricity and connectivity to the Internet cannot be taken for granted.
- Access to an electricity grid cannot be counted on for the average school in villages. In remote areas, electricity is often supplied by generators, and usually in the evenings.
- In some regions, however, schools have solar powered electricity.
- Once a school has a power supply, connectivity to the Internet is in principle not a big technical problem.
- Some schools simply use the telephone net.
- Some use radio connections.
- Some use satellite connections, provided by sponsored projects.
- In India to implement ICT we can provide with 100 percent Internet access in schools.
- There should be combine support in three layers—infrastructure (ICT hardware), general and educational software, and the training of teachers
  [4 and 7]

VI. Various Techniques

- As explained in computational mathematics curriculum. Program in C language are helpful rather than doing it using Pen and paper. So many iterations are there which we can do in program easily and also using Matlab functions for eg: Simps. function is used for Simpson method.
- Use of expressive media and visual effects to understand concepts in details
- This is done through collaborative exercises involving games, activities and discussions. Examples used are from real life and most often in areas that the students will otherwise be interested. The focus is as much on 'why' the concept is relevant to them as 'how' to apply it
- Once the concept is clear, Topic Mastery is achieved through a carefully constructed set of slides that ensure that the topic is dealt with comprehensively.
- Quizzes and Games. There are quizzes using game formats so that students compete positively and work together to answer questions
- A significant amount of time is provided for Practice.
- In addition to the regular chapter tests, there are term assessments and tests that may be required by students facing difficulty in some areas of Mathematics.

[3 and 6]

VI.1　Technique to execute Maths

- observing patterns: based on a computer's ability to produce many examples in a short time
- seeing connections: between formulae, tables and graphs
- working with dynamic images: allows students to manipulate geometrical diagrams
- exploring data: students can interpret and analyze real data in a variety of representations
- "Teaching" the computer by means of an algorithm:
- Encourages the student to express their commands unambiguously and in the correct order.
- Analyze real data in a variety of representations
- Spreadsheets are a very useful tool in the Mathematics classroom and can be used for many types of investigations.
- Students are likely to benefit greatly from learning how to enter formulae into spreadsheets. This can help them remember important formulae and the technique will obviously be useful to them in other areas. In addition to this they will have to learn the specific syntax of the package they are using; this will allow the importance of conventions for syntax to be emphasized. A good example is to have students set up a spreadsheet that solves the quadratic equation
- $ax^2 + bx + c = 0$, when the values of a, b and c are entered in separate cells.
- Using another program, e.g. the internet/Excel/Autograph, alongside the whiteboard software means that ICT can inserted seamlessly into lessons when appropriate. In addition to this the act of dragging or moving graphs/diagrams can be powerful when explaining a mathematical concept, especially if

multiplerepresentations of the same object can be displayed on the screen (e.g. equation, table and graph).

VI.2　Proposition:- 1

To Teach Mathematics at primary level worksheets are available in counting, simple addition, simple subtractions, sorting, etc. These worksheets are colourful and engage learners throughout. These worksheets can print also and are available as per syllabus.

Examples: Tutorvista.com, Navneet.com, Pearson

Proposition:- 2

In 12th standard Mathematics and other subjects question paper solutions with exercise are available for learners. They can avail this facility to improve themselves instead of depending only on textual material on paper. They can use MATLAB software for confirmation of an answer.

```
% Calculate the determinant of A

A = [5 2 3; 3 6 2; 1; 2 5];        % create matrix A
det_A = det(A);                    %find the determinant
```

$$\int_{-10}^{1}\int^{2} 1-6x^2y\ dx\ dy$$

```
>> F = inline ( ' 1 – 6 * x .^2 * y ' );
>> I = dblquad ( F, 0, 2, -1, 1)
```

[5]

Proposition:- 3

At college level in some of mathematics subject we can use ITC to clear the concept in front of student instead of solving it on paper **[2].**

For example 1: In computational Mathematics, Iterations can be done using Matlab like

Gaussian Elimination

- 5x = 3y − 2z + 10　　8y + 4z = 3x + 20　　2x + 4y − 9z = 9
- 5x − 3y + 2z = 10　　-3x + 8y + 4z = 20　　2x + 4y − 9z = 9
```
>> A = [5 -3 2; -3 8 4; 2 4 -9];

>> C = [A b];
>> Cr = rref (C)
```
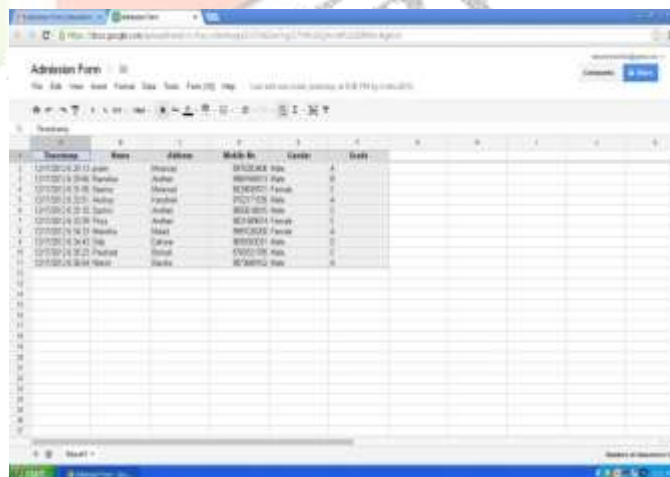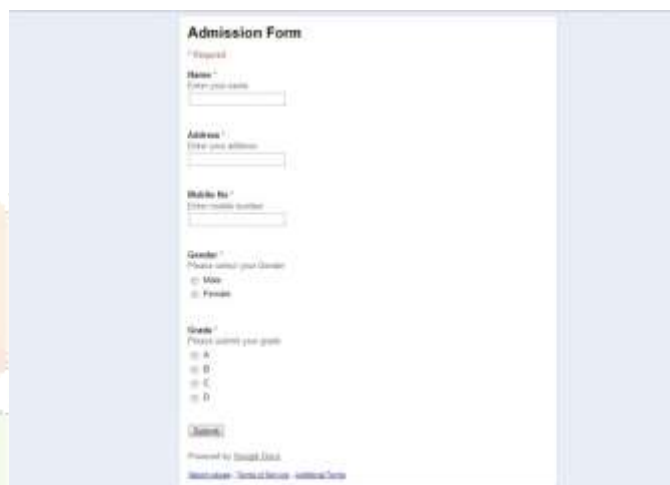**[7]**

For example 2: In computer graphics we are using term translation means moving an object along X and Y direction. We can use programming for this to show an answer for different values which encourages learners for different values of t_x and t_y [1]

VII. Cyclic Diagram

VIII. Analysis Results

- It improves poor handwriting and languages skills through word processing, Equalizes individual differences and has particularly dramatic effects for students with special needs.
- Facilitates self-pacing with increased capacities to deal with individual learning styles as students can work at the pace and intensity suitable to their needs.
- Enables collaborative learning with little indication of the isolated learner. Encourages use of peer coaching and peer reviews.
- Develops communication skills and awareness of different audiences. Has impact on resource–based learning and access to real world information through the Web.
- Increases information reliability and accuracy adding to authenticity of learning tasks, with realistic and up-to-date information.
- Increases student motivation through hands-on activity, visual representations and improved modes of presentation.
- Gives students more control;
- Allows students to produce high quality products.
- Changes teacher practices, planning tools and assessment rubrics
- Increases opportunities for classes to evolve and for student experiences to shape outcomes.
- Have motivated students to commit to learn and to participate in learning activities.
- Has improved students' quality of work and has given them the confidence to perform enhanced learning tasks.

- Has allowed students to learn independently, which has enabled more work to be completed, and has enhanced achievement due to the reinforcement and practice

Proposition:

During admission in First year learners are taking physical form and submitting it to the administration office and waiting for further reply. We can do this by making available form on internet and submitting it the office (application of Google chrome). Create a form and make it available on Net with Uniform Resource Locator(URL), People will take admission online at college level. It will avoid Further Data Entry Procedure. It is an Application of Cloud Computing.

IX. Conclusion

Innovative and challenging uses of ICT can improve Learners data-handling skills and their ability to construct complex models. Clearly the subject of ICT is a special case because it is essential that both practical skills and theoretical knowledge are developed. The research shows that if teachers provide opportunities for learner to carry out in depth investigations with appropriate modelling environments then they can reach higher levels of abstraction and competency in the field of ICT. Effects this was a novice attempt to encourage future teachers of mathematics to integrate ICT in the

teaching and learning mathematics. The findings reveal that the student teachers' perception about problem solving in mathematics actually changed with the use of ICT. Although they were quite apprehensive at first but they enjoyed the course and most importantly, they experienced a new.

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