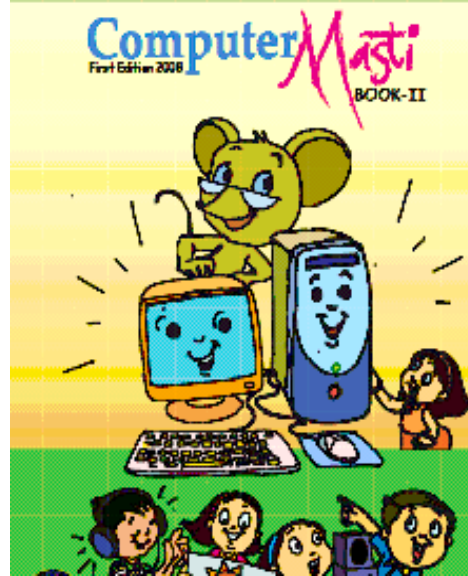


FOSS for Schools: A Case-Study of *Computer Masti*



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Presented at: Open Source India Tech Days
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Why FOSS in Education?

What does the nation gain?

- A developing country like India cannot depend on proprietary software for mass information literacy

What do the stakeholders gain?

- Maximize the ROI, limited investment required
- Allows the user to be in control
- Provides a 'choice' → empowerment
- Smooth transition from technology user to technology maker

What does FOSS gain?

- If FOSS has to become competitive, it should expand its user base. In educational institutes, FOSS reach will be high.
- Many more people will contribute to development and maintenance of FOSS applications.
- Catch them 'young'!
 - introduce FOSS to young students rather than expect them to unlearn what they have learnt and become a FOSS user

Common Misconceptions

- All FOSS applications have a steep learning curve
- FOSS cannot be introduced in primary schools
- Teachers are technophobic and will not be able to use FOSS
- ‘We should do it, but I can’t’ paradox –
“Probably, it makes sense to use FOSS in schools, but.....I am not a technical person and will not be able to use FOSS”

FOSS in Education: Implementation Essentials

- Syllabus that integrates usage of FOSS applications
- Teaching material for the above
- Trained teachers
- Technical support
- Psychological factors
 - *Positive attitude towards technology*
 - *Willinangness to learn and keep oneself updated*

Identifying the Gaps

FOSS usage for teaching Computers in schools is minimal

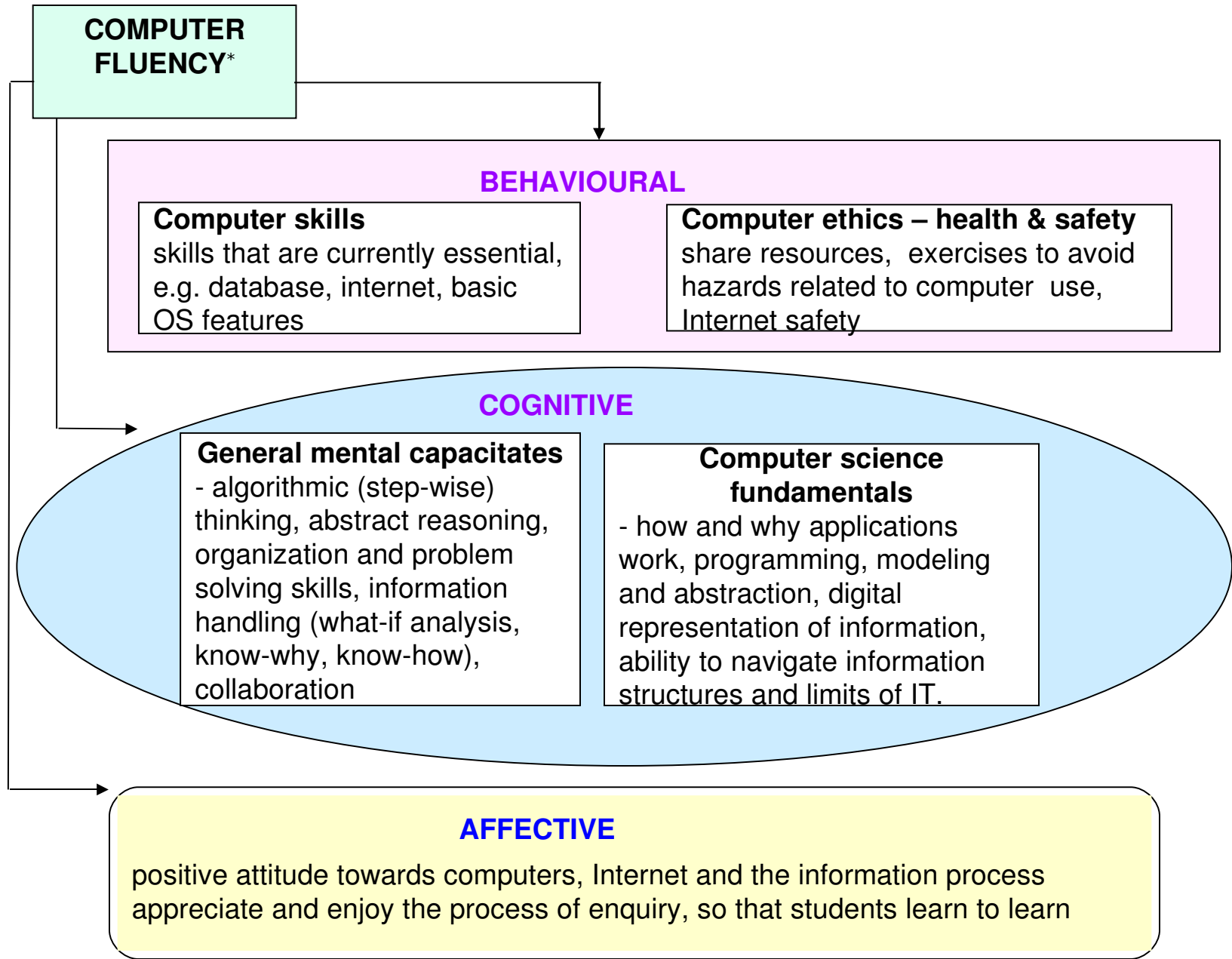
Reasons

- no computer science syllabus that integrates systematic use of FOSS applications
- lack of awareness about FOSS education resources
- non-availability of teaching material, trained teachers and maintenance support team.
- Building a positive attitude towards technology

Addressing the Gap

- Defined syllabus based on FOSS to build computer fluency
- Prepared teaching material for teaching FOSS in primary schools
- Implemented the curriculum for nearly two years in a pilot school in Mumbai
- Conducted teachers' training for FOSS based computer teaching

Framework for Computer Science Curriculum



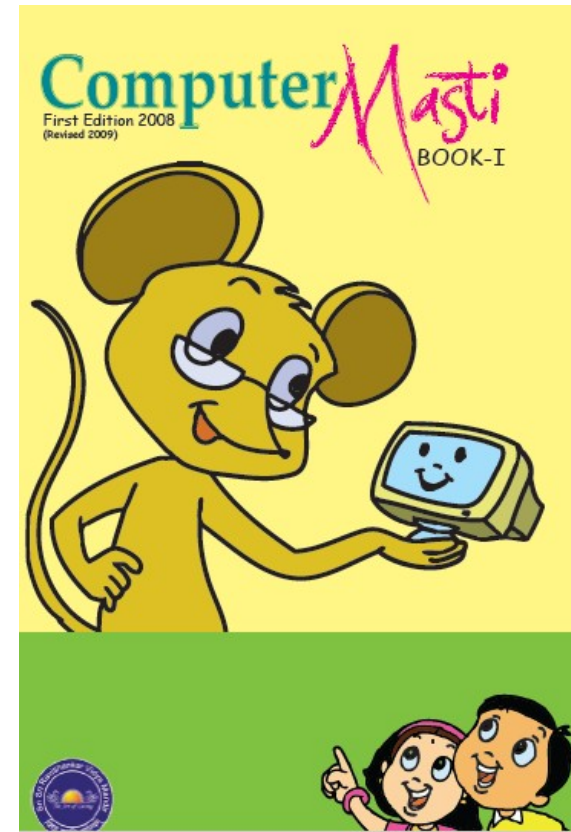
Framework Implementation

For each standard, syllabus is defined by:

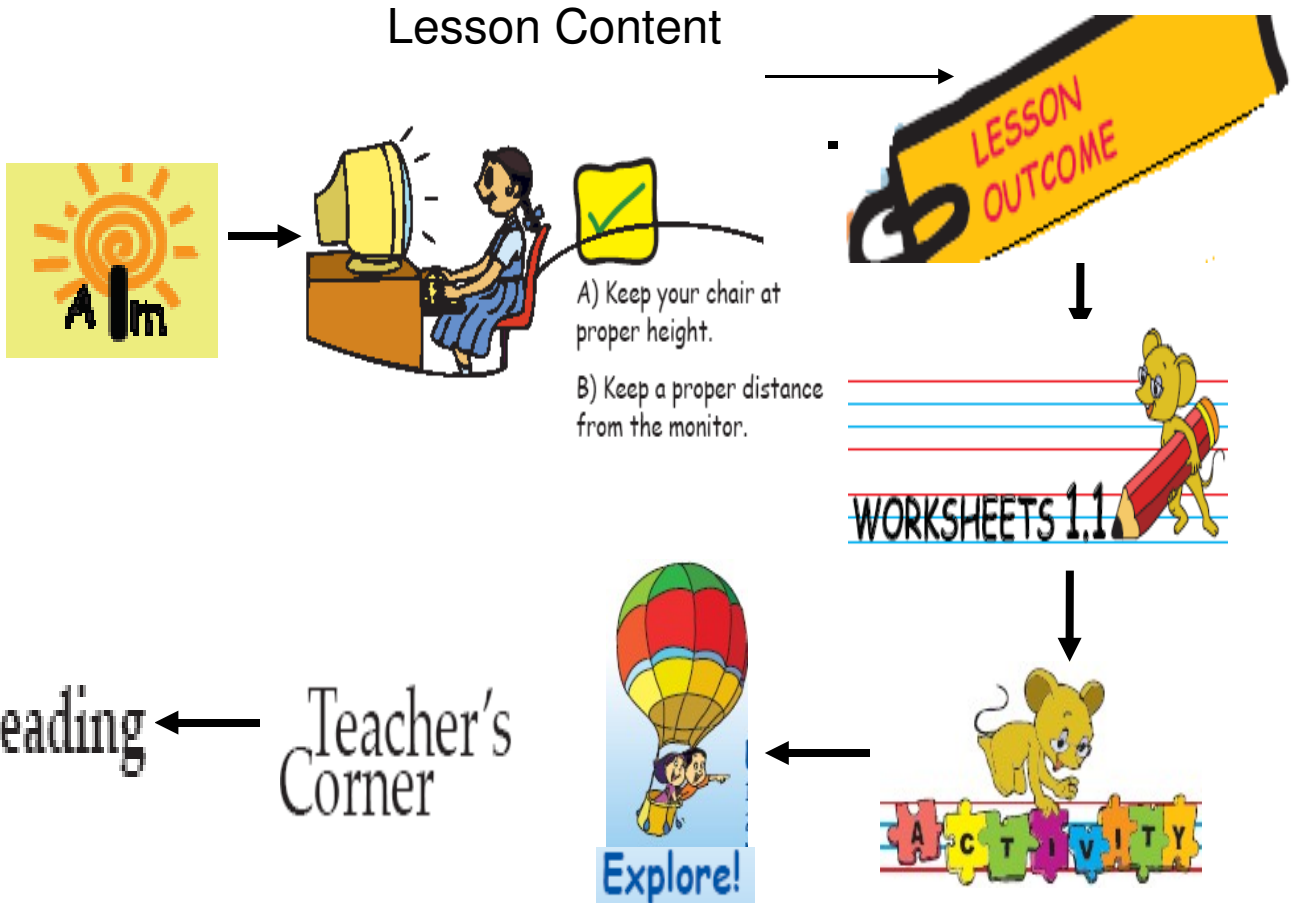
- the topics that should be taught (“what”).
- the reasons for doing so (“why”).
- the plan (“how”).

Three aspects addressed within the syllabus :

- **Concepts:** Learning computer science concepts that are generally useful in many areas as well as some concepts that are specific to computer usage/functioning.
 - **Usage Skills:** Developing hands-on skill in the use of various hardware/software and programming packages/languages.
 - **Social Aspects:** Understanding ethical and security related issues of computer and Internet usage.
- Spiral organization of the curriculum.
 - Detailed syllabus available online.
 - Download curriculum from:
<http://www.cse.iitb.ac.in/~sri/ssrvvm/>



Computer *Masti* (CM): Structure of the Lesson



About the Lesson

Storyboard format: Lesson content woven around child characters - to make it interesting, absorbing and intriguing.

The story format adopts a constructivist pedagogical approach - encourages the characters to keep asking questions, and to explore on their own.

In addition, subtly teach values like sharing, team work etc.

Computer *Masti* (CM) Design Goals

1. Emphasize on concepts and not merely skills
 2. Use FOSS applications - *Edubuntu operating system and Open source educational applications (e.g. Tux Paint) and games (e.g. GCompris, ChildsPlay, Tux Math).*
-
1. Supplement learning in other subjects
 2. Encourage collaborative learning (through group activities)
 3. Provide pointers to teachers about teaching methodology and relevant web resources

Books are released under [Creative Commons](https://creativecommons.org/licenses/by/4.0/), license, freely downloadable at the website <http://www.cse.iitb.ac.in/~sri/ssrvvm>

Example (from Level 2) of Design Goal 1 : *Emphasize Concepts and not merely Skills*

Files are used to store information, pictures, etc.

Folders help us by:

1. Allowing us to keep related files together.
2. Making it easy to locate important files quickly.

Creating a folder

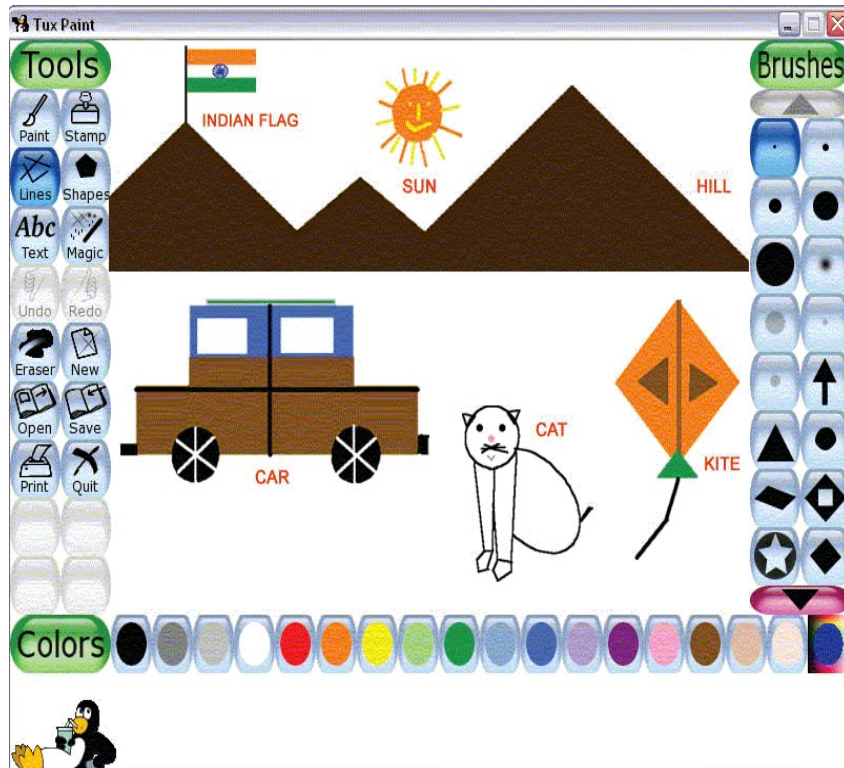
1. Move the mouse pointer to an empty space on the desktop.
2. Right click (click once on the right button of the mouse).
3. Select the option 'Create folder'.
4. Enter a name for the folder.

SKILL

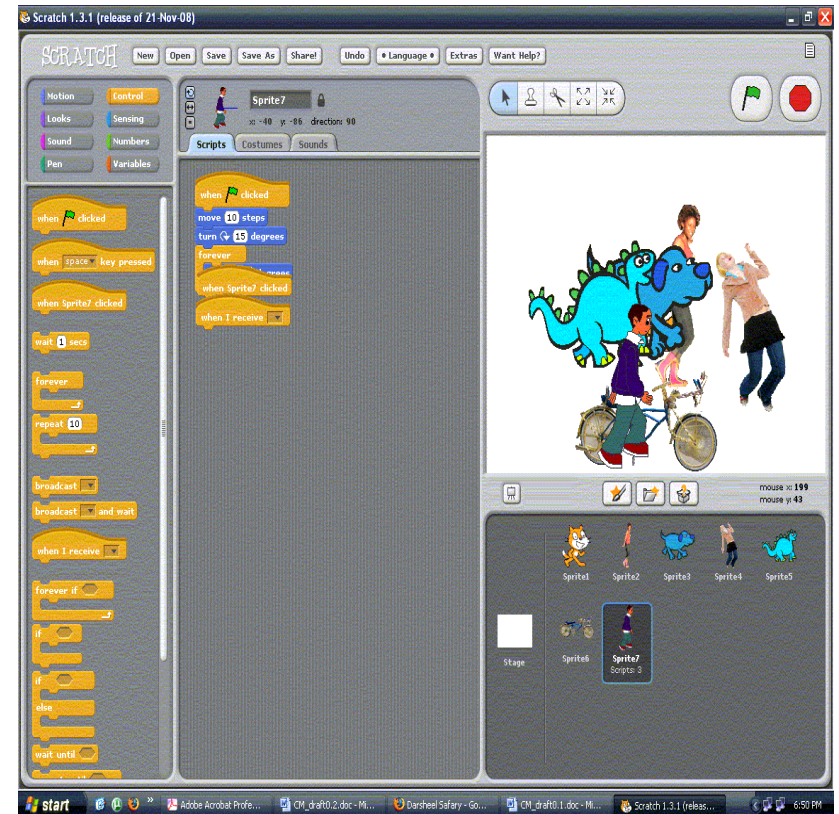


Example (from Level 1) of Design Goal 2 : *Use FOSS applications*

Tux Paint

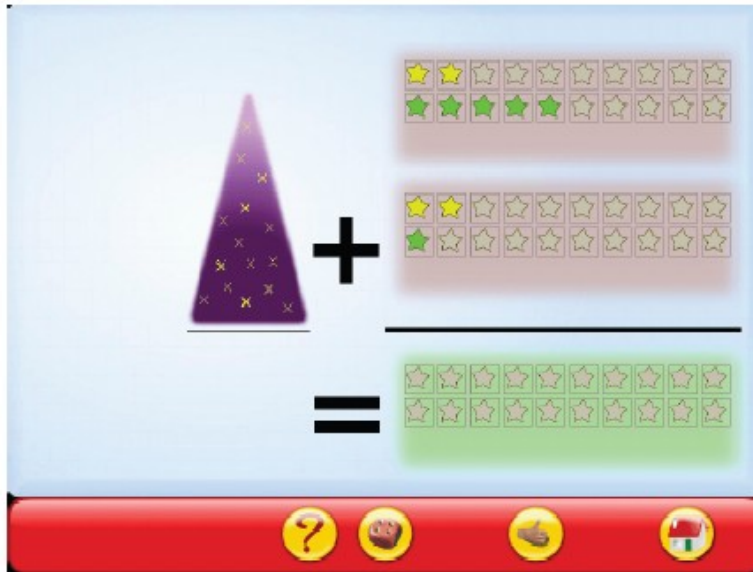


Scratch: Open source programming for kids



Example (from Level 2, 3) of Design Goal 3: *Supplement learning in other subjects*

Play the magician hat game and identify the input and output in it. Find this game in GCompris under math activities.



Tux Math



Example (from Level 2) of Design Goal 4: *Collaborative Learning*

Act out as Input/Output Devices: Have a fancy dress show where different students act as the different inputs required for growing a plant. Student showing input can be sun, water/ clouds, soil and so on. Some students act as leaves, flowers and fruits to show the output.



Example (from Level 2) of Design Goal 5: *Provide Guidelines to Teachers , Web Resources*

Teacher's Corner

- Begin the lesson by asking the students whether they have observed the teacher/ family member start a computer. They would mention switching on the buttons, entering some word, following which the desktop is seen. Tell the students that you will now start the computer and that they should observe carefully what you do.
- Switch on the power, CPU and the monitor. (If you are using laptop, inform the students that it has to be charged for use. Demonstrate how the wire is connected and they can note that the battery is getting charged looking at a particular indicator). Ask them to note the light on the CPU near the power button. Tell them that pressing the button on CPU starts the computer. Ask the students to note if the monitor has a similar button and a light near it. Switch off this button and demonstrate that monitor is switched off. Now

Further Reading :

[http://en.wikipedia.org/wiki/Logging_\(computer_security\)](http://en.wikipedia.org/wiki/Logging_(computer_security))

In addition...

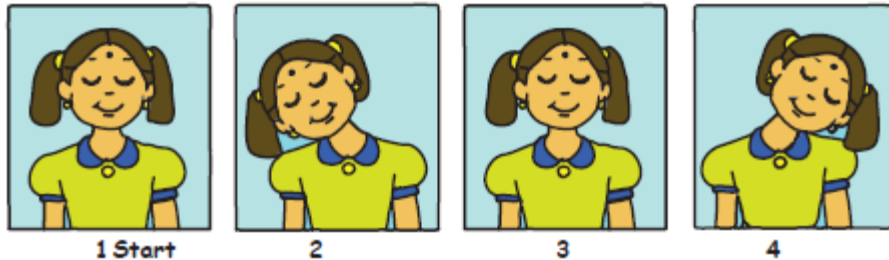
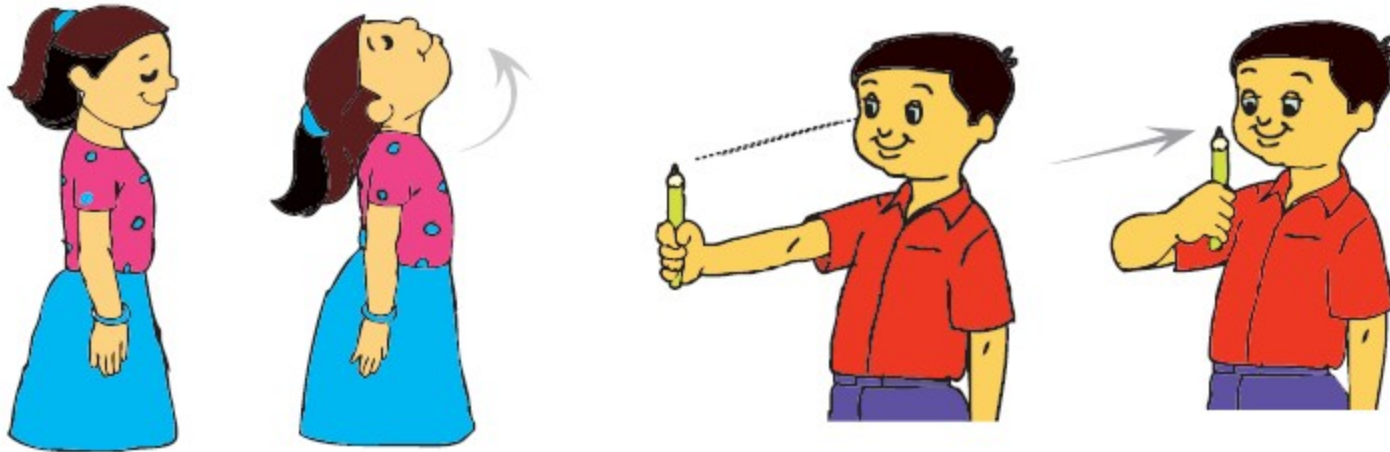
Preface tabulates the Skills, Concepts and Value Reinforced

How To Use This Book

This book is meant to be used for teaching computers to children in the Second standard, in a way that is mostly fun (as indicated by the "Masti" in the title). It is designed so that it can be covered comfortably in one year, with one class (30 to 45 minutes) per week. A weekwise schedule of topics is given below.

Lesson No.	Topic Name	Concepts	Skills	Values reinforced	Weeks
1.	Revision of Level I	o Uses of a computer	o Identification of parts o Correct usage	o Observation o Awareness	1 st - 4 th
2.	Input and Output devices	o Input, Output	o Mouse movement skills	o Sharing	5 th - 7 th
3.	Remain Healthy while using Computers	o Correct ways to use computers	Exercises for o Shoulders o Hands o Neck o Eyes	o Importance of taking care of health o Importance of Exercises o Taking precautions	8 th -10 th
4.	Activities using a Mouse	o Organization o Grouping of similar objects o Folder o Naming of files	o Creating a new folder o Moving files into a folder o Drag and drop of Mouse o Organizing icons on Desktop	o Taking turns o Team work	11 th -13 th
5.	Activity using Paint	o Revision lesson	o Using features of an activity		14 th -16 th
		REVISION			17 th -19 th
6.	Activities using a Keyboard	o Functions of Keys o Change the written text	Using o Arrow keys o Delete o Backspace o Caps lock o Page Up/Down	o Helping each other	20 th -22 nd
7.	Basic Features of Text Editor	o Reuse [copy] o Edit	How to o Copy o Cut o Paste o Undo	o Take turns o Share the resources	23 rd -26 rd
8.	Computer Start up and Shut down	o Start up o Booting o Login/Password o Logout o Shut down	o Start a PC o Enter Login o Enter password o Shut down PC	o Taking permission before doing an activity	27 th -29 rd
9.	Projects				30 th -32 rd

In addition: Exercises and Ergonomic Issues Addressed

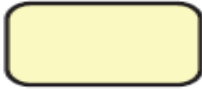


- If you are not typing or using the mouse, relax your hands in your lap.

Besides...

Illustrations - sensitive to - Gender & Body Image Issues

Salman is making chapattis. Can a computer be used to make chapattis?



Besides...

Secular character of the book: Characters from Diverse Religions



Kartar



Amina

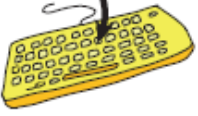
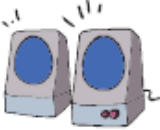






Jeet

Besides....

Animal figures included as primary school kids are able to identify with the animals.

Sonu and Monu, the two baby kangaroos are lost. Sonu can reach his mother following the path by hopping on the input devices of a computer. Monu can reach his mother by hopping on the output devices. Please help them to reach their mothers, by identifying the input and output devices.

 (Input / Output Device)	 (Input / Output Device)
 (Input / Output Device)	 (Input / Output Device)
 (Input / Output Device)	 (Input / Output Device)

Meetu monkey loves bananas. But the banana tree is on the island across the river. Help her reach the tree by marking the seven stones that have the names of items related to a computer.

Problems and Insights in the Implementation stage

Excerpts from the diary of a teacher.....

OS related issues:

- “Each application has several dependencies. It is so difficult, can I not just do *click...click...click...* and get the s/w running”
- “The online forums provide technical support, but where do I start?there is so much of information!”
- “There are several compatibility issues, one version of a particular application runs only on a specific OS”
- “Installing a webcam has taken over a week and it is still not done !”
- “Can I just ask a sys. ad. to fix all the problems?”

Learning in progress.....

- I have started enjoying this process of exploration, I have learnt so much, it could never have been possible with just ‘*click...click...click...*’

Application specific issues:

- How to add pictures to colour in Tux Paint? How to take a back up of the pictures/use the drawing elsewhere?
- Scratch is available only for Windows and Mac; how do we implement it in FOSS based computer education teaching?

Learning in progress.....

- There is a GUI based system for everything ...installation, backup [*Ctrl + H, SPM*]
- Use wine and run any .exe file on a Linux system

Field Insights

- FOSS learning curve is quite smooth and primary school students can easily adopt it.
- Elementary school students are eager learners and can explore the various computer applications with nominal assistance .
- The curriculum has a positive effect on students' attitudes towards technology.
- Computer Masti has the following differentiators --- higher emphasis on computer science concepts rather than skills, and a constructive pedagogical approach

National and International Audience

- CM has created a lot of enthusiasm among the teaching community both nationally and internationally.
- Google analytics data (July 2008 – Feb 2009) shows 2,212 Page views and more than 100 downloads for Book 1 & 2.

Future Directions

- A number of individuals have volunteered to translate the content into Marathi, Kannada and other languages.
 - We have also received requests from European countries to translate and use the CM content.
- Training programs for teachers to implement CM content are being carried out.
 - We offer a one or two day workshop for people interested in teaching using CM.
- Adapting the content to adult literacy programs can also be done seamlessly and a pilot is already being conducted to investigate these aspects.
 - *Location*: Vidya, an IITB, institutional responsibility initiative,
 - *Sample*: 60 IIT staff members from Class IV cadre are learning computers using CM.
- CM content can also be adapted to rural audience by replacing urban specific examples with locally relevant instances.
 - Cursory analyses - 20% changes required.

The CM Team



FOSS in Education: A Business Model

- Teaching material for FOSS
- Extend technical support to schools
- Training of teachers

Essentials

- Awareness about FOSS in education
- Education boards and educational institutes recognizes and accepts its value
- Training of teachers
- Investment of time and effort