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# Pūrṇam

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Portraying the attempts of scholars and scientists.....

..... to understand the contributions of Bharatiya Heritage and SAINTists™

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By the Editor

**Novel; rather, ancient methods of representation of knowledge for modern science/technologies**

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## Abstract

*Today information / knowledge is passed on largely prose form. However, traditionally knowledge was passed on from person to person in several forms; viz., through mantras, stotras, shlokas majority of them in the poetic form. There were also in the form of stories.*

*The paper show cases an attempt to reinvent some of the forms of representation of knowledge by assigning the tasks to a group of students of under graduation in Mechanical Engineering. The attempt is worth noting*

**Keywords:** Representation of knowledge, shlokas, mantras, Astotthara

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## Introduction

M S Ramaiah Institute of Technology, Bengaluru, offers an Ability Enhancement Course titled “Indian Education System”. The course is aimed at understanding the pedagogical attributes of the largely gurukula based traditional education in India in the past, and the present traditional institutes which work on the blended gurukula model. This is meant to help students to take messages from the gurukula system to adopt the possible strategies into their education to improve their learning abilities and attitudes.

For example, the traditional learning process included three steps:

1. *Shravana* (hearing what is told by the guru),
2. *Manana* (Pondering around, recollecting what was heard, think and try to find applications or importance), and last but not the least,
3. *Nididhasana* (deep contemplation & practically implementing or putting it to work and reiterate what was taught).

This would not only help understand the concepts but also work and witness things to retain the same in them for a long lasting memory and first-hand experience. When this topic was explained, students were asked to adopt the concept and asked to write a case study for the process or carry out the experiment or execute the job for a better understanding.

## Traditional ways of representation of knowledge

As a part of the course students are also explained about the different traditional ways of representation or presentation or explanation of knowledge; or i.e., different ways of explaining things, viz., the nature or science or technologies or management etc. They could be in the form of *kathas/ puranas* (stories), *shlokas/karyas* (poetic), *Harikathas*, *mantras* etc. To consider an example, entire medical and pharmaceutical sciences were explained in the form of *shlokas* in the texts of Charaka Samhita, Sushruta Samhita etc. Further, not to ignore, even Art, Architecture, Sculpture, Music and dance are different traditional ways of representation of knowledge.

## Attempt to Reinvent traditional representation of knowledge

While explaining the traditional knowledge representation, the students were explained the technology of computers with the help of *shlokas*, the “Computer Astothara Shatanamavali”; which had explanation for each of the 108 *shlokas* (Harichandra, 2002). Incidentally it was a couple of days before the Ayudha Pooja. The students appreciated it a lot.

To give a sample of the content of Computer Astothara Shatanamavali, it is here...

*Athah Yantra Devataabhyo namaha...*

*Computer Astotthara shatanamaavalibi*

Om computeraaya namaha

Krantikaari yantraaya namaha

Maanava Maanasa putraaya namaha

Aadesha paalaakaaya namaha

Bit Byte Dattakaarakaaya namaha

.....

Online lottery chaalakaaya namaha

.....

Eka shunya praanaaya namaha

Laser jet printer sahitaaya namaha

.....

230 Volts bakshakaaya namaha

.....

Virus apriyaaya namaha

Antivirus bahupriyaaya namaha

.....

.....

Ayudha Pooja priyaaya namaha

.....

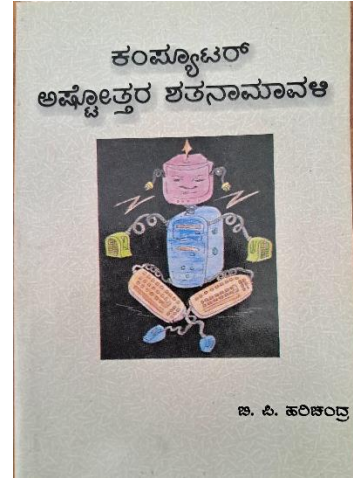


Figure 1: ‘Yantra Devatha’ on Computer Astothara Shatanamavali – Kannada Book

Later, the students were asked to consider any technical topic and explain it in any traditional form said above, or in their own way. The response of the 69 students of III Semester BE (Mechanical Engineering) was quite amazing, and some examples here.

Mr. V S Sri Tilak Ram wrote “The Epic of 4- Strokes”. It is as follows:

Long ago, inside the heart of a mighty chariot, there lived **four brothers** – “Intake”, “Compression”, “Power” and “Exhaust”. They were children of engine bound by destiny, rhythm and a spark of fire.

The eldest, Intake, was calm and generous. Each cycle, he opened wide and welcomed a fresh breath of air-fuel mixture into their chamber-home, saying “without new beginnings, no journey can start”.

Next came Compression, disciplined and strict. He squeezed the mixture tight, muttering, “only under pressure do we discover our true strength”. The others often complained, but they knew that his discipline gave them power.

Then thunder rolled. The fiery sibling, Power, received the blessing of a spark. He roared with unmatched energy, pushing the piston down with all his might. "I am the strength that drives the wheels of destiny!", he cried, lighting up the chamber with fire and glory.

Finally, the quiet youngest, Exhaust, stepped in to clear away the burnt gases, often overlooked, he whispered, "I carry away the past so that the future may enter."

Together they repeated the cycle endlessly, each stroke following the other in harmony. The crank shaft dance to their tune, converting their rhythm into rotation, and the chariot surged onward carrying kings, warriors and dreamers across lands.

Thus, the engine lived on, teaching mankind that "progress is born from teamwork, balance, and a little spark of fire".

The students were free to do their task even in their mother tongue. One student, Ms. Sanjana H wrote about a turbine in Kannada as follows:

### ಟರ್ಬೈನ್ (Turbine)

ಟರ್ಬೈನ್‌ನ ಹೃದಯ ಚಕ್ರ ತಿರುಗುವ ಚುಕ್ಕಿ,  
ರೋಟರ್ ನಾಟ್ಯದಲ್ಲಿ ಶಕ್ತಿ ಹುಟ್ಟಿದುದು ಸಿಕ್ಕಿ|  
ಸ್ಪೀಟರ್‌ನ ಬಾಹುಗಳಲ್ಲಿ ಗಾಳಿ ನಿಂತು ತಿರುಗಿ,  
ದಿಕ್ಕು ಬದಲಿಸಿ ಶಕ್ತಿ ಹರಿಸುತ್ತಿಹುದು ನುಡಿ||

ನೋಜಲ್ ಬಾಯಿಂದ ನೀರಿನ ಬಾಣ,  
ವೇಗದ ಜ್ವಾಲೆಯಿಂದ ತಿರುಗುತ್ತಿಹ ಚಕ್ರಮಾನ|  
ಬ್ಲೇಡ್‌ಗಳ ತಲೆಯಲ್ಲಿ ಹೊಳೆವ ನಾಟ್ಯ,  
ನೀರಿನ ಹೊಡೆತದಲ್ಲಿ ಮೂಡುತ್ತಿದೆ ಜೈತನ್ಯ||

ಶಾಫ್ಟ್ ತಿರುಗುತ್ತಿಹುದು ರೋಟರ್‌ನ ನಾದ,  
ಶಕ್ತಿಯ ಹರಿವಿಗೆ ಕೊಡುವುದು ಸ್ವಾದ|  
ಬೇರಿಂಗ್ ಹಿಡಿದಿದೆ ಚಕ್ರದ ನಾಡಿ,  
ಮೃದುವಾಗಿ ಚಲಿಸಿ ಶಕ್ತಿ ಕೊಡಲಿ ನಿತ್ಯನಾದಿ||

ಕೇಸಿಂಗ್ ಹೊದಿಕೆಯು ರಕ್ಷಣೆ ನೀಡುತ್ತಿಹುದು,  
ಒತ್ತಡ ನಿಯಂತ್ರಿಸಿ ಸುರಕ್ಷೆ ಕಾಯುತ್ತಿಹುದು|  
ಗವರ್ಣರ್ ನಿಗದಿಪಡಿಸುತ್ತಿಹ ಶಕ್ತಿಯ ವೇಗ,  
ಸಮತೋಲನದ ನಾದದಲ್ಲಿ ನಡೆಯಲಿ ಯಂತ್ರದ ರಾಗ||

ಬಕೆಟ್ ಹಿಡಿದಿದೆ ನೀರಿನ ಹೊಡೆತ,  
ತಿರುಗಾಟದ ಶಕ್ತಿಯಲ್ಲಿ ಬೆಳೆಯುತ್ತಿಹ ಶಕ್ತಿಪಟ|  
ಡ್ರಾಫ್ಟ್ ಟ್ಯೂಬ್ ಹರಿವು ನೀರನ್ನು ಸಾಗಿಸಿ,  
ಒತ್ತಡ ಉಳಿಸಿ ಶಕ್ತಿ ನೀಡುತ್ತಿಹ ಸಾಗಿ||

ಕೇಸಿಂಗ್, ನಟ್, ಬೋಲ್ಟ್, ಗೇರ್, ಪಿನ್  
ಇವರೆಲ್ಲ ಸೇರಿ ಮಾಡಿದ ಅದ್ಭುತ ಯಂತ್ರ|  
ಪ್ರತಿ ಭಾಗದ ನಾದ ಒಂದು ರಾಗ  
ಟರ್ಬೈನ್ ನಾಟ್ಯವೇ ವಿಜ್ಞಾನದ ಯೋಗ||

On similar lines, Mr Salim Manzoor wrote the poem of a machine in his mother tongue, Urdu (Figure 1), and gave its translation in English too.

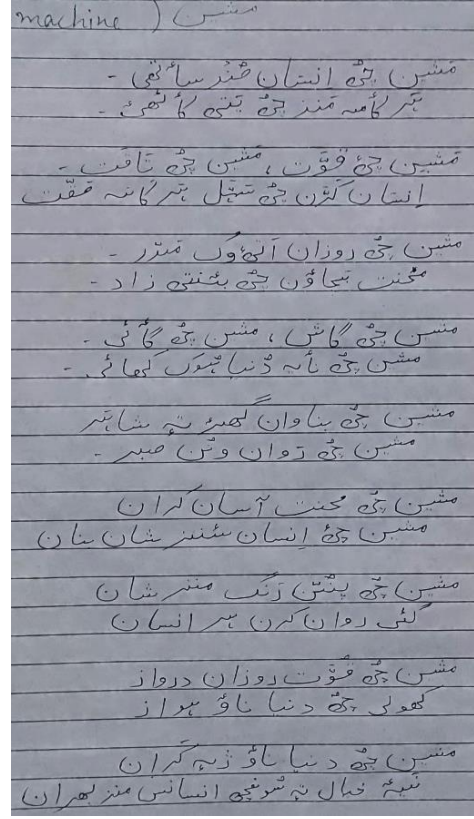


Figure 2: Poetic Explanation of a "Machine"

The following is the translation.

### Machine

Machine is man's companion;  
Helpful in every task

Machine is the Power, machine is strength;  
It makes every effort easy

Machine is Hand's helper;  
It saves labor and time

Machine is light, machine is speed  
It is the handy tool for the world

Machine is the mark of art  
It shows human progress

Machine builds home and cities  
It runs with patience and effort

Machine makes hard work easy  
It increases human dignity

Machine has its own pride  
It give motion of manking

Machine is the key to power  
It opens the doors of the future

While explaining the computer *Astothara Shatanaamavali*, students were also narrated another example, of “*Lathe Astothara Shatanamaavali*” giving example of explanation like this:

Om latheaaya namaha  
Revolving workaaya namaha  
Translating toolaaya namaha  
Tail stock sahitaaya namaha  
Lubrication priyaaya namaha  
..... and so on.

Un-imaginably, going beyond a machine, one student, Nihar Nagaraj Shiroor wrote a “*Gear Astothara Shatanamaavali*”. A sample of this is given here:

Om Gearaaya namaha |  
Om power transmitteraaya namaha |  
Om motion converteraaya namaha |  
Om force divideraaya namaha |  
.....  
.....  
Om endless roteraaya namaha |  
Om ratio createraaya namaha |  
Om lubricant loveraaya namaha |  
Om stress beareraaya namaha |  
Om smooth engageraaya namaha |  
Om factory heartbeataaya namaha |  
Om perfect pitch sahitaaya namaha |  
Om Engineers’ blessingaaya namaha |  
.....  
.....  
Om balanced beingaaya namaha |

Another interesting one, “A short poem of CNC”, by Mr. Pavan G H is as follows:

O Divine weaver of metal and form,  
Whose spindle numbs with digital grace,  
Guided by code, unyielding exact,  
You carve the truth from the raw embrace.

No tremor mars your steadfast hand,

No flaw escapes your watchful eye,  
Through G-code chants and silent command,  
You shape the future piece by piece, high.

From block to beauty, rough to fine,  
With Laser gaze and milling song,  
You turn the vision into line,  
Where human thought and steel belong.

O CNC, mind of the factory floor,  
Architect of the unseen gear,  
We honour thee, forever more,  
For making the intangible clear.

The choice of the topic (technical only) and language was purely left to the students. Hence there were a wide range of assignments given. Just to name some more of them, here it is.... “the story of brake disk”, “the tale of the talking CNC”, “The Silent Hero: The Story of a Motor Pump”, “Fighter jet components’ *astothara shatanamaavali*”, “the heartbeat of iron – the cam shaft”, “the proud hammer”, “the brave piston”, “*Vaavana Hrudaya Mahaakatha*”, “The Divine Story of the Lathe”.

Today AI is taking over the thinking process of the students. At this juncture tasks like that of the above ignite their thought process. Although use of AI for carrying out the above task cannot be negated, each student had their own way of thinking and presenting the topic they themselves chose.

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## Conclusion

According to Swami Vivekananda education is about bringing out the real potentials of an individual into action. Through this task students were able to think out of the box and come out with different ways of representing Engineering aspects. The task is applicable not only to engineering but also any branch of education. Further, it is worth bringing modern science or technological knowledge in traditional forms of representation, which students find more interesting and easy catching.

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