

# Games as Textbooks and Textbooks as Games

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## ABSTRACT

Digital Game-Based Learning (DGBL) is the engine of the next generation textbooks. We are going to present our experiments in free form open source game design and development to highlight some of the critical findings of the group which consisted of about 12 graduate and 20 undergraduate students who have developed their own products and written articles that will be presented and referred to in our work.

We want you to consider this effort as a beginning to create a repository and some trials in our group.

We think we can create games to

- i- Educate
- ii- Design
- iii- Diagnose and treat some of the medical cases in autism, Alzheimer and depression to state only a few.

Being in the application end of the DGBL we are curious to connect with colleagues who are looking into various aspects with traditional well established pedagogy of learning and testing.

## HISTORY of DGBL; what we have learnt so far?

Here are some critical points and basic definitions established in the open literature cited at the end.

- i- *Digital game-based learning (DGBL) is an instructional method that incorporates educational content or learning principles into (video) digital games with the **goal of engaging learners**. Applications of digital game-based learning draws upon the constructivist theory of education* and here the most critical sentence is the ability to engage and as we watch the 18 months old babies focusing the iPad based games the engagement feature is indeed very intense.

- ii- *globalized, technological society of the 21st Century*  
**digital game-based learning (DGBL)** connects learners with the educational content via hand held devices (ipads, iphones, smart phones, lap tops etc..) and digital games can be used in

almost all fields and by any skill levels. It provides learning opportunities that **engage anybody** in **interactive instruction**. **As we are passing from active learning to interactive learning**, it helps prepare us to participate in the **globalized, technological society of the 21st Century**.

- iii- [what Marc Prensky calls} **“digital immigrants”** now have to adapt to the language and learning styles of **“digital natives,”** today’s students who have always been surrounded by technology.
- iv- Prensky recommends that in order for teachers to adapt their instruction to meet the needs of students, they can implement computer or digital-based **games as learning tools** in the classroom. These games can be used in various subject areas and in a variety of ways.
- v- Marc Prensky explains that *the emergence of digital game-based learning came in the “last decades of the 20th century,”* when there was a **global technology boom**.
- vi- The recent generations of students in grades K-12 have lived their entire lives with access to technology — **not only computers, but also digital music and video players, cell phones, video games, and a host of other gizmos that require technology**. Because of this access to technology, Prensky argues that today’s students **“think and process information fundamentally differently than their predecessors and this ability to think and process the information differently will open new applications in the medical treatment where some are born with inherent different processors and now we have the right tools for them. Autistic children are only one such group.**
- vii- **Components of digital game-based learning ; let’s have a quick look into the nature of digital games so far observed and practiced.**
- viii- Digital game-based learning involves activities that can range from completing very simple tasks to the development of intricate problem-solving skills. According to Patricia Deubel, *games can be categorized as “action, adventure, fighting, puzzle, role-playing, sports, and strategy.”*<sup>4</sup> Deubel suggests that the following information should be taken into account when teachers are selecting games for students
- ix- Students’ age, characteristics, gender, competitiveness, and previous gaming experience.
- x- The game’s target age level.
- xi- Special needs. Would students with disabilities be left out?
- xii- Gender and racial diversity. In its choice of characters, language, or situations, does the game offend or slight any particular group of students?
- xiii- Number of players. How many students can play at one time? Will too many be left sitting on their hands?
- xiv- The role of the teacher? Passive observer or active participant?
- xv- Additionally, teachers should consider whether the game will cause too much competitiveness, if it will be ongoing, and the effectiveness of the difficulty level.
- xvi- Deubel suggests that there are a few necessary components required for effective digital game-based learning. First of all, the games must keep learning

and engagement at a high level. Rules and goals are also important components of a strong game-based learning program. Teachers must make the outcomes of the games clear and provide immediate feedback. Deubel also recommends that students have an interactive role not only with the game, but with other students as well.

## Benefits of digital game-based learning

According to Patricia Deubel, digital game-based learning has the potential to engage and motivate students and offer custom learning experiences while promoting long-term memory and providing practical experience.<sup>6</sup> Deubel suggests that in order for teachers to effectively use game-based learning in the classroom, they must first find non-violent games that facilitate planning and problem-solving and relate to the curriculum. Deubel recommends **role-playing, simulation, and adventure games because they often appeal to the development of more than just one skill**. Deubel also notes the function of game-based learning in the development of *vocabulary skills* and the *enhancement of mental quickness*.

### ***digital games provide a great tool for conducting educational research***

According to Mark Griffiths,

- i- ***video or digital games provide a great tool for conducting educational research.*** Griffiths contends that digital games have “great diversity,” while attracting students of various demographic backgrounds.<sup>8</sup> They also help students set and work towards achievement of goals, provide helpful feedback, and maintain records for measurement purposes. Furthermore, Griffiths suggests that
- ii- ***the interactive nature of video games stimulates learning and encourages participants to challenge new topics or knowledge.*** Griffiths also notes that video games can help students develop computer skills that they may need in a society that continues to develop technologically.

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## Using video or digital games with special-needs groups

Griffiths refers to the merits associated with using digital games with special-needs children. For example, he cites a case where

- i- **video or digital games had a calming effect on a seven-year-old child with autism.** Griffiths also provides research data that suggests that adolescents with
- ii- **attention deficit disorder** may experience improvements in “**grades, sociability, and organizational skills**” when using educational video games.
- iii- Additionally, Griffiths touts the possible benefits of using video or digital-based games with **children with**
- iv- **diabetes and other forms of illnesses that require rehabilitation.**

•**We think that digital tools and games and digital teams combined with open sources will create a very productive open innovation where synergies can be instantaneous from diverse geographies and demographics.**

## Case Studies of Open Innovation

Next we will share our experiments and list them all here one after another.

As we did begin to revamp the engineering program at Ansal University, we realized once more, the critical role of **Open Innovation** which we will be describing next in full action with students and faculty in our what we called **honor research projects**.

- i- **Case Study 1:** Use of [www.ROS.org](http://www.ROS.org) Of Stanford University, we have formed a group of students and a few faculty who are interested in creating new robots for farmers in the Northern India around Gurgaon and Delhi Regions. Robot Operating Systems which is available to all as open source software reduced the time to develop and the cost involved while creating a self learning environment among the student teams with their professors as guides. We are looking into a variation of this project to create flying robots for the crop monitoring and again we are using an open source software package provided by a small start up from California, USA [www.3drobots.com](http://www.3drobots.com) and with ease we created a larger collaboration group with several universities from UK, and USA in order to tap into earmarked funds such as UKIERI and Erasmus Mundus.

## ***OPEN INNOVATION, ENGINE to DEVELOPMENT***

In this sense we would like to share our examples tested in India in 2013.

### **i- Case Study 1: Flying Solar Robots**

We decided to make some toys for the kids who were across the fence from the campus and whose parents work in the new construction projects of booming Gurgaon. An idea of social entrepreneurship combined with Open Innovation came to be the cementing element of our group.

We decided to build flying robots and think about possible useful applications in farming communities around us. Children loved this real life toys; not only a game but a useful one.

The group working on the flying robots will summarize their experience by another paper.

Making solar flying robots for the farmers use was our first class of toys.

We were basically amazed at the pace and amount of learning taking place over the open source and open knowledge sharing environment in creating new products. The same team is now thinking to organize a workshop for the high school students who may chose engineering as their field of study.

### **ii- Case Study 2: Tele Nurse**

Another good example is what we experienced in the project that we called “Tele-Nurse” where we have an Artificial Neural Network based intelligent module to help with the information gathering and decision making under uncertainty and with activating necessary actions such as calling the ambulance with a proper kind of tools and nurse help as described in the following schematics. Here the module we are developing is an open source module which we will be sharing with all, in order to reduce the cost and the time of development in Mobile Health Systems and Services (MHISS). Some modifications to the original module may be required as applied to new cases but still much less time and funds will be needed. The development of the whole new code will be costly and will take longer time.

### **iii- Case Study 3: Sacred COW**

**Tele Nurse** project has led us to our **sacred COW** (Care on Wheels) where we extended the e-health services and systems to the rural areas as well as some chronic treatment cases such as kidney dialysis. The patients can stay at their homes and all the monitoring and treatment related information is transferred to the intelligent modules placed in the hospitals. The nucleus of this intelligent module is again similar to the one of the Tele Nurse and based on Artificial Neural Network based information gathering, decision making under uncertainty and

**Tele Nurse**



Tele nursing is the key to improving the **efficiency** and **widening the reach of healthcare** to rural India.

The fledgling health sector in India is facing a **50 percent shortage** of nursing staff due to demand outstripping supply. The **nurse-per-bed ratio in India was 0.87 in 2010** as against the world average of 1.2 nurses-per-bed, based on the data obtained from the World Health Organization. It will decrease even more

Tele-nurse will help **cushion the impending shortage** of trained nurses and also ensure a continuous flow of nursing staff who could also treat and nurse more number of patients at a given point of time with the assistance of Tele-medicine and Tele-nursing technology.

According to experts almost **70% of doctor**, urgent care and ER visits are **preventable**. Many of the non-life threatening medical conditions can be cured by over the counter drugs and home remedies and Tele nurse can help you make that determination.

## Telenurse

The Project

### WHY?

Care and Remedies **on the go**.  
**Interactive** support.  
 Emergency **AMBULANCE** dispatch.  
**Multilingual** support.  
 Dedicated **Phone lines**.  
 Dedicated **Java** and **Android Apps**.  
**Second Opinion** from Doctors.  
**Call forwarding** to Doctor.  
**Database up to date**.  
**Database training on ANN**.  
**Speech recognition training on ANN**.

Extention - **CARE ON WHEELS**

A Telenurse Mobile Health unit

Artificial Neural Network  
 Powered Speech Recognition  
 Fuzzy reasoning

Search through the audio,  
 not just text.



INTERFACING - JAVA



Artificial Neural Network Brain  
 Triage  
 Decision Support System

Database is maintained with all required keywords related to medical field, along with their symptoms rated with priorities, and their cures.  
 ANN algorithms are applied to find best suitable cures.  
 These results sent back to end devices.



Clients are offered  
 Dedicated Phone Lines  
 Telenurse Java Website  
 Android/iOS applications

CLIENT

### HOW?



Team Leader - Vinayak Wadhwa

Team Members : Aviral Sharma , Harish Vats , Kanika Lungani , Mamta Sihag , Nandini Vij, Palak Sharma  
 Sahil Pahwa, Sakshi Sehwat , Samiksha Sharma, Srishti Dudeja, Vaibhav Gupta .

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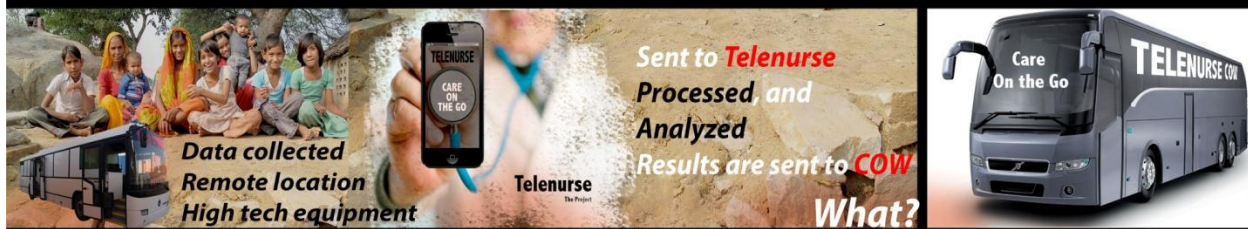
Designed by : Vinayak Wadhwa  
<http://facebook.com/vinayak.wadhwa>



# Sacred COW

## CARE ON WHEELS - COW | Extention to Telenurse

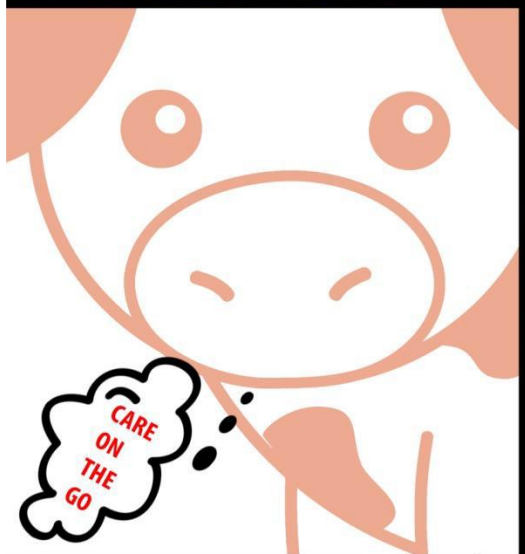
<http://telenurse.in/cow.html>



**Data collected**  
**Remote location**  
**High tech equipment**

**Sent to Telenurse**  
**Processed, and**  
**Analyzed**  
**Results are sent to COW**

**What?**



**Telenurse Mobile Medical Units/ Care On Wheels** have been envisaged to provide preventive, promotive and curative health care in inaccessible areas and difficult terrains, which are underserved or unserved areas under usual circumstances. Factors that negatively influence the existing public health system and call for the exigency are:

Issues:	Solutions:
<ul style="list-style-type: none"><li>Distance of the remote villages from the Public Health Institution.</li><li>Geographical barriers to reach the pockets.</li><li>Lack of mobility support for field visit by the staff assigned to do the job.</li><li>Lack of medicines / equipment/manpower.</li><li>Lack of awareness &amp; health consciousness in the community particularly among disadvantaged people who are socio-economically backward.</li><li>Poverty</li></ul>	<ul style="list-style-type: none"><li>Dedicated COW bus units for Remote locations</li><li>High Tech equipment, medicines and support installed on the COW unit.</li><li>Lack of awareness and Nursing shortage is overcome by Telenurse software, which is Artificial Neural Network based intelligent system</li><li>Its non chargeable service ! <b>its FREE</b></li></ul>



**Team Leader - Vinayak Wadhwa**

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Designed by : Vinayak Wadhwa  
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# AEROBOTS

PROJECT MEMBERS: Abhishek Jain, Sachin Gaur, Sahil Gandhi



## WHY AEROBOTS?



Security and reliability,  
Versatility and adaptability,  
Easy use and optimized costs.



### Features

GPS

High resolution imaging

Accelerometer & Many more

### Future ahead

agriculture

planetary exploration

navigation

rescue operations

[www.postermypwall.com](http://www.postermypwall.com)

# WIRELESS TRANSMISSION OF POWER IN QUADCOPTER

## OBJECTIVES-

- To create a pollution Free transportation system.
- A simple structured unnamed Air vehicle that can be used in remote location.
- Power transmission at places Where wired transmission is not possible.

Our purpose is to create An eco-friendly train-plane hybrid system which provide us high speed ,better mobility and good efficiency. It's a track based air system which allows air locomotive to take its power to recharge their battery.

Wireless power transmission Technology enables flexible And comfortable supply energy needs to electric Drives. It can be utilized to create an effective Transportation System.

An independent transportation System matching India's diversity in topography.

## DESIGNED BY :-

Nikhil Saurabh  
Utsav Raj  
Nishant Dhunna  
Rishav Akash Sahi

CONTACT NO- 8860847404



# ALGAE ENERGY SYSTEM

## "Environmentally-Beneficial" Electricity

\*The Algae Energy System's Electricity is unique as it is produced in an environmentally-beneficial way.

\*The energy generated is stored in an eco-friendly way, the same way plants naturally store energy in photosynthesis.



## How It Works

### 1. Collect Light

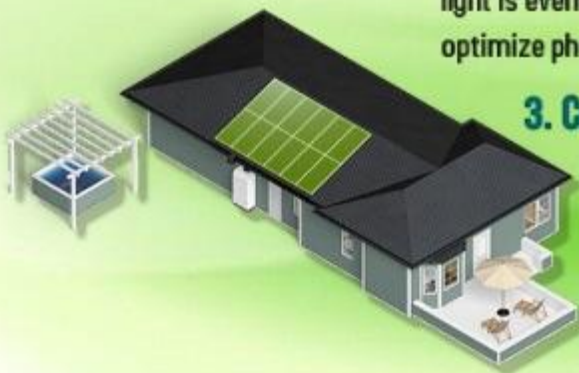
Light is absorbed by solar collectors on the top or side of a structure and is transferred to the bioreactor volume.

### 2. Grow Algae

Algae is grown within the bioreactor volume and light is evenly distributed to the algal culture to optimize photosynthetic efficiency.

### 3. Create Energy

As algae grows and becomes dense, it exits the bioreactor volume and is converted into electricity.





# OCEAN THERMAL ENERGY

**PROJECT LEADERS : Jasmine Dalal , Divisha Manral**

**MEMBERS : Vikram Jaswal , Aviral Sharma , Nitika Pasricha , Manica Verma  
Shweta Rastogi , Suraj Natraj**

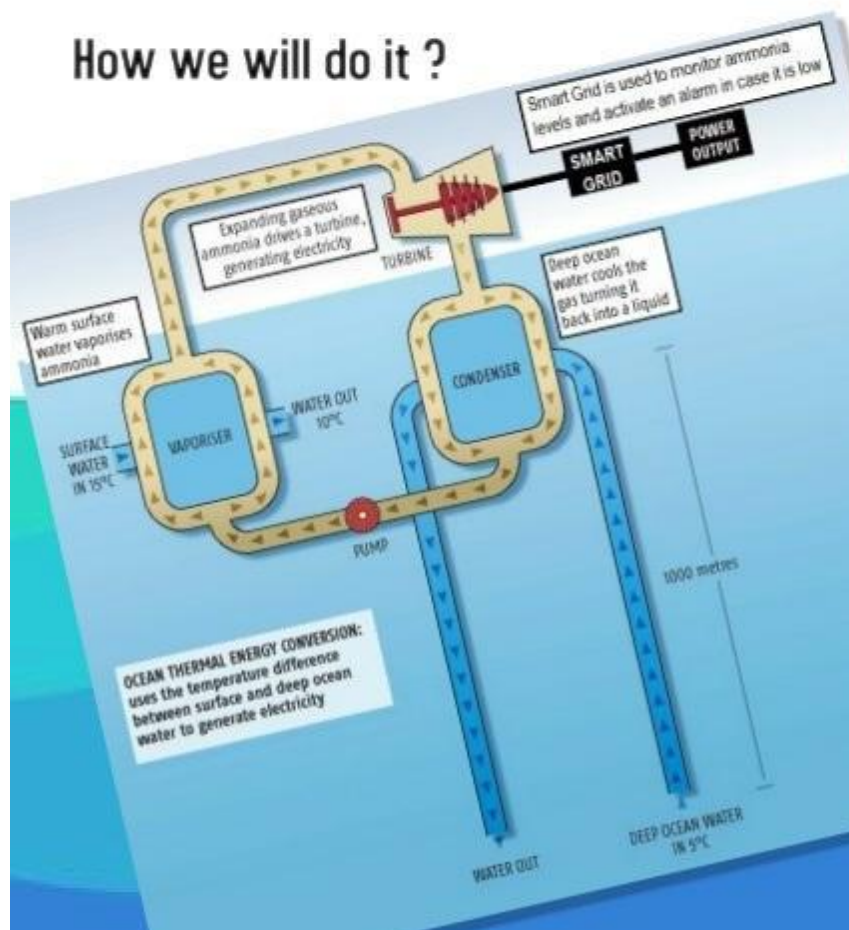
## What we AIM to do ?

Create an automated model that can capture the unused ocean energy across the Indian Coastal Lines , and be used easily without much human interventions

## Why Ocean Energy ?

- \* Firm Power Source (24 x 7)
- \* Environmentally Sustainable
- \* Capable of Massive levels of Energy
- \* Easy availability of resources

## How we will do it ?



For more details contact :  
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[divishamanral@gmail.com](mailto:divishamanral@gmail.com)

e sun rays.

age-old clockwork mechanism.

6.

ck wind to move the solar panel bo  
d a microcontroller expanding its c  
with a single unit.

S!

# BIO-ENERGY RENEW ED

By: Anupam

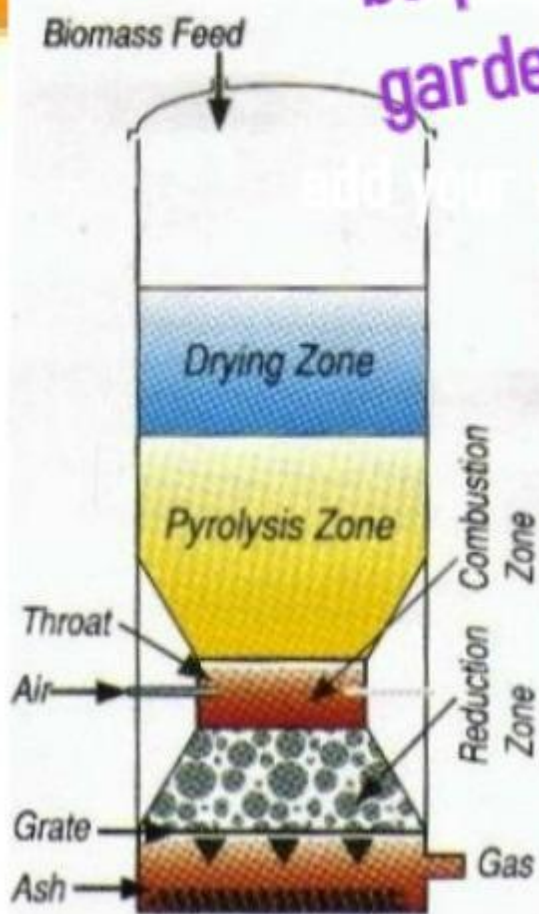
B.tech EEE

Say ur mom to do not dump the  
kitchen waste like that.....

be prepared to collect your  
garden waste.....

BECAUSE its time to  
have a

**GASIFIER** in  
every home



think **GREEN** with me at :  
anupam1301@gmail.com

**NO TENSION  
FOR POWER  
BILL AS  
ITS ALL  
NATURAL**



# IT'S SHOWTIME!

Team members: Saurav Kumar, Manpreet

Presenting you a SLEEK appliance control system that is made tailor made for all your needs

## Features:

- Saves energy owing to its OCCUPANCY LIGHTING FEATURE
- RF based, control from anywhere
- Plethora ambient lighting combinations available
- Laser pointer enhances presentations
- Best suited for auditoriums and projector rooms, libraries.
- Control the Sound System of the room
- Economical and Upgradable.
- Control with a handheld remote
- Unique Feature : Data backup available and integrated mic.

Contact Details: Saurav 8802088836 (sauravkumar617@gmail.com); Manpreet (m\_badyal@yahoo.co.in)



## CONCLUSIONS

- Open Innovation is an engine to productivity
- Cheaper and Faster Innovative Product Development
- DGL is the future of the learning and training
- DGL is interactive and hence encourages innovation and thinking
- DGL creates an active player in learning and training

## REFERENCES

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## Learn More

•Digital Game-Based Learning: It's Not Just the Digital Natives Who Are RestlessThis article from *Educause* offers perspectives on digital game-based learning from Richard Van Eck, Associate Professor at the University of North Dakota and graduate director of the Instructional Design & Technology graduate program.

### •RELATED PAGES

- Modeling: Modeling is an instructional strategy in which the teacher demonstrates a new concept or approach to...
- Discovery learning: This reference article explains the theory of discovery learning and discusses its history and its use in the classroom.
- Beyond blended learning: Reaching every student: This archived presentation from the 2010 NCTIES conference explores the theory and application of blended learning and offers ten ways to improve teaching using a blended approach.

### •RELATED TOPICS

- Learn more about cognition, digital game-based learning, educational techniques, game-based learning, games, and teaching methods.