Designing for Children

- With focus on 'Play + Learn'

Learning is not a child's Play

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Abstract:

Work and play are words used to describe the same thing under differing conditions.

~ Mark Twain

The Educational and Games industries may seem like different worlds, but they have one thing in common: They share the same audience. **Teaching styles, tools are** the medium to impart learning whereas **Games** are an aid to retrench what we have imparted. Research shows that games are incredibly powerful learning tools and can be used to "enhance almost any curriculum".

Creating environments where education and games are merged, is a challenge for educationists, as simply moving courses online or creating games in classroom situations can be surprisingly disabling. Students enjoy using online Game based learning's, appreciate the open access, perceive it as fair, and find the feedback helpful.

This paper considers creating learning environments as a tool for students to collaborate, enhance analytical thinking, work on enquiry based learning and problem solving. Learning through games is also considered as **experiential learning**. Rather than thinking about an encounter or experience in an abstract way students actually encounter the phenomenon being studied, through role playing, problem solving games, or solving assessments on online interactive media.

As a natural process of we the living, we learn from being engaged in day-to-day activities that we experience at first hand.

In every real man a child is hidden that wants to play. ~ (Friedrich Nietzsche)

And this thirst of learning is most prominent in children, although if learning is fun then learning is easy and no more a task. In educational practice experiential learning is frequently associated with David Kolb's experiential learning cycle. The learning cycle can start at any one of four stages but typically starts with a learner carrying out a particular action and then reflecting on the effect of such action. The third step is to develop concepts or general principles which can then be put into practice.

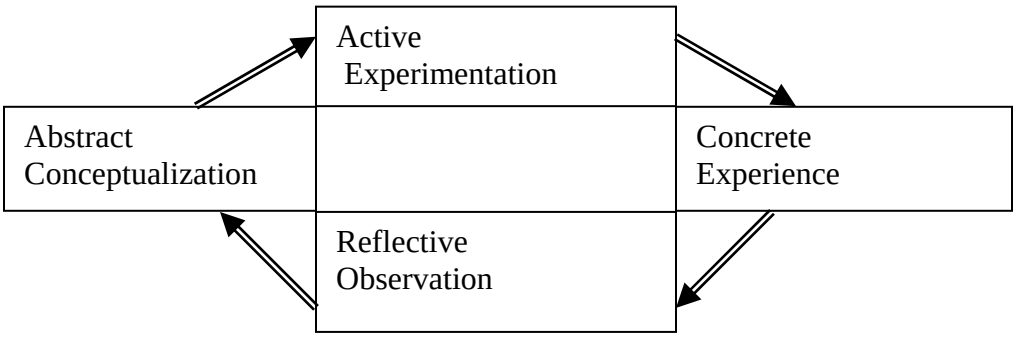

Figure 1
David Kolb's experiential learning cycle

It is the tutor's duty to facilitate situations for the students to engage in experiential learning. Of course there are various forms of tools to enhance learning skills, varying from the very basics to the most complicated ones such as, Mind maps, communicative media, interactive media, online simulation, multimedia.

The focus of this paper is on two different age groups of children that are a)5 years to 10 years and the teens that is from b) 13 years to 19 years, where in the games/ play for the two groups are very different in terms of cognitive skills. This paper would be covering the online games created for the younger group and play assessments created for classroom situations for the elder group. *Play is the only way the highest intelligence of humankind can unfold. ~ Joseph Chilton Pearce*

Key words: Learning, games, experiential learning, Cognitive Skills, Problem Solving.

1. Introduction

1.1 Complex education system in India….

India has over 230 million students and just 6 million teachers. With over 1.3 million schools, 400 universities and 18,000 colleges, we certainly have one of the most vast and extensive education systems in the world. But sample this: gross enrolment in primary education is 108%. However, the gross enrolment ratios drop drastically to 69% at the middle school, 51%

at secondary school, 27% at higher secondary and around 10% at higher education levels. The drops out reasons are not just monetary but also boredom, doubt, accessibility, lack of motivation.

Add to this the reality that currently 90% jobs available in the industry are skill-based and 90% of education imparted to students is knowledge-based. This fuels the widening gap between the talent produced by our education system and that required by our industry. Thus, the need for relevant and more skill-oriented education is imperative.[1] Another area of concern is the inadequate availability of faculty both in terms of quality and numbers.

1.1.1 Methodology of the study:

- **Desk Research –** Advanced search techniques through secondary and primary data collection.
- **Extensive Primary Research –** through providers, buyers, PE firms, one on one interviews.

1.2 Games in Educational settings in Indian culture

Advancements in handheld computing, their portability, social interactivity, context sensitivity, connectivity, and individuality open new opportunities and immersive learning environments. Games should be designed whereby inquiry is a process of balancing and managing resources, combining multiple data sources, and forming and revising. Thus making tools and resources available from anywhere leads to positioning of students in virtual investigations. The game structure provides students a narrative to think with, tools to work with and their own thought processes to solve it. A quick comparison between the most famous Pac Man game and traditional teaching can give us an insight of the impact of games on enhanced learning's. (Appendix 1)

2. Understanding Engagement

2.1 Student engagement occurs when "students make a psychological investment in learning.They take pride not simply in earning the formal indicators of success (grades), but in understanding the material and incorporating or internalizing it in their lives."[2] The main issues under engagement are

[1] http://www.financialexpress.com/news/rejuvenating-education-through-ict/509014/

[2] Newmann, F. (1992) *Student Engagement and Achievement in American Secondary Schools*. Teachers College Press. pp. 2–3.

- Retention
- Making curriculum relevant
- Good effective teaching
- Enabling better, "deep", autonomous and reflective learning.

The main concern of engaging students into the gaming world is:

- Students of all learning abilities can become more competent thinkers;
- Develop new classroom tools and evaluate their efficacy in this respect;
- Renewed interest in the ways in which young people think; constructivism,
- Teachers can improve student's thinking through specific interventions;

2.2 Retention and Recall

One must have experienced, that while playing an online game, the learning is autonomous. This learning is so strong that if the game is played again and again one tends to remember the next move in the game and you are pre prepared for it. It is like **Déjà vu**.

Students all across the world face the problem of remembering course contents, interlinking contents with other subjects for integration of all subject modules within a semester or programme. And for this very reason students end up taking rote learning as their only support and hence delve into shallow learning. Thus it is the responsibility of the tutor to arrange instruction so that knowledge is retained by the students for a longer time.[3]

The critical questions that arise here are:

- What is memory?
- Why do we forget?
- What can be done to help retain and recall?

Bartlett States- "Remembering is not a re – excitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a whole active mass of organized past reactions or experience and to a little outstanding detail which commonly appears in image or in language form. [4]

[3] Computer Assisted Assessment in Higher Education", Sally Brown ;pg 33
[4] "Teaching in further education – an outline of principles and practice" – L.B. Curzon- pg 203

Many models of memory reflect that it is an enigma that show "information processing" approach which views it as a three sequential processes of **REGISTRATION, RETENTION** and **RETREIVAL** of information.

- **Registration** – comprises the perception, encoding and neural representation of stimuli at the time of a learning experience.
- **Retention** – allows the neurological representation to be stored over a period of time for later use.
- **Retrieval** - allows the student to have access to information previously registered and retained.[5]

If this is so then **why do we forget?**

A variety of reasons for the phenomenon of forgetting can be advanced repression, disuse of information, trace decay, cue forgetting and interference.

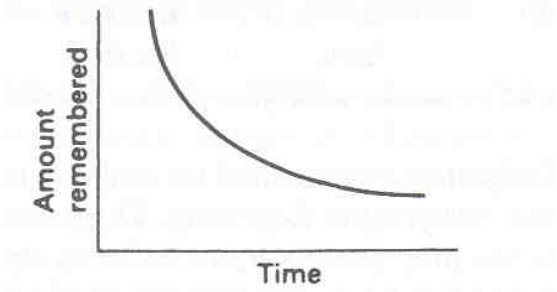

Fig 2. [6]

Information is expanding at such a rate that pupils require transferable skills to cope with this growth. Modern society requires citizens who can assimilate information from multiple sources, often in pressured situations, and make measured decisions.

In light of this recognition, rote learning has become increasingly discredited. Accordingly, the focus of current education has shifted away from such methods towards an understanding that pupils need to acquire new skills and knowledge; both in the sense of learning new things and learning in new ways, and that teachers have to be equipped with the necessary expertise to facilitate this progress.

[5] "Teaching in further education – an outline of principles and practice" – L.B. Curzon- pg 211
[6] "Teaching in further education – an outline of principles and practice" – L.B. Curzon- pg 211

2.3 Using Online Games to Understand Engagement

Educational games are games that have been specifically designed to teach a certain subject, expand concepts, reinforce development, understand events or culture, or assist them in learning a skill as they play.[7] For anywhere any time accessibility issues, it is time for Indian education to move up to interactive tools, rather than just chalk and talk. An educational computer game can be defined as an electronic medium with all the characteristics of a gaming environment that have intended educational outcomes targeted at specific groups of learners.

2.4 Types of Online Games - Simulations and Strategy Games

All over the world people of all ages, professions are indulging in games, though demand and supply of technology based games are on their highest peak now. There is no dearth of online games available, but how many are used to enhance learning. Presently, there have been many impressive achievements in the application of IT to education. Thus teaching and learning are no longer confined to the classroom. Different approaches are being incorporated for gaming through multimedia, simulation, virtual reality packages and visualization techniques.

As rightly said "We learn through different sense modalities, and the more one modality reinforces another, the more effective the learning. The more the TLA's, the better the learning. Also as given in the following table:[8]

Most People Learn:

10%	*Of what they read*
20%	*Of what they hear*
30%	*Of what they see*
50%	*Of what they hear & see*
70%	*Of what they talk over with others*
80%	*Of what they use & do in real life*
95%	*Of what they teach someone else*

Table 1.

It is important to know about the types of games that are available. Broadly online games can be categorized into five types:

1. MMOG

2. First-person Shooter

[7] http://en.wikipedia.org/wiki/Educational_game

[8] *Biggs 2003, 'Teaching for quality learning at university', Pg 80*

3. Adult/Gambling/Erotic

4. Puzzle/Strategy

5. Racing/Simulation[9]

MMOG is a massively **multiplayer online game** is a video game which is capable of supporting hundreds or thousands of players simultaneously. By necessity, they are played on the Internet, and feature at least one persistent world. They are, not necessarily games played on personal computers. MMOG has further categories of role-playing game, first-person shooter , real-time strategy games , sports game , racing , rhythm game , management game , social game , Real-world simulations. [10]

In the multi-billion dollar industry of gaming, online games have a real small place in which to grow, however their presence remains ever expanding and there are always going to be new and fancier games almost daily to locate and play on the expanse known to the world as the "web". Each of these games can be inspiration to design new games to enhance school and college curriculums. No doubt, the best available online games are the ones that allow minimal personal input from the user and allow free play.

2.4.1 List of children's educational games[11]

Big brain Academy: Wii Degree	*The ClueFinders*
Carmen Sandiego series	*EcoQuest*
GCompris	*Genomics Digital Lab*
Gizmos & Gadgets	*Immune Attack*
JumpStart	*Math Blaster*
Oregon Trail	*Reader Rabbit*
Quest Atlantis	*Treasures of the Deep*
Storybook Weaver	*The Magic School Bus* series
Urban Jungle	*Zoombinis*
InLiving	*I.M. Meen*

Table 2.

[9] http://www.articledashboard.com
[10] http://EzineArticles.com/?expert=CD_Mohatta
[11] http://en.wikipedia.org/wiki/Educational_game

Some other Amazing sites of online games for 5 to 10 year olds, to enhace cognitive skills, help kids engage in problem solving and get in the habbit of enquiries.

- http://www.nickjr.co.uk/shows/dora/index.aspx
- http://www.primarygames.com/social_studies.htm
- http://www.playkidsgames.com
- http://www.ixl.com/
- http://www.seriousgames.dk/node/141

3. Calling Professionals who can Multi Task

Communities, business and government leaders are calling upon our institutions of learning, to graduate a different kind of student, than a generation ago. Among the skills called for are critical thinking, problem solving, good communication and ability to work collaboratively. No more we can adopt short cuts for our teachings. We need to give our students enough time for cohesive learning.

While this impact is being felt across the educational sectors, the demands of higher education (HE) for bespoke high-quality learning and teaching materials to be delivered online have resulted in the creation of a new role - that of the learning technologist. The definition of who a learning technologist is, and what role they play is still developing, but there is no doubt that this role has become as embedded in the business of higher education as that of lecturer or librarian. Learning technologists are at the leading edge of e-learning developments, and are taking on strategic challenges that the advent of E-learning has made to the education community.

3.1 Assesments for Higher Education

There is much evidence to show that assessment motivates student learning. However, students exhibit complex learning behaviors: they may adopt a surface approach to meet the requirements of the task; a deep approach to maximize understanding; or an achieving approach, where a high grade is the sole goal. There is also evidence that the *form* of the assessment can influence a student's approach to learning.

….The single, strongest influence on learning is surely the assessment procedures … even the form of an examination question or essay topics set can affect how students study … It

is also important to remember that entrenched attitudes which support traditional methods of teaching and assessment are hard to change (Entwistle, 1996: 111/12)[12]

3.2 Adult Educational Computer Games / Assessments

Educational assessment is the process of documenting, usually in measurable terms, knowledge, skills, attitudes and beliefs. The term **assessment** is generally used to refer to all activities teachers use to help students learn and to gauge student progress. Though the notion of assessment is generally more complicated than the following categories suggest, assessment is often divided for the sake of convenience using the following distinctions:

1. Formative / summative
2. Objective / subjective
3. Referencing
4. Informal / formal.

Putting assessment at the core of the development of a new on-line pedagogy provides a welcome opportunity to move the current debate beyond that concerned with technology to one that is fundamentally educational[13]. Some adult online games are listed below to support students learning while having fun.

- *Democracy*
- *Food Force*
- *Global Conflict*
- *Mavis Beacon Teaches Typing*
- *President Forever 2008 + Primaries*
- *The Typing of the Dead*
- *CyberCIEGE* [14]

3.3 Other forms of Online Assessments

Computer-assisted assessment (CAA) may include a variety of activities which assess knowledge, understanding and skills using one or more technologies such as the Internet,

[12] *Biggs 2003, 'Teaching for quality learning at university'*
[13] On-line assessment: exploring its role in a new on-line pedagogy. *Assessment & Evaluation in Higher Education*
[14] http://en.wikipedia.org/wiki/Educational_game

intranets, CD-ROM and optical data capture systems.[15] Some of the most common online assessments tools used are Wikis, Blogs, surveys, Quizzes, discussion boards, Rubrics, etc. Other Dedicated assessment tools are Informatology , Question Mark , Exam Builder , Pedagogue , RapidExam , Web Test , i-assess , e-test , YnotAssess etc. Some of them would be open sources and some might ask for payment or an Athens password.

Though more than games it is considered that tutors , trainers should instill the habit of independent learning in students of higher education and the children of this next generation are already well verse with surfing on the net, thus the most appropriate tool for them are the open sources or resources.

4. Open Access

Open Educational Resources can be defined as free and open digital publications of high quality materials organized as courses that include lectures, related reading materials, snapshots of discussions, assignments, evaluations, etc. Access to these resources radically breaks down the barriers to quality education.

In India, there are three or four major initiatives for creating open educational tools and resources. However, all of them are directed towards OER in the basic sciences and engineering sciences areas.

One of the major programs in India is the National Program on Technology Enhanced Learning **(NPTEL).** The NPTEL project is being carried out by seven Indian Institutes of Technologies (IIT's), the Indian Institute of Science, and other premier institutions around the country and being funded by the Human Resource Ministry.

The second important open educational resource project is the **Ekalavya** project launched by IIT, Mumbai. In this project, the content is developed in various Indian languages and is distributed through the internet. This project has also developed an Open Source Educational Resources Animation Repository (OSCAR) and provides web-based interactive animations for teaching various concepts and technologies.

[15] BULL, J., AND DANSON, M., 2004. *Computer-assisted Assessment (CAA)*

E-Grid is the third main OER initiative of India that develops and maintains pedagogically sound and refereed Educational Resources in identified subjects. This project is supported by the Human Resource Ministry at IIIT, Kerala.

4.1 Others

Virtual Learning Environments , such as **Moodle** and **Blackboard**, can act as a front-end user interface for educational tests. Games based on such tests can be single or multi-player games.

5. Some Big names in E learning in India

India is in the top six countries of the world to adopt E learning in various industries, one being the education. India ranks third in e learning resources, cost advantage, scalability, maturity and overall performance.[16]Some of the Pioneer organizations of India are NIIT, Tata Interactive systems, Aptech, Aptra, BrainVista, Genpact, Upside learning, 24 x7 learning , tutor Vista, Educomp, Pearson education etc.

6. Conclusions:

6.1 The Future of Online Games In Education

Educators learned some guidelines about designing engaging environments, most of which have become incorporated into student centered learning environments.[17] Since then, gaming technology has improved dramatically, but very little has been done to study how these improvements might be incorporated into learning environments. First, many teachers and educators only use commercially available "edutainment" products, but there has been very little empirical research into how these environments work.

Taking a design approach to researching games might provide a useful framework for studying games, which thus far, have lacked a coherent research paradigm[18] . As designers

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[16] value notes research

[17] Jonassen, D.H. & Land, S. 2000. *The theoretical foundations of learning environments*. Mahwah, NJ: Erlbaum.

[18] Gredler, M.E. 1996. Educational games and simulations: A technology in search of a research paradigm.

In Jonassen, D.H. (Ed.), *Handbook of research for educational communications and technology*, p. 521-539. New York: MacMillan.

of interactive learning environments, instructional technologists can also learn from current developments in gaming.

Indeed, even a cursory glance at the latest games can leave the designer blown away by what is currently possible with technology and inspired by the sleek interface or production values games contain. In fact, the greatest benefit of studying games may not be as much in generating theoretical understandings of human experience in technology or guidelines for instructional design, but rather, in inspiring us to create new designs.

7. Acknowledgements:

I would like to thank following people for their valuable time and sharing their information valuable information in their areas of expertise:

- Mr.Dipankar Bose , Vice President, Shared operations, Pearson Education.
- Mr.Anil Chikara, Founder and President, 24x7 Learning
- Mr.Rishi Arora, Tata Consulting Services
- Mr. Sunil Sharma, From Gaming background.

Appendix I

Pac-Man	**Traditional Schooling**
Player plays at his/her pace.	Groups of students learn at one pace.
Students are actively engaged in quick and varied activity.	Students passively absorb information in routine activities, such as lecture.
Players play and practice until they master the game.	Students must all go at the same pace, regardless of achievement. As Reigeluth (1992) describes, traditional schooling holds time constant, allowing achievement to vary.
Players have feeling of mastering the environment, becoming more powerful, knowledgeable and skillful in the environment.	Students learn knowledge abstracted by teachers and regurgitate this knowledge on pencil and paper tests, rarely applying it in any dynamic context.
Game players work together, sharing tips and trading secrets.	Students perform in isolation, and rarely use one another as resources.
Performance is criterion based;	Students are graded normatively, graded against

each student competes against his/her ability to master the game, to reach new goals.	one another's performance and encouraged to compete against one another.
Games are played for the intrinsic reward of playing them, for the emotional state they produce	Schools are structured around extrinsic rewards, such as good grades or fear of failure.

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