Lesson 24

PEDAGOGICAL STRATEGIES & TECHNOLOGY IN CLASSROOM

Hypothesis testing:
Hypothesis tests are procedures for making rational decisions about the reality of effects. A problem can have multivariable solutions. But there is a dominant answer to every question.

Isaac Asimov

More on the above quotation:

By using technology, people can be provided with the platform where they can test their knowledge and observe if their misconceptions are contradictory. Can a student test his hypothesis on the basis of daily life questions? If the purpose of hypothesis testing is not accomplished then our education is useless.

A born child is always very creative in mind. The book, "Out of Our Minds-Learning to Be Creative" by Ken Robinson, It is written that, one can learn creativity and enhance the power of capability.

"There is a paradox: as children most of us think we are highly creative. As adults many of us think we are not. What changes as children grow up? Organizations across the world are competing in a whirl that is changing faster than ever. They say they need people who can think creatively, who are flexible and quick to adapt."

Too often organizations say they cannot find creative people. Why not? That is the basic question. In this provocative and inspiring book, Ken Robinson addresses these three vital questions:

1. Why it is essential to promote creativity?
2. What is the problem? Why do so many people think they are not creative?
3. Young children are buzzing with ideas. What happen as we grow up and go through school to make us think we are not creative? What can be done about it?

If a student is a slow learner, a teacher must provide him with a choice to learn on his own pace. All students cannot learn at the same level of understanding. Secondly, immediate feedback must be given to the students. Unless a student does not try to do a conscious effort to erase the deepen misconceptions in his mind. Through the use of technology, teachers can bring students to the same level of learning. In short,

- Let students learn at their own pace.
- Let them get intermediate feedback to realize their misconceptions and wrong connections between different concepts.

Pedagogical strategies should be developed that allow:

- Individual learning pace
- Instant feedback
- Excitement, wonder and enjoyment of students in classroom.

Lesson 25

COMMANDMENTS FOR TEACHERS FOR AN EFFECTIVE CLASSROOM

When a teacher enters a classroom, he must create a learning environment where students learn by interest, enjoyment and wonder. But unfortunately, today most teachers deliver the lecture in such a way that lacks student interest. Talent of the students is destroyed.

Two equations were given to the students to solve, which are:

$Y= -2x + 7$

$Y = -4x + 11$

It was mentioned to the students that firstly, they have to make table of these equation, secondly, plot them in the graph and then solve to get the answer. Point of intersection is to be calculated. The following instructions were given to them:

1. Think what would be the major obstacles of learning to solve the given problem?
2. What pedagogy would you use to address the above mentioned problems of learning?
3. What specific features of power point 2010 would you use to support the pedagogy to address the problems of learning?

Student must try to find answers through hypothesis testing. **Hypothesis tests** are procedures for making rational decisions about the reality of effects. Secondly, students are able to do problem solving. For problem solving, they need to develop a hypothesis to get answer to the question. Hypothesis testing and problem solving go side by side. When a problem is proposed to the students, they think of a possible answer, but at the same time if their mind is stuck with another daily life observation that contradict with the answer, now here the thinking process starts that proceeds with problem solving and hypothesis testing.

There is a need to develop thinking process in the minds of students today. Thinking process among students can never be developed by proving the students with:

- Air conditioned classrooms
- Beautiful architecture
- Fashionable teacher
- Computing lab

Second issue in Pakistani schools today is that teachers come to the classroom delivers a lecture conventionally. There is no collaboration among students in classroom. Designing a collaborative classroom is very hard for teachers. It is assumed that whatever a teacher speaks in classroom is understood by the students. Such lectures are never interactive, which means that students forget the previously learnt material after sometime and as a result they are not able to understand a new concept. In classroom learning environment,

- the first thing is that we must measure what students have learnt today in classroom and are they able to relate this information with the previous one to solve problems.
- If teachers are not available in classroom, students must be involved in learning activities.
- When homework is assigned to the students, it must be kept in mind that will the students be able to complete their homework on the basis of the concepts learnt today in the classroom.

- All the above three steps are integrated, how effectively he completed his homework. What mistakes are dome by him while doing his homework are all associated with the learning in classroom.

10 Commandments for Teachers by Bertrand Russell:

1. Do not feel absolutely certain of anything (means learn to tolerate ambiguity, learn to have open mind about all questions)
2. Do not think it worthwhile to proceed by concealing evidence, for the evidence is sure to come to light.
3. Never try to discourage thinking for you are sure to succeed.
4. When you meet with opposition, even if it should be from your husband or your children, endeavor to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory.
5. Have no respect for the authority of others, for there are always contemporary authorities to be found.
6. Do not use power to suppress opinions you think pernicious, for if you do the opinions will suppress you.
7. Do not fear to be eccentric in opinion, for every opinion now accepted was once eccentric.
8. Find more pleasure in intelligent dissent than in passive agreement, for, if you value intelligence as you should, the former implies a deeper agreement than the latter.
9. Be scrupulously truthful, even if the truth is inconvenient, for it is for more inconvenient when you try and conceal it.
10. Do not feel envious of the happiness of those who live in a fool's paradise, for only a fool will think that it is happiness.

Lesson 26

POSING PROBLEMS WITH A CONTEXT

Two equations were given to the students to solve, which were:

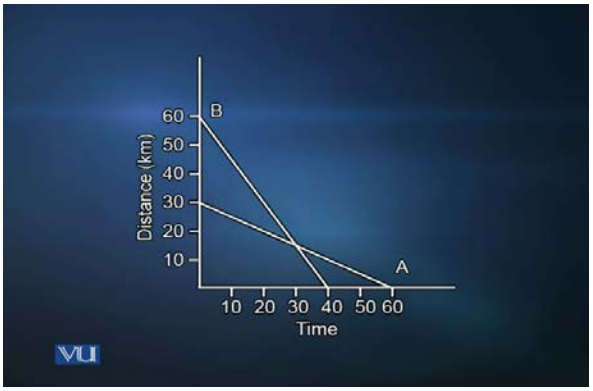
Y= -2x + 7

Y = -4x + 11

It was mentioned to the students that firstly, they have to make table of these equation, secondly, plot them in the graph and then solve to get the answer. Point of intersection was to be calculated. The following instructions were given to them:

1. Think what would be the major obstacles of learning to solve the given problem?
2. What pedagogy would you use to address the above mentioned problems of learning?
3. What specific features of power point 2010 would you use to support the pedagogy to address the problems of learning?

If value of X is given to the students, are they able to calculate the value of Y? If the same problem is proposed to the students in some context, then it will become easy and more understandable to the students. If the graph of the equation is presented as:

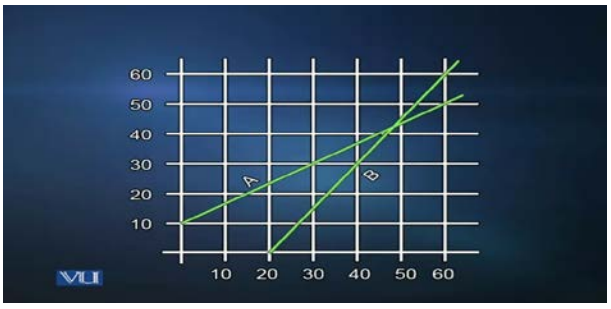


On X-axis, the values show time and Y-axis shows Distance. Now the equations will be solved on the basis of 'in how much time, how much distance is covered?' The graph is formed on the basis of these equations. Now the point of intersection is to be found. It will be easier if you try to make a story behind these equations. For example,

Two cars are travelling to Lahore, one has the distance of 300km and the other has 600km. One is travelling at more speed than the other. Is it possible that these two cars will cross each other at a certain point? Or there is a common station where they can meet each other.

Example 2:

Here is another graph for simultaneous equations:



Now here, 2 cars A and B are travelling to Lahore in which car A travels from 10 km to Lahore while Car B starts from 20 km to Lahore. Car A is at a constant speed and starts to travel first. While car B travels 20 minutes after that. Is it possible that the second car (car B) which starts travelling after 20 minutes and has more speed reaches the destination first? Now such story telling can

create motivation among students. They will think that a fast moving car will reach the destination first; can both the cars intersect or cross each other at a certain point? If a certain point is decided to meet, what should be the speed of the car to meet the people in other car on time? In this problem, it is assumed that the speed of cars is constant; if variation in speed of the cars is also added then this problem can become more interesting for students.

It is important to provide the students with context of a story while teaching simultaneous equations because it creates meaningfulness to the students. They will understand the concept more clearly when associated with daily life situations.

Teachers in classroom must discuss with the students what they are going to learn. It is the responsibility of a teacher to create an effective learning environment in the classroom. The teacher must focus on:

- Creativity
- Critical thinking
- Communication
- Collaboration

We need to provide the students with daily life experiences for learning, so that they can be involved both physically and emotionally in learning. Problems in real life do not have a black and white solution. Teachers must also keep in mind that different students have different levels of learning. Such type of teaching and learning process follows **4C Model.** In this model following should be taken into account:

- **Context:** Present a real life story, problem or scenario in a context
- **Challenge:** Incrementally, make the problem a challenge.
- **Choices:** Let the students explore the choices that they have.
- **Consequences:** Allow students to think critically about the consequences of adopting each choice.

In short, a teacher must take into account the following:

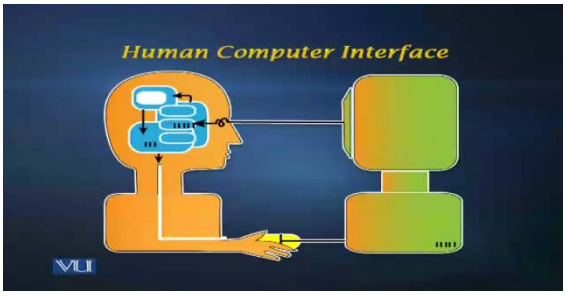
- Critical thinking
- Context
- Challenge
- Choices
- Individual Pace of Learning
- Instant Feedback: Rapid and frequent feedback helps students achieve their learning goals.

Lesson 27

HUMAN COMPUTER INTERFACE

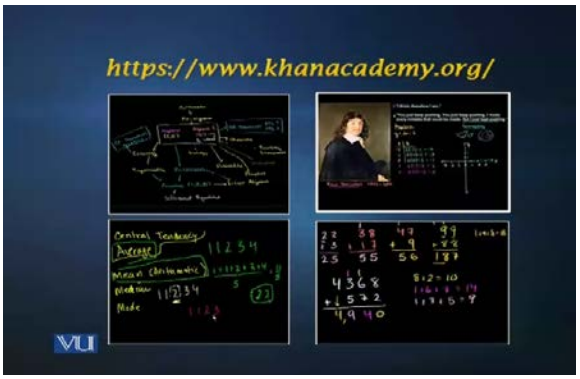
When a teacher enters a classroom, he knows what he has to teach today, how to teach, how to assess the prior knowledge, of students and students' reaction is the feedback that he gets immediately from the students. This feedback can be made more effective by using technology in classroom. The process of feedback must be continuous that is feedback must be taken from the students after every 10-15 minutes. Whenever the students give an answer, a teacher tries to analyze whether the students are thinking in the right direction to solve a problem or not. A teacher can trace the thinking process and precede it in the right direction if needed. When a teacher poses a problem there are many choices of right answers, and there are consequences on the basis of every choice. After the discussion of these consequences, the choices of answers get limited.

While interacting with technology, it is not necessary that your teacher is always available to you as is the case in conventional teaching. Computer allows you to make many choices and on the basis of these choices you yourself choose consequences. You can make choices of your teacher's availability as you interact with the computer and the interface that you interact with is called **Human Computer Interface.**



Human Computer Interface:

Human Computer Interface is now being used as a **Learning Interface.** Human Computer Interface was first used in web page design by different marketing companies for buying or selling. But when we use HCI in learning, its purpose is to challenge them to make choices based on what they have learnt. When choices are made, then how the computer responds to the choices is basically the function of HCI.



For example, the interface of Khan Academy is also a web based learning portal. Its interface is not attractive as shown in the image below:

If you visit the separate window for examinations on khan academy, it is interactive whereas the videos of Khan Academy are not interactive at all. The interface is designed to augment the learning process.

Definition of Human Computer Interface (HCI):

HCI (human-computer interaction) is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings. A significant number of major corporations and academic institutions now study HCI. Historically and with some exceptions, computer system developers did not pay attention to computer ease-of-use. Many computer users today would argue that computer makers are still not paying enough attention

to making their products "user-friendly." However, computer system developers might argue that computers are extremely complex products to design and make and that the demand for the services that computers can provide has always outdriven the demand for ease-of-use.

One important HCI factor is that different users form different conceptions or mental models about their interactions and they have different ways of learning and keeping knowledge and skills (different "cognitive styles" as in, for example, "left-brained" and "right-brained" people). Another consideration in studying or designing HCI is that user interface technology changes rapidly, offering new interaction possibilities to which previous research findings may not apply. Finally, user preferences change as they gradually master new interfaces.

Advantages of HCI:

- Very flexible with the use of "switches" (options)
- Good for "expert" users - can quickly access commands
- Uses the fewest system resources

Disadvantages of HCI:

- Requires the user to learn "complex" commands or language
- "Hidden" features i.e. if you don't know the commands you won't know the features are there
- Not very good for novice users

HCI must be introduced as a separate subject at University level so that computer engineers can use the interface internationally as well. HCI as a subject is a critical concept because many Universities like Stanford, Harvard, Cambridge, Oxford etc. offer HCI as a compulsory subject in their CS degree programs. It is focused on the quality of product. There is a misconception among people about HCI and they believe that its front interface must be attractive. However, the functions and specifications of the software are more important. Where ever there is interaction of humans with machines, it needs to be enhanced in many ways. If I look at the products produced according HCI interface then it can be: Samsung Galaxy Tab and IPad

If these two are compared, first thing is that their weight is very low. Pointer speed of screen is different then other products. These differences can add on to the usability of the product beyond the colors or front interface. Because if the weight of the hardware is heavy then it does not feel right in your hand at all. All of this is linked to the human psychology of how people will perceive it. If people perceive that it is easy to use then it can be used to enhance learning as well after some time of experience.

HCI merges the following three areas:

- Psychology
- Computer Science
- Virtual Design

Basic HCI Heuristics:

- Rate of responsiveness
- Error recognition and communication
- Interface feedback

Lesson 28

TECHNOLOGY IN LEARNING

The first thing that most students do in classroom is listening and watching around the things in classroom whether it is a conventional classroom, e learning or blended classroom. It is very unfair with the students if teachers believe that students will start reading without looking at the book or without thinking.

Another important activity that students engage in classroom is discussion. The students must think and explain with one another just as they do in collaborative learning. Collaborative learning plays an important part in e learning and peer interaction. Peer interaction means that if teacher gets feedback from the students and comes to know of any difficulty in student understanding then he can make groups and start peer interaction. Students will learn the concept better by discussion instead of listening the same thing by the teacher again.

Third step is instant feedback. Because of instant feedback, all the weaknesses are highlighted and gradually can be overcome through proper planning.

Importance of learning in classroom:

The major thing in classroom learning is that teachers must think they are teaching a particular concept. why and how to teach it in classroom? These two factors are very important for a teacher because what a teacher wants to teach is the expertise he already has. Due to this expertise, he can impart knowledge to his students very effectively and efficiently. If a teacher is successful in gaining students interest in classroom, then the knowledge goes from short term memory to long term memory of the students. Students learn best through visualization. If a biology teacher wants to teach about fish, then with the help of technology he can show a live fish in the jar on the projector so that all students can visualize it. While showing them the live fish he can explain the parts and properties of it instead of reading about it in the textbook. A teacher has to be an artist if he wants his students to learn something permanently or wants the knowledge to get stored in long term memory.

Advancement in technology in the last 15 years:

An experienced UET professor Shahid Bukhari has shared that he is the legend of teaching. He utilized almost all the resources provided by the University in his teaching. Firstly, he was against piracy. In 1994, he developed a laboratory on Linux, this was interconnected through internet. Amazingly, this became State of the Art laboratory in UET. He showed a lecture on his screen and the same was displayed to the students as well on their screens. It was a very low cost technology. All the students viewed the assignment on their screens and started working independently. He always tried to create a story in teaching and in this way he practically transformed his lecture. In order to get feedback he divides the students in groups. Students were given limited time to read the slides and after that one volunteer student from each group came and presented what they discussed and understood. In this way, the teacher came to know about student learning in classroom. He used daily life examples in his classroom.

Lesson # 29

INNOVATION IN EDUCATION

In the book, **'Creating Innovators' by Tony Wegner,** It is mentioned that the most innovative companies in the world today are:

1. Apple
2. Google

He interviewed these companies to find out the reason why they are so innovative. There is a need for innovation in every field today, whether it is economy, weather forecast, flood controls, education or medical etc. To find out new solutions to everyday problems one needs to be innovative.

Need for innovation in society and education:

Innovation is defined as "the process of making changes to something established by introducing something new." It applies to "…radical or incremental changes to products, processes or services." Over the years there have been many changes in the way education is designed and delivered in different parts of the world.

Today, technology is a significant driver behind change, and can play an important role to bring innovations in educational design and delivery. There are immense possibilities for greater and wider-spread change with the use of present-day technological advancements, as well as with the implementation of innovative educational programs. The challenge is to ensure that innovation plays a constructive role in improving educational opportunities for billions of people who remain under-served in a rapidly developing world.

It is very difficult task to create innovators. The most popular University internationally for innovative students is Stanford.

Quotation from the book, **'Creating Innovators' by Tony Wegner:**

"According to the most recent estimates, real median household income has declined nearly 11% in the last decade. With a disappearing middle class, income inequalities continue to grow in the United States. More than 37% of young families defined as fewer than 30 are living in poverty, the highest level on record, and they are disproportionally African Americans, Hispanic and Native Americans. The total number of Americans living in poverty, both old and young, is now more than 15% of our population, the largest figure in the 52 years that poverty estimates have been published.**"**

In this book, all the problems of African Americans are highlighted related to poverty and education. The only solution according to Tony Wegner is that there is a need for innovation to address and solve these problems.

When Apple and Google companies hire employees, they observe the following characteristics in them:

Profile wanted by Apple and Google:

- Innovation (must be innovative, creative)
- Collaboration (must be able to collaborate)

- Communication skills(must be able to communicate his innovative ideas with colleagues)

Such innovations cannot take place alone. One need to work as teams to communicate and collaborate in problem solving. All the aspects of the problem are identified clearly and then innovative solutions are provided.

Innovation for 'Learner-Centered' Education:

How can innovation and technology offset the barriers of access and mobility that has been a deterrent to education in many parts of the developing world?

With the emergence of smart phones, eBook readers, Internet and low-cost computers, as well as solar electricity, cell phone access, and other technologies, comes the opportunity to provide education to assist individuals and communities in places under-served by traditional educational institutes. Technology and other innovations enable educational design and delivery to be adapted to the needs and environment of students enrolled in Open and Distance learning (ODL) and traditional educational programs. Thus, technology can also help programs shift to a 'learner-centered' approach to education.

Lesson 30

APPLICATION OF TECHNOLOGY IN EDUCATION

The children who go to Punjab high schools is 20, 00,000. Government of Punjab is subsidizing the books for children and almost 20 crore is being spent on it. If these books are replaced by electronic books, there will be no printing cost and the only cost will be of interface. The quality of education and the matrix which are collaboration, communication, discovery, critical thinking, problem solving etc. are taught to school going children.

In America, according to 2007 Consensus, 20 lac children are home schooled. According to the following reasons, their parents do not allow them to go to school:

- Inappropriate school environment
- Bullying
- Lack of religious and moral instruction
- Dissatisfaction from school instruction
- Special needs of children
- Physical and mental problems of children

In the book "Now You See It" By Kathy Davidson, it is written that, "Games are the most elevated form of investigation"

Albert Einstein

More on the above quotation:

Albert Einstein is talking about philosophical games. Many philosophers have discovered that such questions which seem to be intractable can be solved through games. They say that games are the purest form to check intellectual abilities.

Quotation 2:

"She advocates games for all forms of teaching and all forms of learning, insisting that game mechanics apply to all actions online and offline, from simplest to the most complex global social actions. She advocates using games to teach collective decision making and responsible action in the world, and she hopes to introduce students to the joy of activist learning.**" McGonical**

McGonical is a game designer and a social evangelist, who believes that "reality is broken" and that the best way to fix it is by playing games. (Now You See It book)

With the Ph.D. from the University of California-Berkley, she has had an epic wins in designing games for business, the arts, entertainment, social causes, environmental purposes, and political movements. For her, games are the solution to many of our problems; if we were all gamers, we could cure a lot of problems in society. She believes that if from infancy on, we all played games as if our life depended upon them – especially multiplayer collaborative games – we would learn that challenges never stop, and that it is worth risking utter failure in order to have an epic win.

She believes that once you experience an epic win, you have the confidence to be fearless and unstoppable, not just in the next game, but in the world.

For example:

World without Oil is a computer game which was launched on April 30, 2007 and concluded on June 1st 2007. It imagined the first thirty two days of a cessation in the production of oil worldwide. Over a hundred thousand players eventually contributed to the game, completing 1,500 complete scenarios, all with different global and local consequences. These scenarios are all archived and can be downloaded. They are so realistic and so well informed by research, experience and the science and sociology of environmentalism that they are now used by educators in courses at all levels and by policy makers who use them to train for informed decision making.

Use of technology in different models:

1. **Virtual University Model:**

Virtual University can cater to million students at the same time. The Virtual University of Pakistan delivers education through a judicious combination of broadcast television and the Internet. VU courses are hand-crafted in meticulous detail by acknowledged experts in the field. Lectures are then recorded in a professional studio environment and after insertion of slides, movie clips and other material, become ready for broadcast. Course lectures are broadcast over free-to-air television and are also made available in the form of multimedia CDs. They can also be made available as streaming media from the Virtual University's servers. The multiple formats allows for a high degree of flexibility for students who may view the lectures at a time of their choosing within a 24-hour period. Additionally, students can use the lectures to review an entire course before their examinations – a facility simply not available in the conventional face-to-face environment.

In addition to the prescribed texts, comprehensive reading material / lecture notes in the form of web-enabled content are provided through a comprehensive Learning Management System (LMS) hosted on the VU Web Servers and accessible over the Internet. The full power of hyperlinks is utilized for making the on-line experience truly powerful. The LMS also provides an e-mail facility to each and every student as well as discussion boards for interaction within the VU community.

Assignments are handed out through the LMS and also submitted by the students through the same mechanism. Pop-quizzes and practice tests are also conducted through the LMS.

Midterm and Final Examinations for every semester are conducted in a formal environment at exam centers designated for this purpose throughout the country. Invigilators appointed by the University conduct the exams. The formal examination atmosphere assists in critical quality assurance of the student assessment system.

Advantages of the above model:

- Many students can benefit from teaching regardless of their physical locations.
- Additional costs are required for recording of lectures such as camera men, makeup etc. But the benefit of it is that not only a classroom of fourty students but 40,000 students can listen to your lecture at a time.
- Examination is carried out from a question bank prepared by experts and can easily measure students understanding during the semester.

Disadvantages:

- In conventional classroom, pace of the lecture can be changed according to students interest but the recorded lectures cannot be changed

- If a teacher is allotted to teach a course, he will keep the same notes for not more than three years, and after that some substantial changes are made in it. But in recorded lectures it is difficult to make changes because recording is a long term procedure.

In short, advantages and disadvantages of VU model are:

VU model Advantages	**VU Model Disadvantages**
- Teaching and testing resources are made available to masses	- No instant feedback
- Scalability	- Difficult to update courses after a certain period of time
- Centralized examination instruments	- No interactivity during the lecture
	- No collaboration
	- Lacks social presence

Khan Academy Model:

Khan Academy is an organization on a mission. "We're a not-for-profit with the goal of changing education for the better by providing a free world-class education for anyone anywhere."

All of the site's resources are available to anyone. It doesn't matter if you are a student, teacher, home-schooled, principal, adult returning to the classroom after 20 years, or a friendly alien just trying to get a leg up in earthly biology. Khan Academy's materials and resources are available to you completely free of charge.

How it works for students

Students can make use of the extensive library of content, including interactive challenges, assessments, and videos from any computer with access to the web.

Advantages:

- Effective communicator
- Khan Academy assumes that there must be a computer or laptop for every student, whereas VU has established centers for students all over the world.
- Instant feedback. Vu does not provide instant feedback
- It is easy to update the lectures of Khan Academy while VU requires a lot of production cost.

Disadvantages:

- It eliminates the social interaction that must be present in classroom.

How these models can be improved:

These models can be improved if the focus is on the following:

- Interactivity
- The recorded lectures of Vu or Khan Academy must be build in with instant feedback

- Examination
- Collaboration
- Communication
- Problem solving
- Inquiry
- Critical thinking

Lesson 31

LEARNING THROUGH GAMES

A child is reading something about football in a book. His imagination about football is useless until he has a direct interaction with the play. He goes to a park where he meets his friend and starts playing football with him, now competition between them starts. Competition encourages motivation. When he starts playing with friends or team there is social interaction also. Social interaction gets enhanced and there is communication and collaboration between them while playing. He tries to achieve the target by beating the other friend. If he fails to beat his friend, he is not disappointed as he has tried to achieve his target to the maximum. There is also an element of emotional satisfaction. He gets instant feedback on his actions. All the steps mentioned in the above example are important for learning. Following are the important aspects to maximize learning:

- Games can promote learning. There is no emphasis on physical education in our schools. All the British Public Schools have a clear emphasis 'games are always as important as academia'.
- Social presence of teacher is important in classroom whether it is a conventional classroom or an e learning classroom. A teacher can collaborate with the students at the same time while teaching. It maximizes students learning.
- Cognitive presence: when students start thinking in classroom the teacher must communicate his expectations to the students to promote critical thinking.

The Art and Science of Teaching / Using Games to Enhance Student Achievement

Games are a regular part of students' lives, no matter what their grade level. Students play games throughout the day on their computers, Internet, and their cell phones. One of the few places they don't regularly play games is in their classrooms. Although some teachers use games as a part of their instructional repertoire, most teachers do not, and those who do include them may not be using them to their potential.

Defining games:

- A form of competitive activity or sport played according to rules.
- An activity that one engages in for amusement.

There are certain rules to follow in games and there is an objective that needs to be achieved.

What is Game-Based Learning? It is known as a Game-Based Learning (GBL) the learning method of using games while teaching a subject. Games that are used for this purpose have been designed with the idea of achieving learning outcomes.

Some benefits of using Game-Based Learning

- **Gets student attention.** Students are easily engaged in game activities due to their willingness to play.
- **Students get a positive experience about learning.** The use of games encourages students to keep learning and erases the idea that learning is boring.
- **Rememorize concepts or facts.** Activities such as solving a crossword or alphabet soup are more engaging than a regular test. Prepare some contests such as "Who wants to be a

millionaire" or "The wheel of fortune". Encourage students to work in teams to achieve the goal where their **knowledge is the clue to succeed**.

- **Reinforce and consolidate knowledge in a friendly environment.** The most effective way to turn content into something **meaningful** is to find out where and when to use it. With games students can reinforce and consolidate their knowledge through practicing and getting reward for their achievements.

- **Understand the consequences of our choices.** Using games enables users to understand the consequences of their choices. In other words, the students **learn through experiences**, through trial and error. Games offer a safe environment to test and **learn through mistakes** so that the information becomes meaningful as students understand its use.

Story, Drama, Narrative, Games:

Narrative:

When relationship between the concepts moves in a same direction it is known as a narrative. For example, a narrative in mathematics can be given as start with counting, then addition, combining counting and addition will result in multiplication, combining subtraction and counting results in division. Connections are at the heart of narrative.

Narratives help in:

- Better memorization/memory
- Rich understanding
- Triggering complex and larger in number mental operations when the student stumbles upon the same concept later.

Types of narratives:

- **Logical narrative**
- **Temporal narrative**
- **Spatial Narrative**

Story:

When there is a human motive in the connections of narrative, it becomes story.

- An account of imaginary or real people and events told for entertainment.
- A report of an item of news in a newspaper, magazine, or broadcast.

Drama:

- A play for theatre, radio, or television.
- An exciting, emotional, or unexpected event or circumstance.
- a composition in verse or prose intended to portray life or character or to tell a story usually involving conflicts and emotions through action and dialogue and typically designed for theatrical performance

Lesson 32

PEDAGOGY OF DRAMA & STORYTELLING

Definition of Drama:

Drama is an art form that explores human conflict and tension. It generally takes the form of a story presented to an audience through dialogue and action. The story is conveyed using the elements of the theatre: acting, costumes props, scenery, lighting, music and sound.

Drama has an emotional and intellectual aspect on both the participants and audience members. It holds up a mirror for us to examine ourselves, deepening our understanding of human motivation and behavior. It broadens our perspective through stories that portray life from different points of view, cultures, and time periods.

Definition of Drama Education:

Drama education uses the art form of drama as an educational pedagogy for students of all ages. It incorporates elements of an actor's training to facilitate the students' physical, social, emotional, and cognitive development. It is a multisensory mode of learning designed to:

- Increase awareness of self and others
- Improve clarity and creativity in communication of verbal and non-verbal ideas; and
- Deepen understanding of human behaviour, motivation, diversity, culture and history.

Storytelling as a Pedagogical Tool

Storytelling is a powerful pedagogical tool. Simply put, storytelling is delivering information in an organic form. The teacher, the storyteller, and the performer share a similar purpose: to inform, engage, and entertain their audience. They all seek to communicate their message in the most compelling and provocative way possible. Telling a story engages the audience in a unique way. Storytelling, then, is yet another device in the repertoire of a good teacher. It is not only a potent tool for the teacher as a way of organizing information, but as a dynamic means for students to express what they have learned. The magic of storytelling changes the atmosphere in the classroom and in so doing enhances the learning environment. Stories serve to open the mind so that the hearer is ready to take things in. In short, stories appeal to the heart, and, once the heart is won, the mind is open to learn!

Stories promote lively imagination on the part of students. When students listen to a story, they create mind pictures, make inferences and predictions, and fill in the gaps. They in a sense become involved in creating the story, thus forming a relationship with the narrative. When packaged as a story, the oral delivery of information promotes greater involvement than does written language.

In order to appeal to different learning styles, it is necessary to transcend the traditional presentation of fact and theory. Stories are concrete; they exemplify concepts better than abstract, non-creative methods. Teaching storytelling also teaches presentation, communication, and writing skills. Using storytelling as a method of instruction and assessment supports educational objectives. These include:

- improving verbal skills
- gaining self-confidence

- discovering the meaning of events
- developing a love for language and stories
- encouraging higher levels of cognitive thinking
- gaining a more in-depth understanding of narration
- improving imaginative skills
- internalizing the traditional structure and conventions of stories
- improving writing skills
- encourage active participation in the creation of stories

Storytelling is such an effective tool for the teacher because it is a powerful form of communication. Both the student and the teacher benefit from it. Students learn from hearing stories because they pay closer attention, understand the message more readily, and retain key points longer. Teachers become better educators because being able to tell a story effectively enhances the perception of the teacher as a leader. A teacher who can adeptly tell a tale reveals an approachable, likeable, and human side to his or her personality. This helps to close the distance between the teacher and the students by making the teacher's status less threatening.

Lesson 33

PEDAGOGY IN EDUCATION

In the book "Pedagogy of the Oppressed" By Paulo Freire, it is written that

- The teacher teaches and the students are taught.
- The teacher knows everything and the students know nothing.
- The teacher thinks and the students are thought about.
- The teacher talks and the students listen and listen meekly.
- The teacher disciplines and the students are disciplined.
- The teacher acts and the students have the illusion of acting through the action of the teacher.
- The teacher choses the programme content and the students who were not consulted it adapt to it.
- The teacher confuses the authority of knowledge with his or her professional authority.
- The teacher is the subject of learning process while the pupils are mere objects.

In the problem posing education people develop their power to perceive critically the way they exist in the world with which and in which they find themselves. They come to see the world not as a static reality but as a reality in process, in transformation.

The two educational concepts and practices under analysis come into conflict.

Another book, "Now You See It" by Cathy N. Davidson, it is discussed about a newly open school, in which there are 100 students. There philosophy of teaching is quite different. The author wrote about a teacher:

Mr. Gemaine believes that we all need to take education seriously and that every child, including each 6th Grader in Voyager Academy, needs to view learning as the key to a future whose destiny she holds in her own hand. That's how Mr. Germaine teaches, with the intensity of someone who believes that, individually and collectively, we are responsible for our civilization's survival. When I ask him what his standard for success is , his answer was simple: "Perfection! I am taken aback, but as I watch the class unfold, I understand that he challenges each child to find a perfection of his or her own. No aiming for the A, B, C or D here. The bar is set at how high we can go.

An activity to build a bridge with the help of ice-cream sticks is given to the students. They are given choice to work individually or in groups. Now some students work in groups and lead their group to success in building the bridge.

But teachers in our Colleges or Universities follow a certain content to teach and to not try to go beyond it. Students are with different life experiences and prior knowledge but all are treated in a uniform manner which is not good for their educational career. So, Cathy addresses the system of education that such system must be developed in which every student in given special and different attention.

Lesson 34

PROBLEM-BASED EDUCATION

In hospitals, doctors use their knowledge of medicine and human body to diagnose diseases. They also use technology to check the symptoms of disease. The disease is like a problem that they try to solve.Similarly, when a problem is posed to a child, he has some choices corresponding to that challenging problem.

In the book, "Thinking Fast and Slow" by Daniel Kahneman, some problems with context are given; two of them are shared here for discussion.

Problem: 1.

A bat and a ball cost 1 dollar 10 cents. The bat costs 1 dollar more than the ball. What is the cost of the ball?

Problem: 2.

If it takes 5 machines, 5 minutes to make 5 widgets. How long it would take 100 machines to make 100 widgets?

Students of Pakistan who live in cities have protected lives, they study in well known institutions and they go to school in a protected environment. They do not know the real challenges faced by other children of Pakistan who are not able to go to school. In villages, children do not give money to the shopkeeper rather they deal in barter trade. They know the current rates of wheat that they sell to the shopkeeper to buy things. They know the rates and are very sharp to calculate. They do their calculations very quickly and without the use of paper and pencil.

Now if the language of posing problems is their everyday language then students would be able to give the right answer. The prior knowledge of children who lives in villages or in backward areas is sufficient to understand a new concept. But we do not try to use that prior knowledge for their learning; instead we start with the simple concepts of teaching addition and subtraction which has no connection with real life situations. If these concepts are taught with the help of their real life experiences then it would last in their minds for a longtime. Our education system snubs the creativity in classroom and motivation for questioning in classroom

Importance of prior knowledge:

- Curriculum should be connected to community.
- Former knowledge of students is developed very strongly but the application of knowledge is not up to the mark because connection is not made with real life.
- In Italy schools, it is a tradition to study the community first and then incorporate it into the curriculum so that gaining knowledge and application will go side by side.
- Students should be able to put in use the knowledge that they have gained.
- Interactivity presupposes that the learner has some degree of prior knowledge.

Assessing Prior Knowledge:

Students come to the classroom with a broad range of pre-existing knowledge, skills, beliefs, and attitudes, that influences how they attend, interpret and organize in-coming information. How they

process and integrate new information will, in turn, affect how they remember, think, apply, and create new knowledge. Since new knowledge and skill is dependent on pre-existing knowledge and skill, knowing what students know and can do when they come into the classroom or before they begin a new topic of study, can help us craft instructional activities that build off of student strengths and acknowledge and address their weaknesses.

Once prior knowledge and skill is assessed, there is a range of potential responses, depending upon the type of course, the uniformity of results, and the availability and type of supplemental materials and alternatives.

Some facts n figures:

- In Pakistan 20-30 lac students reach high school.
- 30-50 lacs drop out and don't reach high school.

While 40% of children are going to school the rest 60% who are majority are not going to school. Students can be attracted to school by making school environment attractive, meaningful content should be taught to reduce the drop out rates. The technique to standardize education for all is not applicable. But for the group of students who are diverse and to control the drop outs, education needs to ne centralized. While customizing, it is necessary to think that how technology or pedagogical skills can be implemented.

Lesson 35

HOW SCHOLING CAN BE IMPROVED?

A discussion with University Professors was made in which some questions were highlighted about schooling of children. Some of the questions and their discussion is included in this handout:

How can the future schooling in classroom improved?

We need to consider the historical perspective. The world is going through new advancements day by day, so one has to keep our self updated. Staying in the same situations such as 40 to 50 years back will make us suffer. Secondly, goal of education is dramatically shifted as society and industry is becoming sophisticated and to producing people for such society and industry is very challenging. What characteristics one needs to work in the future workplaces? Thirdly, we never try to gage the impact of education on outstanding students. Learning pedagogy has an impact on average students and not on outstanding students. The role of the teacher is to advance the level of learning of average students.

The major problem here is that teachers in classroom are unable to excite the students. It is the duty of the teacher to enhance the level of average learning students and made them think critically. They must be taught in ways that increases creativity. Moreover, they need to learn about communication, innovation and collaboration.

What are the major stages in schooling that needs improvement?

The first thing highlighted in this discussion was classroom environment in which a teacher is present; there is teaching presence, cognitive presence and social presence, and the book which the students read after class hours. Classroom atmosphere is almost damaged in our well-known schools and the textbooks are not up to the mark as well.

- The first stage discussed was that the books must be interactive.
- Students should be excited need to be enabled by teachers to discover.
- Information access point must be other sources as well as schools.
- Interactivity must be present in teaching.
- Transformation of knowledge can be possible in areas where school buildings are far away through online or mobile schooling.
- Smart devices can be applied to learning.

There is an area in Lahore where Muslims and Christians live. They are living peacefully. A child from that area is working in a salon. The reasons why he did not go to school are:

- Could not study in a conventional school
- He cuts hair from 11 am to 11 pm

He says that he has time in the morning till 11 am to study. When asked, what does he want to study? He says that he wants to improve his English Language. His brother is teaching in a school and he says that he can teach him spoken English in 4 months. He has taught through computers, there is a software in which the words are spoken and then the students spell and read the words. He is a street smart child who has a mobile phone with internet connection. He used Facebook and twitter on that. He has no training on it but with the passage of time, he knows how to use these social sites.

So, in this way, without any training, people design such elements of innovation with trial and error.

Similar with the above example, there are two children who work on a general store, a boy who is a garbage picker and a maid at home who has a mobile phone and Wi-Fi in it. They use it to access their neighbors' internet connection. Someone who accesses internet everyday can use it for the sake of learning as well. If these people are empowered to learn through the tools available to them e.g. a mobile phone and a Wi-Fi, they can learn on their own. In this way a large number of population who cannot afford conventional teaching can learn as well. The problems which are hindrance in their learning can be resolved through technology.

- In non-traditional education, flexibility is a key factor.

The children who use mobile internet use such activities that they know and understand, the rest is ignored by them. In conventional teaching the accreditation time is so long and one has to study for one year to be promoted to the next grade. Flexibility can be incorporated while thinking about the technology design.

With reference to NY Times, an article was written, Cathy Davidson wrote in response to it:

Teachers Should Change How They Teach Students Today. That's Our Job: Response to NY Times, Cathy Davidson wrote:

In conventional teaching, there is:

- Accreditation
- Assessment
- Rules and regulations

Cathy says that the above mentioned points demonstrate a very apologetic approach. We have made education so dull and boring that unless all these formalities are not fulfilled, the system cannot work.

Lesson 36

TECHNOLOGY IN EDUCATION

Modern classroom doesn't mean modern school building in a well known area. But modern classroom can be anywhere, where modern teaching and learning tools can be used.

An experiment on technology in Ethiopia:

Almost 8000 Motorola Zoom Tablets were distributed among children. These were distributed in an area where very poor families lived. There was no proper schooling in that area.

The boxes were left in the village. Closed, tapped Shut. No instruction, no human being. I thought, the boys will play with the boxes! Within four minutes, one kid not only opened the box, but found the on/off switch. He'd never seen an on/off switch before. He powered it up. Within five days, they were using 47 applications per child per day.

Within two weeks they were singing ABC songs in English in the village and within five months they had hacked Android. Some idiot in our organization or in the media lab had disabled the camera and they figured out it had a camera and they hacked Android.

Here we can assume that if children are provided with controlled conditions, they can learn anything without proper schooling.

Miles from the nearest school, a young Ethiopian girl named Rahel turns on her new tablet computer. The solar powered machine speak to her: "Hello! Would you like to hear a story?" She nods and listen to a story about a princess. Later, when the girl has learned a little more, she will tell the machine that the princess is named "Rahel" and she likes to wear blue—but for now the green book draws pictures of the unnamed Princess for her and asks her to trace shapes on the screen. "R is for Run. Can you trace the R?"

Then Rahel started writing her own stories. She listens to the stories, write her own and share.

The book tells her that she is very good at music, and her lessons begin to encourage her to invent silly songs about what she's learning. An older Rahel learns that the block language she used to talk with the turtle is also used to write all software running inside her special book.

Both the above mentioned findings on Motorola Zoom Tablets distribution highlight the shortcomings of our schooling system:

- If all the controlled conditions are removed, it is observed that learning still occurs. The process of learning never stops for those who want to learn.
- School means standardization of knowledge. Different landmarks are set and there is a time frame to achieve these landmarks/targets. Without technology, teachers still do not have evidence that the landmark is achieved.

News on NY Times about YouTube when blocked in Pakistan:

One notices consequence of this decision was that 215 people in Pakistan suddenly lost their seats in a massive, open online physics course. The free college level class created by a Silicon Valley start-up called Udacity, included hundreds of short YouTube videos embedded on its website. Some 23,000 students worldwide had enrolled, including Khadijah Niazi, a 11 years old in Lahore. She was on question 6 of the final exam when she encountered a curt message saying, "This site is unavailable."

Niazi was devastated. She'd worked hard to master this physics class before her 12th birthday, just one week away. Now what? Niazi posted a lament on the class discussion board: "I am very angry, but I will not quit."

In every country, education changes so slowly that it can be hard to detect progress but what happened next was truly different. Within an hour, a young man from Malaysia began posting detailed descriptions for Niazi of the test questions in each video.

There was a social presence in an online classroom. The variables of social presence are affected by generational change. We accept such social presences in which we spend time in our childhood. So, the new generations will have the powerful indications from online learning. With the passage of time, the social presence through online social networking sites will gain importance. Through technology, a social universe is created.

An instructor from Portuguese tries to help Niazi in a way that she can access YouTube through proxy sites. Another student from England named William also promises to help her.

None of these students have met one another in person. The class directory included people from 125 countries. But after weeks in a class, helping one another with Newton's laws, friction and simple harmonic motion, they'd started to feel as if they shared the same carrel in the library.

Together they had found a passageway into a rigorous, free collage level class and they were not about to let anyone lock it up.

By late that night, the Portuguese Professor has successfully downloaded all the videos and then uploaded them to an uncensored photo-sharing site. It took her four hours, but it worked. The next day, Niazi passed the final exam with the highest distinction. She was the youngest girl ever to complete Udacity's Physics 100 class, a challenging course for the average college freshman. That same day, Niazi signed up for Computer Science 101 along with her twin brother Muhammad. In England, William began downloading the videos for them.

Lesson 37

A PREVIEW OF PROBLEMS OF EDUCATION IN PAKISTAN

Three schools were visited for survey; major question that was asked from teachers is that what courses do you think are difficult to understand for students? What is their definition of understanding? If students are facing difficulty in a subject or topic, what pedagogical techniques should be applied to them?

The first school visited was Chritian Nagar High School, there was a school in every colony separately and there was a tough competition. It was like a branded chain of schools which is a good improvement in Pakistan. The problem highlighted by this school administration was that they want to increase their amount of learning. First thing is that they want to measure learning in classroom. And then they want to use such innovative tools which are not very expensive and let the students discover and learn thoroughly.

The second school visited had a chain of their branches everywhere in the city. The problem highlighted in this school was that they want to expand their schools. They think that some other schools which were started when this school was established had more branches than this school. The challenge of this school was that they want to cater the students who are from upper middle class. What should they do? Can they make conventional schools in any other area? The infrastructure of school is not difficult for them but the actual learning in classroom is a challenge. Second option is that they must not spend whole money on the infrastructure of schools rather they can utilize the 20-30% of it on innovative pedagogy and technology to maximize students learning. And the constructed building of school must not be corresponding to the conventional school building.

The Third school visited had three to four branches only and it also caters the students from upper middle class families. The challenge addressed by administration of this school was quite different and it was that their income had reduced in the last few months for an unknown reason. The problem here is about management in which pedagogy and technology also contributes a lot. The first problem here is managing growth of the school. They do not want to do it in a standardized way rather they want to leverage growth through innovative technology.

The system of this school was observed carefully, there was a building for teachers in which students study in a conventional manner. Another building is there is which no teaching staff is present and there are only content designers. They used to observe different books of matriculation or O'levels and then try to create their own content. These are experienced people who have teaching experiences at University level. These people claim that they can work hard for content development. They are not using any innovative technology or pedagogy. A question arises in mind that how much the content material developed by these people is effective? They replied that we are doing this task since 40 years. Doing a same task for 40 years does not guarantee you that you are doing it effectively. Is there any quantifiable measure through which you can easily demonstrate the effectiveness of teaching and learning?

There are two ways one is that they must do it experimentally; secondly there have been many researches on the learning theories since 15 years. But in their system or content development section, these theories were not given importance. They are just observing other books and then creating content for their schools.

The level of understanding is measured through examination in our schools. But students who get good grades in classroom sometime do not have enough knowledge to apply the knowledge in real world settings. With the use of technology, it is possible to assure at least lower level of understanding of students.

Teachers from this school highlighted some of the topics of mathematics, physics and biology which they feel that students feel difficulty. It was inquired about linear graphs from teacher through email that what topics are required as prerequisites. They wrote:

"You have asked about the responses of students while studying this chapter. Although it is not difficult for them to understand the concepts.

Overall they have some problem in the selection of scale according to different coordinates, especially in conversion graphs; where different fractional values also are involved."

Now they proposed a list of concepts that students must know to understand linear graphs and their applications. There are:

- Cartesian plane
- One to one correspondence
- Four quadrants
- Cartesian product
- Ordered pairs
- Scale of graphs
- Construction of tables satisfying linear equations
- Conversion units
- Graphical solution of linear equations

Almost all these concepts are interlinked with each other and students have enjoyed this chapter. I think that they have some problem in understanding the slope of the equation.

Then it was asked from the teachers that what sequence you follow while teaching this chapter in classroom. They say that the following sequence is followed:

- Cartesian plane
- Cartesian product
- Ordered pairs
- Coordinates
- Graphical solution of linear equations
- Dependent and independent variable
- Abscissa and ordinates

There is no connection in the above mentioned sequence of topics.

Objectives of this chapter given in the Punjab textbook of 9^{th} class are:

- Draw a graph of an equation of the form $y = c$
- Draw a graph of an equation of the form $x = a$
- Draw a graph of an equation of the form $y = mc$
- Draw a graph of an equation of the form $y – mx + c$

Teachers claim that students understand all of these. Cognitive, teacher and social presence is necessary in teaching and learning process. The major aspect is that when teacher enters the classroom, he must present a scenario through which students got excited and interest in the class is developed. Students must get excited that the presented problem is most similar to the daily life problems.

Lesson 38

TEACHING THE HANDICAPPED

A handicapped girl was doing PhD from NUST; her motivation was to complete her studies using technology. She was the student of School of Electrical Engineering and Computer Science. She wanted to cater for learning solutions for handicapped children regardless of their ages. Technology can be used to measure classroom learning as well. When lectures are delivered in a conventional classroom in which a teacher delivers a lecture and pedagogy is not changed. The students only listen to the lecture, and meaningful learning does not take place. Such conventional lectures are still delivered in our schools that has made the students handicapped of their thinking.

- The main idea that needs to be taught to the students. Teacher needs to decide the most suitable route through which students can learn the concept meaningfully.

The core courses taught at University level are open ended. Many courses require reading but intensive in which if the topics are of learner's interest, they proceed further easily.

Secondly, pedagogy to teach the courses plays an important role in student learning. The practitioners should know all about pedagogy in detail. There is a variety in pedagogy the teacher can give projects to the students or can teach through problem-based learning. It is the responsibility of the teacher to take the bottom students with the other students effectively in learning.

For example if I am learning Pakistan studies then there must also be a change in my civics behaviour so that I can relate today's news with the history. Similarly to learn mathematics you should be able to break down the real world situations into its mathematical symbols.

A teacher must take into account the following:

- The method adopted to teach the concept must delivers effective learning.
- How can the teacher change the pedagogy rapidly from one topic to other topic?
- What existing technology tools are available that can be adopted in the classroom?

A school administrator must think about:

- What technology tools are helpful for students learning and can be used easily in school?
- How effectiveness of teaching methods can be measured in school?
- How teaching can be assessed with the use of technology?
- If an administrator wants to improve the skills of teachers, how it can be done?

In Canada, teachers are trained to teach the handicapped. At first, there is a general training of how to include the handicapped in a classroom. They try to involve as all the students in the mainstream of education. It is proved that handicapped students can learn in an ordinary classroom with some additional use of technology. It is taught as a subject in Canada at graduate level.

Teaching students with Physical Disabilities:

To maintain inclusive classrooms, teachers should have knowledge of physical impairments, assistive technology, teaching strategies, and necessary accommodations and modifications.

Children with physical disabilities, once taught in separate classes and even separate schools, now learn beside their peers in regular classrooms. Inclusion has changed how these students are

educated, with the continuing development of the Individuals with Disabilities Education Act (IDEA) ensuring rights to a quality education.

As types of physical disabilities vary in degree of impairment, teachers need to have a general knowledge of various conditions and how they affect children. Assistive technology can facilitate these students by allowing them to participate in the classroom activities easily and independently. Specific classroom and instructional strategies, as well as accommodations and modifications, also assist the students in achieving their best individual educational outcomes.

The Practice of Inclusion

With the development and reauthorization of education laws, such as IDEA, inclusion has become the typical practice in educating students with disabilities. Unlike mainstreaming, inclusion offers students support services to assist them to function in the general classroom. In an inclusive classroom, general educators set the tone to create an accepting learning environment that benefits all students.

Assistive Technology

Any device or tool that enables a student to participate in the learning activities can be called assistive technology. Simple pencil grips or ergonomically designed pens can make holding and manipulating writing instruments easily. Oversized art supplies and handmade adaptations can allow students with fine motor difficulties to create art.

For those with more severe impairments, assistive technology lets students have access to computers for learning and expressing themselves. Keyboard and mouse alternatives replace standard input devices. Voice recognition software allows users to speak what they want to input instead of typing on with a keyboard.

Classroom and Teaching Strategies

Teachers can significantly improve educational outcomes of students with physical disabilities by implementing specific strategies. Classroom arrangement with easy access to supplies can prevent accidents and improve participation in activities. Using a buddy system or working with paraprofessionals can provide students with necessary assistance to complete assignments. Finally, individual accommodations and encouragement can promote learning and ease frustrations due to physical difficulties.

Accommodations and Modifications

Since each student differs in degrees of impairment and ability, accommodations and modifications must be individualized according to needs. Although some subjects are more difficult to accommodate and modify for certain disabilities, many options make learning accessible. Accommodations can include note takers, the use of scribes for written assignments, handouts in alternative formats, and separate rooms for testing. A teacher's creativity also opens new opportunities to learn.

Adaptive Physical Education

Physical disabilities should not exclude students from participating in gym activities. Depending on a student's disability, a separate, adaptive class or modifications within a typical gym class can offer

physical education. Basketball, golfing and tennis can be adapted so that students can participate with the assistance of a physical education teacher or aide.

Lesson 39

DISCOVERY BASED COLLABORATIVE LEARNING

"Guide to e-learning" by Michael Allen, and "E-learning in the 21st century- A framework for research and practice" by D. Randy Garrison through light on the importance of e-learning.

Why e-learning? World peace:

- It is tempting to add it to the list because peace is dependent on understanding and understanding is the product of learning.

The book by Michael Allen emphasizes what the developers of e-learning modules should keep in mind:

- Understand what is possible in e learning
- Know how to avoid spending money on e-learning
- What you can demand in an e-learning environment?
- How can you evaluate e-learning projects?
- How can you measure and compare e-learning situations?

Drawback of old versions of e-learning models:

- Communication, collaboration and exchange of ideas lacked in the older version of e-learning

Now in the last 5 years with the use of internet, you can not only communicate with the teacher but also with other people learning the same disciplines. The power to communicate and compute has enhanced e-learning due to internet.

Discovery based collaborative learning:

To implement this approach an experiment was done in UET. Whole class was divided into 4-5 groups and then the teacher tried to take them all along as they are travelling through leaps. The teacher did not give them all the knowledge rather had to discover knowledge on their own. The students learn better in collaboration with the other group members, instead of individual learning. It is necessary for the teacher to observe that there is collaboration and communication among the group members. Teacher needs to monitor the students so physical presence of teacher is necessary.

Another group of students' implemented discovery based collaborative approach in a virtual mode. An online group was made by the students so that they can communicate with one another and make notes. If a group member identifies a difficult point in discussion, the other member try to help him which brings in mo0re discussion points. In this way the process of discovery based learning continues. When writing comments, different colors were assigned to students so that the teacher can identify the input by each student. The teacher needs to highlight the mistakes of students so that correct concepts are developed.

It is necessary to provide different types of communication channels to the students. If students are limited to a certain channel then their interest in learning will gets limited. Social communication plays a very important role in learning. Students do not only rely on the teacher but learning a shift from 'teacher to learner' and then from to 'learner to learner'.

Lesson 40

THE COMMUNITY OF INQUIRY OF FAIZ AHMED FAIZ

Pitrus Bukhari was a very famous professor of Government College University, Lahore. He created a social and cognitive presence in the University.

When people around us think critically and in-depth about the ups and downs of life the product of such thinking is highlighted in the poetries of our poets. One of the most famous poets is Faiz Ahmed Faiz who wrote about the people who are unable to attend formal schooling but if provided with the opportunities and resources, they can do wonders. Every person in Pakistan today has cell phones and most of them have Wi-Fi in it. If such people are guided properly to use these devices for their education their skills can be developed.

E-learning facilities and community of inquiry must be developed for these learners that includes social, cognitive and teacher presence.

The three contexts of learning discussed earlier are:

- Firstly, the street smart children who cannot attend formal schooling but are intelligent enough to use the facilities for their future benefits and education.
- Second is the girl Khadija Niazi, who was studying an online course but suddenly due to some reasons YouTube was blocked. People around the world started to help her out in her difficulty by providing her lectures and notes through other sources instead of YouTube. It was a good example of cognitive presence among the students of the same course.
- Third is the websites where well known Universities provide online certificate courses.

In the book, "e-learning in the 21st century" it is written that:

- E-learning has some inherent capabilities; the way to discover these inherent capabilities is our task.
- It is a complete transformation of learning

It is totally a new paradigm on which the following report is proposed:

US web-based Online Education Commission:

The question is no longer if the internet can be used to transform learning in new and powerful ways. The commission has found that it can. The Web-based Education Commission calls upon the new congress and administration to embrace an e-learning agenda as a center piece of our nation's federal education policy. (July 2001)

Deeper learning:

In comparison to the previous educational methods, today the methods to evaluate the deeper understanding of students have changed as well. Computers are helpful in providing the interactive learning experience, and Internet opens the channel for communication. The combination of these two has provided us with totally different learning tools from the past. So, the depth of understanding can be far more than it was possible previously..

Limitations of Todays Schooling:

- The main purpose of teachers is to cover the syllabus rather than educating the students to discover and communicate new ideas.

In E-Learning in the 21st century, it is written that learning takes place in:

- A community where individual experiences and ideas are recognized and discussed in light of societal knowledge, norms and values; where autonomy and collaboration are not conflicting or contradictory terms but are essential elements of a unified and qualitative shift in the process of critical inquiry.

Institutions of higher education have slowly begun to appreciate that the content alone will not define quality learning but the context; how the teachers design the learning experience and the interactions that derive the learning transaction, will ultimately distinguish each institution.

A quality educational experience is the dynamic integration of content and context created and facilitated by a discipline expert and pedagogically competent teacher.

(Listen to the video lecture for the interview of Faiz Ahmed Faiz)

Lesson 41

PEDAGOGY OF FAIZ AHMED FAIZ

When name of Faiz Ahmed Faiz came to mind it directly has the feeling of revolution, innovative and radical ideas and equality. In 1938 there was no concept of technology in education. Faiz addresses the poor and those who do not have many facilities in their lives in his poetry.

In the interview of Faiz Ahmed Faiz, the revolutionary idea addressed is that teachers were the common resource at that time and it did not matter that the teacher belonged to a particular institution. A teacher was the teacher of all students. All the students were also treated equally and the institutions that they belonged to didn't matter.

The discussion forums at that time were made when the teachers and students sat together for discussions. It was known as 'Majlis' in which the graduate students were given the level of former teachers. In 'Majlis' a student dictated his thinking and ideas to all members present there in a specific context that he had faced or suffered in life. All the students benefitted from the source presented and the presenter got instant feedback which is very necessary in learning. FAiz Ahmed Faiz also says that most of their study was not based on formal classroom setting, and students learnt mostly through the libraries or 'Majlis' discussions and discussions with senior teachers.

Ways to make learning possible for all:

- Firstly, all teachers should be called at one place to share their ideas and all students should be welcome to attend. All students can choose the topics of their interest so that can benefit from the teaching.
- Teachers and students must not be specified to a certain college or University.
- Second thing to keep in mind is that students must be able to use their learning in such discussions so that others can give feedback.
- Students today rely on internships before entering the practical field. At the time of Faiz Ahmed Faiz the component of practical field was included in the curriculum.
- Students must have command of the soft skills as they must not hesitate to comment or ask questions in a discussion forum.

Use of technology for social interaction:

Such social interaction among teachers and students can be made possible through technology. A discussion forum can be online. For example, Facebook today is an online social website that provides the individuals with discussions but it does not serve the purpose of education. For the purpose of education the online course websites that are providing online certificate courses to the individuals serve the educational purpose. Social presence is an important aspect of online learning.

In the book, "e-learning in the 21st century", it is written that

"Because e-learning can be accompanied by the sense of aloneness, one of the first and most important challenges for the teacher is to establish social presence."

Social presence is also important as students observe and adopt habits of teachers as ideals. So, the responsibility of the teacher is not only to deliver the content but also the character building of the students.

In an e-learning class, there should be:

Step: 1

- Triggering event
- Sense of puzzlement
- Dissonance

Step: 2

Exploring the issue or problem by gathering and exchanging relevant information.

Step: 3

Integrating or making sense of information by connecting ideas in a meaningful way.

Step: 4

Resolving the issue by applying and testing the ideas either directly or indirectly.

Lesson 42

E-LEARNING

When you enter a high school classroom, you observe complete silence. If there is noise in the class it is said that there is no classroom management on the part of the teacher. A specific training to teachers is given on maintaining discipline in the class. Students most of the time just listens to the lecture and they are not allowed to talk or ask questions in the classroom.

Individual experiences include:

- Reading
- Writing
- Doing

The aspect of "Doing" can be included only by using effective pedagogical strategies in classroom.

In the book, "e-learning in the 21st century" by D. Randy Garrison, a classroom is discussed in which the social presence in classroom is highlighted.Classrooms such as physical or online in which students are getting educated have social, cognitive and teacher presence. The role of students is to construct knowledge. A student can use a tablet and an internet connection in which the skills of thinking, reading, writing and are used. If the personal level learning in a conventional classroom and a challenging environment of online education are mixed together, it can make a collaborative classroom.

Schools prepare students for real life. More and more jobs today are team and project oriented. So students need to learn how to work in teams. This can only be possible through collaborative learning in classrooms. A successful individual is the one who know the social skills and has also command on the content. Emotional Quotient is necessary to be fulfilled in the job market as compared to IQ. It is important to make it part of the school curriculum.

There is a need to teach discovery and collaborative learning in our conventional classrooms. In the traditional classroom, a teacher is always in command of the classroom. Technology and technology should never be in command. The key role of the teacher is to imagine the collaborative classroom where there is no silence, students need to communicate with one another and share their ideas.

Phase in an e-learning experience:

1. Triggering event/ Dissonance
2. Problem exploration and information gathering
3. Integrating and making sense of this information
4. Resolving the issue by applying the ideas either directly or indirectly

Basic rules in any class:

- Welcome the participants
- Encourage them to discover
- The role of the teacher must be of a facilitator

Lesson 43

CHARACTERISTICS OF AN INNOVATOR

Quotation:

1. **"We shape our tools and thereafter our tools shape us"**

This quotation focuses on the use of smart devices like apple and macintosh. The new generation adopts the new technologies quickly.

2. **"No one has a finer command of language than the person who keeps his mouth shut."**

In the book "The Innovation Secrets of Steve Jobs" it is written that according to a research done by Harvard research, one skill that separates innovators from non-creative professionals is 'associating'. Associating is the ability to successfully connect seemingly unrelated question, problems or ideas from different fields. The more diverse our experience and knowledge is, the more connections the brain can make.

Fresh inputs trigger new associations. For some, these lead to novel ideas. The three year Harvard research project confirms what Steve Jobs told the reporter 15 years later – creativity is just connecting things. Here is what the researchers had to say:

"When you ask creative people how they did something, they feel a little guilty because they did not really do it. They just saw something. It seemed obvious to them after a while. That's because they are able to connect experiences they have had and synthesize new things. And the reason they were able to do that was because they had more experiences or they had thought more about their experiences than other people. A lot of people in our industry have not had very diverse experiences… so they do not have enough dots to connect and they end up with very linear solutions without a broader perspective on the problem. The broader one's understanding of the human experience, the better design we will have."

He has spent a lifetime exploring new and unrelated things – the art of calligraphy, meditation practices in an Indian ashram, the fine details of Mercedes Benz. The three business professors who conducted the research for The Innovator's DNA, which is also a book published in December 2009 (Harvard Business Review), offers an enticing comparison. First they want the reader to imagine that he has an identical twin, then imagine that identical twins have the same brains and natural talents and both have been assigned the task of creating a new business venture.

More on the above quotations:

Three things that emerge from these quotations are:

- First, when innovation takes place, it becomes obvious after a time. After that successful innovation is not questioned. For example, today children of same ages are taught in the same class that was also an innovation in education. As in the past, students in a class were from different ages because all people could not afford education. Now the obvious thing is that all children are divided age-wise in a class. Standardized testing is also another example.
- Use of technology tools does not amuse the old age people. For example, a librarian in a University when asked about digital books, says that even DAWN News is available online but he does not find it excited to read online.

- Todays' generation wants the things to be more rapid as their attention span has decreased. New technologies has made this new generation very fast.
-

Quotation:

Cognitive presence is the heart of an educational experience that is creating and sustaining a community of inquiry where students are engaged in a collaborative and reflective process consists of four phases:

1. Practical inquiry which includes understanding an issue or problem.
2. Searching for relevant information.
3. Connecting and integrating that information.
4. Actually confirming the understanding.

The focus here is managing the process and monitoring the depth of understanding. This involves facilitating and focusing the discourse, providing appropriate insights and information when needed and seeking some common understanding.

Theory also suggests that start the learning with posing a problem. Searching data about the problem can include reading books or surfing on internet. Now at the third step they have to connect all the searched information with the issue or problem.

Lesson 44

TRADITIONAL TEACHING VS. ONLINE LEARNING

In the book *Creating Innovators* the focus on innovators who brought a change in the world in the last 5-10 years. The schooling and the role of parents of these innovators is highlighted in the book.

In Pakistan, all of us have studied in a traditional classroom, and we have accepted it even though real learning hardly ever happened in the traditional classroom. Since feedback is not provided timely in the traditional teaching approach so the learning of each student is only assessed in the exams.

Access to Traditional Classrooms:

- The street smart children who are working in workshops, selling goods at shops etc. do not have access to formal education system and hence are deprived of schooling. There are inbuilt limitations of a traditional classroom.

How can emerging technology replace or improve the traditional classroom:

- Technology can provide instant feedback;
- Technology provides different learning rates;
- With the use of technology, for instance if a tablet is available a virtual class can start anywhere.
- Learning takes place even if the teacher has weaknesses in his teaching skills in a non-traditional classroom where technology is used.

Variables that impact a traditional classroom:

- Pedagogical strategies in the classroom;
- Social interaction between students and the teacher;
- Collaborative learning coupled with enriched social presence.

Importance of Social Presence in an Online Classroom:

The Instructor's Role

The instructor's role is critical to learning, whether it is face-to-face classroom or online. Studies on distance learning advocate that instructor-to-student, and student-to-student (social presence) interaction is a critical component of learning, as it improves the effectiveness of learning as well as learner satisfaction.

Instructor's Issues

The role of the teacher automatically shifts when the physical is replaced by the virtual classroom. The new role of the instructor is "redefined as a facilitator, organizer, and manager". Online teachers need to realize their role in shaping the social aspects of the online classroom. The teacher plays a critical part in establishing social presence for the entire learning community.

Feedback & Time

In order to create a social link between students and the teacher, the teacher must take into account the isolation felt by students when online communication lags. If time frame expectations are not

met, students feel less socially connected in an online learning classroom. Answering email with a shorter turn-around time is pertinent to fostering social presence in the online learning classroom.

Importance of Cognitive Presence in Classroom:

Learning is about mental operations. To get the most out of your online class, think about the different associations and meaning students are developing from the material and the discussions generated during the class. A large gap between what is presented and what is learned means that students aren't cognitively involved in a class, as students may only be superficially interpreting content, thereby missing the overall intent of instruction. The effective delivery of instruction allows students and instructors to maintain cognitive presence within the classroom.

Steps to Create Cognitive Presence:

- Create a triggering event
- Explore the problem
- Integrate new ideas and meanings
- Come to a resolution

Lesson 45

PROBLEMS OF LEARNING THROUGH PEDAGOGY & TECHNOLOGY

In his book, *Stratosphere* Michael Fullen says that to reduce inequality we need to use technology education and low cost resources:

"The problem of inequality is becoming more pronounced and more entrenched decade by decade. Deepening inequality is a societal time bomb. So far, technology has not been our friend because, as I argue in this book, we have not made it our friend".

He predicts that in the near future, the losers will be approximately 90%, corporate profits will be 50% high while the income from labor will be 50% low. In short, there will be an irreversible shift from labour to capital. It is certain that no good can come out of this for the rich or the poor.

The slogan for online learning is: "Double the learning in the classroom, double the students in the classroom and half the cost."

In his book *Creating Innovators* Tony Wegner discusses the characteristics of innovators. He has discussed the life of a Curt Philips who invented IPhone. He was the team lead of Apple innovators. Curt Philips was the eldest child in the family. His education was a challenge for his parents as he changed many institutions. Then he went to Stanford University and the courses there really excited him.

- He wanted to invent something for the betterment of the people.
- He studied computers as he thought that it was not a specialized subject like engineering and he could use it to solve a lot of different problems.

However, he could never see himself wanting to write code for google. Writing a code on a server that no one would ever see or interact with did not really appeal to him. He wanted to create products for people that they could hold and use so he started exploring robotics. For his Master's degree, he took mechanical and electrical engineering classes and found out about embedded system design sequence called Smart Product Design and that was a turning point in his academic career.

Smart Product Design classes taught mechanical engineers, a little bit of electrical engineering and software engineering so that they could build embedded systems. These courses were the longest and hardest in the Stanford engineering program because se the classes required the most dedication.

Curt Philip was excited about these courses because his previous experience in Stanford engineering had been solitary in learning Computer Science. He describes this experience by saying that you go write a code but you could not be any further from the reality of real world engineering. How do I solve a political problem, a social problem and a technical problem all together to deliver something? I had discovered that where I wanted to add value was at the intersection of things.

Being a PHD never appealed to him as he never wanted to spend five years becoming really deep in one area. He wanted to find ways to add value at the margins. What that meant practically in engineering is being an integration engineer. You bring these pieces together to create a product. These classes were great for him because he worked in teams on these multidisciplinary problems that required bringing together a set of tools to create a solution.

Creativity and innovation:

Creativity and innovation are at the heart of a powerful shift occurring in our lives as society is moving from an industrial economy to a knowledge economy (Sawyer 2006; Florida, 2002). Many educators in fields ranging from business to the arts, from the humanities to the sciences, feel the challenge of teaching students to be creative innovators. There is a growing recognition that in order to prepare our students for the demands of 21st century jobs, creative thinking, problem solving, communication, innovation, collaboration and critical thinking skills are as important as academic and technical skills.

Thus at the university level, the challenge of teaching students to be creative and innovative relies on faculty expertise in delineating elements of creativity and innovation as measureable learning outcomes and establishing appropriate assessment measures as higher education moves toward standardized learning outcomes and assessments. This challenge is also an opportunity for faculty to enhance the teaching and learning and the scholarship of teaching creativity and innovation. Creativity and innovation are life long skills and practices that promote not only individuals but also our economy.

How Can We Teach Creativity and Innovation:

1. Design Projects to Bring Out Creativity
2. Create a Culture that Promotes Creativity and Innovation
3. Scaffold for Creativity and Innovation

