Unit-2
Learning theories and educational software/ICT

From 2074/1/3

From 2075/1/7

From 2075/10/29

2076/10/05

Bloom's Taxonomy of learning?

- **Cognitive**: mental skills (*knowledge*)
- **Affective**: growth in feelings or emotional areas (*attitude or self*)
- **Psychomotor**: manual or physical skills (*skills*)

Cognitive Domain

- **Knowledge –.**
- **Comprehension**
- **Application –**
- **Analysis**
- **Synthesis**
- **Evaluation**

Affective Domain

- LEVEL OF EXPERTISE
- PERCEPTION
- SET
- GUIDED RESPONSE
- MECHANISM
- COMPLEX OVERT RESPONSE
- ADAPTATION
- ORGANIZATION

Psychomotor Domain

- **RECEIVING**
- **RESPONDING**
- **VALUING**
- **ORGANIZATION**
- **CHARACTERIZATION BY A VALUE OR VALUE COMPLEX**

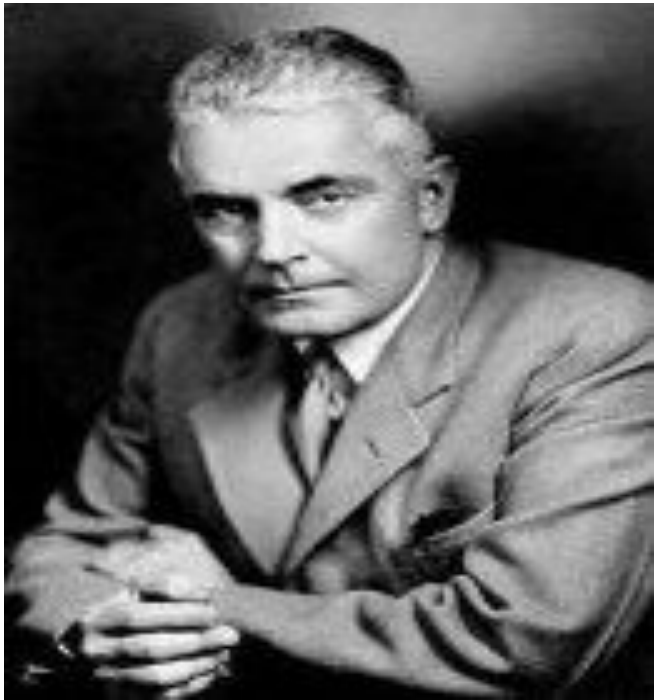
Learning Theories

Learning theories are conceptual guidelines developed by the theories for learning knowledge. There are many such theories but three are common: **Behaviourism, Cognitivism (Mentalism)** and **Constructivism**. These theories are also called behaviourist, cognitivist (mentalist) and constructivist respectively.

Behaviorism

The term "behaviorism" was invented by John Watson (1878–1959). Watson believed the behaviorist view is a purely objective experimental branch of natural science.

John B. Watson



- There are also types of conditioning (such as classical conditioning by Pavlov and Operant Conditioning by B.F. Skinner, etc.)
- In behavior analysis, learning is the acquisition of a new behavior through conditioning and social learning.
- There are three types of conditioning and learning:

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- **Classical conditioning**, where the behavior becomes a reflex response to an antecedent stimulus.
- **Operant conditioning**, where an antecedent stimuli is followed by a consequence of the behavior through a reward (reinforcement) or a punishment.
- **Social learning theory**, Learning occurs through observation

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The behaviorist school sees the mind as a "black box," in the sense that a response to a stimulus can be observed quantitatively, totally ignoring the effect of thought processes occurring in the mind. Early computer learning systems were designed based on a behaviorist approach to learning.

In fact, **Empiricism(Behaviourism)** is the belief in sense perception, induction, and that there are no innate ideas.

Behaviorists claim that it is the observable behavior that indicates whether or not the learner has learned something, and not what is going on in the learner's head. The most applicable principle is Skinner's operant conditioning which states three stage procedures for learning.- Stimulus- Response – Reinforcement (S-R-R).

Some beliefs of the Behaviorism

- We have no source of knowledge other than sense experience so, **behaviorist** says that all knowledge comes from sense **experience**.
- Mind is a blank sheet of paper/ a blank slate (it is gradually filled with experiences).

- Our knowledge is *posteriori (after birth)*, dependent upon sense experience
- According to the Empiricist(**Behaviorism)**, the innate knowledge is unobservable and ineffective; that is, it does not *do* anything. The knowledge may sit there, never being used.
- Induction (inductive method)

Cognitivist

Cognitive theories grew out of Gestalt psychology. Gestalt psychology was developed in Germany in the early 1900s by Wolfgang Kohler . The German word *Gestalt* is roughly equivalent to the English *configuration* or *organization* and emphasizes the whole of human experience.

Gestalt psychologists criticize behaviorists for being **too dependent on overt behavior** (observable behavious) to explain learning. They propose looking at the patterns rather than isolated events.

Cognitive…

Two key assumptions behind this cognitive approach: that the **memory system is an active organized processor of information** and that **prior knowledge plays an important role in learning**.

Cognitive theories look beyond behavior to consider how human memory works to promote learning, and an understanding of short term memory and long term memory is important to educators.

Cognitive…

They view learning as an internal mental process (including insight, information processing, memory and perception) where the educator focuses on building intelligence and cognitive development. The individual learner is more important than the environment.

Two of the key concepts within the cognitivism learning theory which create the new knowledge are accommodation and assimilation.

What is Assimilation

Assimilation is an adaptation process by which new information is taken into the previously existing schema. This is how humans perceive and adapt to new ideas. Here, the learner fits the new idea into what he already knows. For example, a small child may have a schema about a type of animals. The child's only experience with dogs is their pet dog, and he knows that dogs have four legs. One day this child sees another dog. He identifies the new animal as a dog based on his previous knowledge of his dog. Labeling it as a dog is an example of assimilating the animal into the child's dog schema.

What is Accommodation

Accommodation is the process by which pre-existing knowledge is altered in order to fit in the new information. A new schema might be created in this process. This happens when the existing knowledge is not accurate. For example, a child knows that a dog has four legs. When the child sees a horse for the first time, he calls it dog as it has four legs. He fits in the new animal with the existing knowledge; this is assimilation. But an adult points out that it is a horse, not a dog; then the child alters his knowledge that all four-legged animals are not dogs.

Therefore the **main difference** between assimilation and accommodation is that in **assimilation**, **the new idea fits in with the already existing ideas** while, in **accommodation**, **the new idea changes the already existing ideas.**

http://pediaa.com/difference-between-assimilation-and-accommodation/

Assimilation

Saw this four-legged animal for the first time.

Existing Schema: His four-legged pet is a dog.

Child will call this a dog.

Accommodation

Existing Schema: His four-legged pet is a dog.

Someone points out that this is a cat, though it has four legs.

Realises that all four-legged animals are not dogs.

Constructivism

Constructivism is a theory of learning that has roots in both philosophy and psychology. The essential idea of constructivism is that **learners actively construct their own knowledge and meaning from their experiences**. This theory suggests that **learning is an active, constructive process**. The learner is an information constructor. People actively construct or create their own subjective representations of objective reality.

The main contributors in this approach are:

- Lev **Vygotsky** (1896 – 1943)
- Jean **Piaget** (1896 – 1980)
- John **Dewey** (1859 – 1952) etc

Two views on Constructivism

There are two views within constructivist approach of learning. Two cognitive psychologists, Jean Piaget and Lev Vygotsky, developed the same concept in two different ways. In their approaches, there are also similarities and differences.

(A) Individual Constructivism

It is also known as **personal constructivism** or **Cognitive constructivism. This** perspective is based on the work of Swiss **developmental psychologist** Jean Piaget. Piaget's theory includes two major parts, a "**ages and stages**". This theory predicts what children can and cannot understand at different ages. It describes **how children develop cognitive abilities according to ages** (developmental psychology). Piaget states that learning does not occur passively. It occurs by active construction of meaning according to the developmental stages of cognitive abilities.

B) **Social Constructivism**

Russian philosopher and psychologist Vygotsky states that the **process of knowing** (cognitive development) is **affected by other people and is mediated by community and culture**.

An important part of Vygotsky's work (1986) is **critical upon Piaget's contribution** to constructivism. While Piaget believes that development precedes learning (based on development or maturation learning occurs), **Vygotsky believes the opposite**.

Basic Principles (Concepts) of Social Constructivism/Key concepts

Inter-psychological and Intra-psychological levels of construction

The major theme of Vygotsky's theoretical concept is that **social interaction** plays a fundamental role in the **development of cognition**. Vygotsky believed that **everything is learned on two levels**. First, through **interaction with others (Inter-psychological)**, and then **integrated into the individual's mental structure (Intra-psychological)**.

According to Vygotsky, every function in the child's cultural **development appears twice**: first, on the **social level**, and second, on the **individual level**; first, **between people** (inter-psychological) and then **inside the child** (intra-psychological).

In other words, thought develops from society to **the individual** and not the other way.

Constructivism in classromm

Some strategies for classroom applications of constructivism for the teacher include having **students working together** and aiding to **answer one another's questions**.

Another strategy includes designating one student as the "expert" on a subject and having them teach the class. Finally, allowing students to work in groups or pairs and research controversial topics which they must then present to the class.

Learning activities in constructivist settings are characterized by active engagement, inquiry, problem solving, and collaboration with others. Rather than a distributor of knowledge, the teacher is a guide, facilitator, and co-explorer

who encourage learners to question, challenge, and formulate their own ideas, opinions, and conclusions.

Summary

- *Behaviourism* focuses only on the objectively observable aspects of learning.
- *Cognitive* theories look beyond behaviour to explain brain-based learning.
- And *constructivism* views learning as a process in which the learner actively constructs or builds new ideas or concepts.

Constructivism

Constructivism allows students to construct rather than receive knowledge. Based on **collaboration and cooperation**, Constructivist Learning focuses on real problems, creative solutions, transfer, and problem solving.

Technology (simulations, applications software, and multimedia, constructive and informative (useful) software tools) is used to facilitate cognitive skills, emphasize transfer, create group projects and presentations, highlight the contributions and talents of diverse learners, and explore the relationships between data.

Learners use technology (hypertext and hypermedia, bulletin boards, chats, computer-supported intentional learning environments, and computer mediated environments) to gather information, conduct research, communicate,, share documents, and participate in open-ended learning

Technology and Learning Theories

Behaviorism :-

Behaviorism emphasizes memorization and repetition in teacher-centered environments.

1. Use of technology from the behaviorist perspective is traditional classroom practice. In it, the **users are relatively passive.**
2. **The content and interaction between the user and the software are predetermined, and there is a limited collection of acceptable responses (No creativity)**.
3. The acquisition of facts through **repeated practice and rote memory, or learning from the technology**, is the goal of instruction.

Technology is used to solve identified weaknesses, and support practice through tutorials, drill and practice software, online worksheets, and other forms of computer-based learning.

Computer assisted instruction (CAI), integrated learning systems, **drill practice** programs, **computer-based tutoring systems**, and **assessment software are some of the technologies designed based on the behaviorist learning theory**.

Summary of Learning Theories and ICT Tools

Behaviourism	Variety of drill and practice computer-based learning software	For example, CBLs that drill students on multiplication and addition (individual instructive tools)
Cognitivism	Tutorials and information databases	For example, encyclopaedia and Internet resources (informative tools)
Constructivism	Individual generic purpose tools	For example, Excel, Word and PowerPoint, simulations, hypertext and hypermedia, organizational tools (individual constructive tools)
Social constructivism	Collaborative generic environments	For example, e-mails, bulletin boards, knowledge co-construction/exchange forums, computer-mediated collaborative problem solving environments (social communicative/constructive tools)

Evaluation

- How does ICT create interactive class ? Justify logical answer .
- How can we use learning theories in the development of educational software and tools?
- **Why is networking an alternative view of learning? Give your own idea.**
- **How do you use mobile devices in the classroom for teaching learning process ?**

2.2 ICT use for actionable, engaged and interactive learning

Does ICT create interaction in the class ?

ICT in Education means “Teaching and Learning with Interactive Communication Technologies. ICT is not limited to the computers or the internet only. It ranges from the use of FM radio to the use of satellite for communication. A large amount of data, visuals available on any topic can be brought to the classroom from all over the world. That is why ICT has been considered as an emerging area with huge potential for making educational process more interactive and meaningful.

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ICT enhances the teaching-learning process, the quality and accessibility of education, the learning environment, learning motivation and scholastic performance. Through ICT, images can easily be used in teaching and improving the memory of students, teachers can easily explain complex instructions and ensure students' comprehension and create interactive classes and make the lessons more enjoyable, which could improve student concentration, involvement and attendance.

ICT's offer varieties of models in teaching and learning. It is obvious that by the use of CT's, instructors will develop strategies that will promote deep learning and change the learning environment into the learner-centered environment. The impact of ICTs on learning can be approached in various ways to meet the need of learners. ICTs shift in the role of a teacher to that of a facilitator. The use of ICTs offers a platform for student to question, investigation and construction of new information in the process of teaching and learning.

- Activities determined by learners
- Working in teams
- Find new solutions to problems
- Integrating theory and practice
- Student-directed
- Diagnostic

Engaged Learning

What is Engaged Learning?

Engaged learning is the process in which students actively participate in their learning process. The teacher serves as a "coach or facilitator," guiding students to the desired goal.

Engaged Learning is a pedagogical strategy that links classroom learning with community development practices. For students who are learning about the field of information and communication technology for development (ICTD), engaged learning can be an effective approach to provide them with practical experiences in helping local communities through ICT-based innovation.

ICT has a positive motivational impact on the following learning processes:

- engagement
- research
- writing and editing
- presentation
- Through improving motivation, ICT impacted on the quality of pupils work. ICT needs to be used to support subject learning, that is, to impact on pupils
- There was evidence that ICT impacted positively on pupils attitudes towards and engagement with their school work and some evidence from pupils and school staff that behavior in class was better when ICT was used.

Learning through networking - alternative view of learning

Networked learning is a process of developing and maintaining connections with people and information, and communicating in such a way so as to support one another's learning. The central term in this definition is connections. It takes a relational position in which learning takes place both in relation to others and in relation to learning resources.

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Social networking sites (SNSs) have the potential to facilitate interaction, communication, and collaboration.

Social networking sites are educational tools because students can use them for communication and social support as well as for discovering and sharing knowledge. However, because of their advantages in communication, these social networking sites have a huge potential for education. This subject is under debate and under study in different countries and cultures, and input is needed from various perspectives.

In general, the social networks sites provide users with a private virtual space where each one could build his own public profile and manage a list of links to other users' profile.

Facebook (facebook.com)

Founded in 2004 by Mark Zuckerberg, this social network site was formerly named the facebook.com and was designed as a closed online social network, available only for Harvard University staff and students. Subsequently, network access has been extended to other universities and companies like Apple or Microsoft. Since 2006, Facebook provides free access regardless the membership in a university or company.

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Users can look up for their friends from around the world and can build their own profile that can be public or private. The profile could be changed at user will or, public profiles could be blocked by the administrators. Each user is allowed to post messages or photos which, also, could be public or could be addressed to a specific group or users. More recently, Facebook also provide different types of games for the users' entertainment.

Con…

There are two approaches:

(a) Learning for using Facebook

(b) Using Facebook for learning

Possible uses of facebook in education

There are many possible uses of Facebook in education, some authors (Onlinecollege.org, 2009) stating about 100 ways to use Facebook in the classroom, in order to provide value to the educational process. The main features which recommend Facebook as a valuable tool which could be used in education are:

Con…

- ♣♣Exchanging information through links, photos or multimedia content related to specific subjects;
- ♣Creating surveys and quantifying the feedback
- ♣Using the on line chat for direct communication between students and teachers.
- ♣Publishing news on tests, exams or face to face meetings.
- ♣Integrating Facebook with other collaborative services provided by other application (like Google docs).
- ♣Using Facebook as a complement for an eLearning platform

Twitter (twitter.com)

Twitter is a micro blogging service based on WEB 2.0 technology. The main characteristic of Twitter is the feature of transmitting short messages like SMS, up to140 characters. Formerly, many users considered Twitter an alternative SMS service in the Internet. Being two years younger than Facebook, Twitter is online since 2006 at www.twitter.com In the online community, the short messages transmitted through twitter are known as “tweets” and the users of Twitter “tweeters”. In order to transmita message, a user could directly access the twitter web site

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Several mobile phone operators from different countries allow the transmission of messages on Twitter network through SMS, using your mobile phone.

The base concept for Twitter is to allow the users to publish their own notes on a personal Twitter account and, in the same time, to let them read messages posted by other users on their accounts. Each person could define a custom list of Twitter users and is allowed to follow notes posted by these people.

Twitter for micro blogging is used nowadays in many activities:

Publishing news: by newspapers or media agencies. There are several TV stations (like CNN or PROTV) which publish the latest news on Twitter, allowing users to be informed in the shortest time via mobile phone notifications.

Promoting blogs: Many Twitter users have personal blogs and are using Twitter in order to promote their activity on a personal blog and to attract new visitors.

Promoting political activities: In recent years Twitter started being used extensively for political action: elections, protests (complains), etc. There are countries where large protests were coordinated on Twitter, when local authorities tried to censor the calls to protests in local media.

ICT can create actionable learning and teaching situation

The actionable learning framework for capacity building is directed toward improving human performance. It does so by adopting a systems perspective on human performance improvement and establishing adaptive learning, as both the goal and means of change.

Stanford doctoral candidate Molly B. Zielezinski and her colleagues provide five Actionable Tips for improving the quality and effectiveness of technology implementation in low-income schools.

Actionable tip #1: Technology for remediation

Students enrolled in low-income rural and urban districts are more likely to use technology for **remedial purposes**. Teachers as well as students, should be using Web 2.0 technologies for authentic tasks. Teachers and students can use the following methods for learning purpose:

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Actionable tip #2: Let students create original digital content.

Educreations: Educreations is a powerful presentation tool. Educreations is an iPad app that functions like a recordable whiteboard. Because it captures voice and handwriting and also allows the user to upload pictures to create interactive lessons and stories,

Scratch: Scratch is a program that introduces visual, block-style computer coding. This free website allows students to create games and stories through the use of visual block style coding.

Piktochart . : Piktochart is a free easy to use website that allows users to create info-graphs. Piktochart can be used in any learning activity that requires students to respond to a question or topic.

Actionable tip #3: Pick digital tools that promote interactivity and discovery.

Atmosphere Design Lab: This website is an interactive way for students to learn about the different types of gases that make up the atmosphere.

Duo lingo: Duolingo is a free language-learning platform that includes a language-learning website and app.

Actionable tip #3: Honor students as experts, and let them share their expertise with an authentic audience. विद्यार्थीहरूलाई विशेषज्ञहरूको रूपमा सम्मान गर्नुहोस्, र उनीहरूलाई उनीहरूको विशेषज्ञता एक प्रामाणिक दर्शकसँग साझेदारी गर्न दिनुहोस्।

- Students have noteworthy knowledge and information that they are capable of sharing with authentic audiences.
- **YouTube** is a video hosting website where users can enjoy the videos and music, upload original content, and share it all with friends, family, and the world. Users can create their own channels to house their videos and create playlists. However, be careful on the age restrictions--users should be 13 years old. Youtube links with google accounts. It would be useful have students post the video as either private or can only be accessed with link if you have privacy concerns.

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Aurasma: Aurasma is a free app for OS and Android devices that uses advanced imaging recognition to blend the real-world with rich interactive content such as videos and animations, called "Auras".

Museum Box: Museum Box, is a site that provides the tools for students to build up an argument or description of an event, person or historical period.

Actionable tip #4: Find the right blend of teacher and technology. शिक्षक र प्रविधिको सही मिश्रण फेला पार्नुहोस्।

Technology should not replace the teacher but rather assist the teacher in the classroom. Teachers play a critical role in maintaining a blended(merged) learning environment. we know that students do the best when they are able to work with peers and feel supported by their teacher. In the blend learning environment, students need to receive immediate digital feedback from their teachers.

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Google Docs

Google docs are an online, collaborative tool where an individual can create word documents.

Google docs are useful because they are word documents that can be accessed from anywhere since they are online. Google docs are collaborative as multiple people are able to view, edit, and comment on a document at the same time.