Module for B.Ed Early Childhood Education Programme

EBS217SW:
DESIGNING INSTRUCTIONAL MATERIALS USING ICT TOOLS

DR. ROSEMARY TWUM

IoE/MoF/TUC/GHANA CARES TRAINING AND RETRAINING

PROGRAMME FOR PRIVATE SCHOOL TEACHERS

Ministry of Finance   Trade Union Congress   University of Cape Coast

DECEMBER, 2022

TABLE OF CONTENT

CONTENT   **PAGE**

UNIT 1:   INTRODUCTION TO LEARNING BY DESIGN

This unit would discuss the terminologies learning by design, teacher design teams and interactive lectures. The principles in designing activities would also be discussed. This unit will also expose you to basic information and definitions of instructional design and instructional design models. Its main aim is to provide you with professional knowledge on aspects of how to design instructional materials.

Learning outcome(s)

By the end of the unit, the participant will be able to:
1. Define *learning by design*
2. State any three characteristics of learning by design
3. Explain what is meant by *teacher design teams*
4. State at least five principles in designing activities
5. Define *interactive lectures*
6. Discuss *instructional design*
7. Describe the ADDIE model
8. Discuss different models of instructional design

SESSION 1: LEARNING BY DESIGN

In this session, we will focus on learning by design. In addition, we will look at explaining teacher design teams. Interactive lectures and principles in designing activities would also be described.

Learning outcome(s)

By the end of the session, the participant will be able to:
1.   discuss *learning by design*
2.   explain what is meant by *teacher design teams*
3.   state at least three principles in designing activities
4.   define *interactive lectures*

Meaning of Learning by Design

The concept of learning by design signals a shift away from focusing on the teacher and the instructional process to concentrating on the learner and the learning processes. Learning by design is a project-based inquiry approach to address the emerging needs of learners. It has roots in case based reasoning and problem-based learning. Learning by design emerged from the constructionist theory that emphasizes the value of learning through creating, programming, or participating in other forms of designing. The design process creates a rich context for learning. Learning by design keeps you focused, and it provides the necessary steps to provide good quality instruction from the beginning of the process, through development, design, implementation and finally when you evaluate the project overall. Learning by design is an educational approach that causes students to deeply learn concepts and skills along with learning cognitive, social and communicative skills. This approach encourages students to be successful thinkers, learners and decision-makers. In whole-class discussions, the teacher assists students to compare and contrast their ideas, identify what they need to learn in order to address the design challenge, choose a learning issue to focus on and designing an

activity to examine that issue. This discussion provides an opportunity for teachers to identify students; misunderstandings and misconceptions and then begin the process of supporting those. The teacher presents demonstrations, assigns readings and/or presents short lessons relevant to discovered knowledge gaps. Learning by design involves the following:

- They focus on a problem of practice.
- Seek ways to use technology (and thereby learn about technology) to address the problem.
- Their exploration about technology is tied to their attempts to solve educational problems.
- Being designers to technology not passive users.
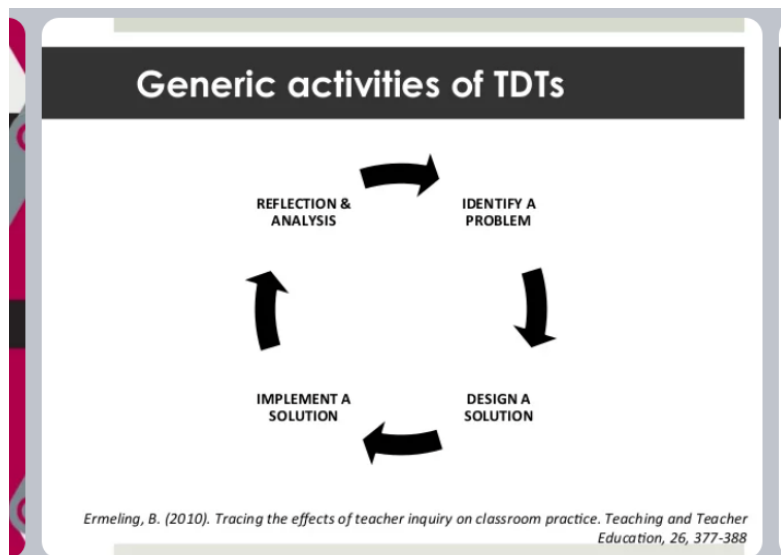
Characteristics of Learning by Design
- Design is not something that can be taught by teacher and demonstration-it is best learned by experiencing it
- Design is for a purpose
- Design is iterative
- Design is complex
- Design is eclectic

Meaning of Teacher Design Teams
Teacher design teams can be defined as a group of individuals (two or more teachers from the same or related subjects) working collaboratively on a regular basis to design and develop ICT- based solutions to authentic pedagogical problems. Teachers developing their own practice and enacting/using it within their classroom allow them to have a sense of ownership of product.

Teacher design team promotes:
- **Active learning** (learn by doing, learn through problem solving processes)
- **Local ownership** (not just a consumer of technology)
- **Collaboration** (learn/teach each other, focus on practical problem from different perspectives)
- **Sensitive** to their subject matter and instructional goal

Generic activities of TDTs

REFLECTION & ANALYSIS → IDENTIFY A PROBLEM → DESIGN A SOLUTION → IMPLEMENT A SOLUTION

Ermeling, B. (2010). Tracing the effects of teacher inquiry on classroom practice. *Teaching and Teacher Education, 26,* 377-388

Components of Designing of activities

According to Thiagi (2006), for effective instruction to take place, three components need to be present. These are:

1. Content related to the instructional objectives
2. Activities that require learners to process the content and to provide a response
3. Feedback to learners to provide reinforcement for desirable responses and remediation for undesirable responses

Therefore, it is necessary to rethink the use of lecture-presentations. While a lecture is a valid form of instruction, it does not necessarily lead to deep learning because it positions the participants as passive recipients of information. This is the case where the students only learns facts. For a lecture to be effective, it must first of all be the most appropriate means for achieving the learning outcomes. In addition, the lecturer has to be not only knowledgeable about the subject matter but also engaging and motivating. And the lecture must be done in an interactive way, or in combination with short participatory activities. This should be done irrespective of mode of delivery, be it elearning, face-to-face, etc.

Principles of designing learning activities

1. Integrate content and activity to focus on key content and foster active learning.
2. Design and implement activities that help learners to master the content and strengthen their critical thinking, creativity, problem-solving and decision-making skills.
3. Be guided by your target learning outcomes. Choose content and learning activities according to the target learning outcomes.
4. Engage in authentic learning: Use real-life examples and simulations of real-life activities, such as making an assessment, analyzing a problem, identifying solutions, and making a proposal.
5. Help participants build on prior knowledge and professional experience and make connections between these and the training content. Design activities to get participants with varied levels of experience and expertise on the topic.

Meaning of Interactive lectures

Interactive lectures include at least one opportunity for students to interact actively and directly with the material through a specific learning task. These can be brief segments within a larger lecture-based class period and can include a single repeated technique or a mix of several different ones. It fosters active learning by getting learners to engage with the content by answering a question, interpreting a case or situation, or solving a problem.

The activities are designed to allow everyone to participate, and increase their chances of retaining what they are learning through immediate practice.

For instructors or lecturers, the activities provide feedback on the level and extent of understanding of the topic. How do we make lectures interactive?

Making lectures interactive

1. Adjust your goals for class time and be clear about those goals with students
   The teachers' mastery of subject matter takes on a more strategic benefit: using class-time to evaluate student' needs at that time. With this knowledge, you can tailor the information that you deliver in class and students will gain deeper understanding of the material.

2. Break your lectures into 15 to 20 minutes mini-lectures
   Breaking up your lectures into 'content bursts' or 'mini lectures' allow the space for student interaction and processing ideas. This should especially be used on key concepts that would be difficult for students to research on their own.

3. Add student interaction and inquiry in between your mini-lectures.
   Moments of student interaction provides teachers with actionable feedback on what students understood from the content burst as well as to help you identify which topics you will want to follow up on or reproach. Students benefit from peer interactions that allow them to practice applying their new concepts and skills in real time.

Ways to get students interacting with lectures

- Have students asks questions about their muddiest points.
  Prompt students to write a question about their most confusing points from the readings. Gather all the questions they have and address them.

- Break students into groups to discuss
  Pair students and have them share their curiosities.

- Ask students to decide on the most important things to decide
  Include students' ideas in your mini-lecture. Start with what they think is most important.

- Use class time for discussion
  Have a short discussion on lecture at beginning of class, then use the lass to solve any problem students may have.

Key ideas
- Learning by design is a project-based inquiry approach to address the emerging needs of learners.
- Teacher design teams can be defined as a group of individuals working collaboratively to design and develop ICT- based solutions to authentic pedagogical problems faced by teachers.
- Interactive lectures fosters active learning by getting learners to engage with the content by answering a question, interpreting a case or situation, or solving a problem.

Reflection
- What are some of the experiences you have had with teacher design teams at your school? How have these experiences prepared you as a professional teacher?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
1. Read the article: Koehler, M.J. & Mishra, P. (2005). Teachers Learning Technology by Design. *Journal of Computing in Teaching Education, (21)3*. https://files.eric.ed.gov/fulltext/EJ882473.pdf

   After reading the article, discuss the following questions with your colleague peers.
   a) Identify the problem in each of the three examples.
   b) How was the problem solved? Do you agree with how the problem was solved? If no, what would you do differently?
   c) What were the similarities in all the examples?
2. Describe a time during your profession as a teacher when your school developed a teacher design team. What was the main purpose for creating the team? What was the problem? How did you solve the problem? How did this opportunity enhance your professional development?
3. As a teacher, how were you making your lectures interactive?

SESSION 2: INSTRUCTIONAL DESIGN

As a teacher, have you ever designed a few things to be used in your teaching? Probably, yes. Nevertheless, you may have done it without following certain steps in instruction or following certain instructional designs. But, do not worry if you have been doing it wrong all this while. Now, you get an opportunity to learn to design materials the right way so that they are properly designed to enhance our teaching. In this session, we will look at the definition of instructional design. How instructional design assist educators would be discussed. We would also look at the basic steps of instructional design as well as explain the characteristics of instructional design.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define instructional design in their own words.
b.   State ways in which instructional design assist educators.
c.   Identify the basic steps of instructional design.
d.   Identify the characteristics of instructional design.

Meaning of instructional design

Instructional design can be defined as "the systematic process of translating principles of learning and instruction into plans for instructional materials and activities (Wulfrek and Ellis, 1983). In short, instructional design is the process by which learning products and experiences are designed, developed, and delivered. Siemens (2002) cites instructional design as "a system or process of organizing learning resources to ensure learners achieve established learning outcomes". He suggests that it is both a framework for learning and a quality process that helps to ensure the effective presentation of content and aids in supporting learner interaction. According to Kurt (2017), instructional design can be defined as a process, discipline, science, or reality.

Instructional design as a process

It is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities and try-out and evaluation of all instruction and learner activities.

Instructional design as a discipline

Instructional design is that branch of knowledge concerned with research and theory about instructional strategies and the process for developing and implementing those strategies.

Instructional design as a science

Instructional design is the science of creating detailed specifications for the development, implementation, evaluation and maintenance of situations that facilitate the learning of both large and small units of subject matter at levels of complexity.

Instructional design as a reality

ID can start at any point in the design process. Often a glimmer of an idea is developed to give the core of an instruction situation. By the time the entire process is done the designer looks back and she or he checks so that all parts of the 'science' have been taken into account. Then the entire process is written up as if it occurred in a systematic fashion.

According to Mager (1984), the goal of instructional design is to answer three major questions:
1. Where are we going? (What are the goals of the instruction?)
2. How will we get there? (What is the instructional strategy and the instructional medium?)
3. How will we know when we have arrived? (What should our tests look like? How will we evaluate and revise the instructional materials?)

Who is an instructional designer?

Instructional designers are the 'architects' of the learning experience and the 'directors' of the Instructional Systems Design (ISD) process. An instructional designer is somebody who applies a systematic methodology based on instructional theory to create content for learning events. An instructional designer works with subject matter experts (i.e., instructors), designing and implementing the best teaching strategies and assessment tools to achieve target outcomes. Instructors provide the content knowledge, and instructional designers provide the advice, tools and best practices.

Ways in which instructional design assist educators

Improve delivery of instruction

It is cost effective, given that it ensues students learn efficiently by creating high quality learning materials that take into account the strengths and weaknesses of students. These materials are also focused and customized to address the specific needs of educators. Teachers may use many interactive elements on the platform- videos, audios, short stories, interactive graphics, workbooks, discussion boards, PDF handouts and more.

Creation of effective and meaningful lessons

Adding instructional design to your process helps you create the interactive learning environment learners crave. By bringing the important information to the forefront and presenting it to the learner in an order that makes sense to them, your lessons will be more efficient.

Assist students in making sense of information

Instructional design takes students deep into content and takes into consideration their learning. Instructional Design encourages learner-centered activities and activity-oriented planning.

Makes learning engaging

If you want to teach someone to make chocolate, you can simply list the different steps to effectively communicate the process. However, that approach won't engage learners in a way that helps them internalize the information. Wouldn't it be more fun and effective to reframe those steps into an activity that lets you explore chocolate-making and learn from your missteps? Creating more engaging lessons will ensure learners actually pay attention and retain the new knowledge or skills they learn. Instructional Design focuses on the learner's experience, and on how to make it stimulating, memorable, and true-to-life.

Effective lessons help students cut through extraneous information

Information is easy to access. But there's a difference between accessing info and understanding it in a way that helps you improve teaching. When you learn something on your own, with little or no instruction, you spend a lot of time sifting through extraneous information. Wouldn't it be easier if someone did that for you, so you could skip ahead to the important stuff? Instructional designers help streamline and structure information in a way that makes it easy to learn and incorporate into your day-to-day life.

Steps in instructional design

Since, instructional design is a process, there are steps that need to be followed.
There are six basic steps in instructional design:
1. Analyze your learners and the learning context.
2. Define your learning outcomes (knowledge-attitudes-skills).
3. Structure the learning content.
4. Select the learning materials or resources.
5. Design the learning activities.

6. Determine the modes of assessment.

A systematic process of Instructional Design enables an educator to:
- Identify the performance problem
- Determine the goals and objectives
- Define your learners and their needs
- Develop strategies to meet needs and goals
- Assess learning outcomes
- Evaluate if goals, objectives and needs are met

In performing each step, an instructional designer seeks to answer the following basic questions:
1. Who are our learners? What do they already know and how do they learn best?
2. What do we want our learners to learn? Why?
3. How do we structure the learning to achieve our learning objectives?
4. What learning resources are appropriate, effective, and available?
5. What strategies will we use to ensure that effective learning takes place? What combination of activities will enable the learners to achieve the learning objectives?
6. How do we know whether the learners are learning/have learned what they are supposed to learn? How do we assess learning?

Characteristics of Instructional Design
According to Branch and Merrill (2002), there are characteristics that should be present in all instructional design models:

1. Instructional design is learner centered: Learner and his/her performance are the focal point.
2. Instructional design is goal oriented: Well defined goals are essential.
3. Instructional design focusses on real world performance. Help learners perform the behaviors that will be expected of them in the real world.
4. Instructional design focusses on outcomes that can be measured in a reliable and valid way. Creating valid and reliable measurement instrument is essential.
5. Instructional design is empirical. Data are the heart of the process.
6. Instructional design typically is a team effort. This process usually involves teamwork.

Principles of Instructional Design

Helping Learners Acquire, Retain, and Transfer New Knowledge and Skills
A number of approaches can help learners retain what they learn and transfer it to new situations. This is especially important for ensuring that new concepts are absorbed.

Choose the appropriate level of difficulty
Selection of learning goals, materials, and tasks should be sensitive to what the student has mastered and be appropriately challenging—not too easy or too difficult. Consider a text used to help students learn about a computer troubleshooting procedure: If the text is extremely easy and overlaps perfectly with what the learners already know, then it will not stretch their knowledge beyond what they already knew without it. Neither will the adults gain much knowledge if the text is too complex and with technical jargon beyond their understanding. Learners need to be engaged with new and meaningful

content, but they also need to practice and further develop the skills they have already begun to acquire.

Present material in a clear and organized format
Learners benefit from a clear and organized presentation that helps them remember new information. It is important to remove any irrelevant information, even if it is interesting, that could compete for the learner's attention and detract from learning. Visual displays that are hard to read or spoken presentations given in noisy environments can compromise learning because they draw attention away from deeper processing of meaning. Providing structure and organization is important to help learners understand concepts and how they relate to each other. In addition, new material should be presented in bits so that new learners are not overwhelmed with too much new information at once.

Use multiple and varied examples and formats
If knowledge, skills, and strategies are acquired in multiple and varied contexts, learners can better apply the knowledge across a range of tasks and situations. Memories can be triggered by multiple cues, so that knowledge is available when needed. Learners may acquire knowledge more slowly this way, but retain and transfer it better than if they had learned it in only one context. But, remember the amount of information should not overwhelm the learner to the point of attention being split or cognitive capacities being overloaded.

Space presentations of new material across time
It is better to distribute the presentation of materials and tests over time than to concentrate the learning experiences within a short time span. It is better to space the same amount of study over days or weeks than to cram it into a single study session. Re-exposure to course material after a delay often markedly increases the amount of information that a student remembers.

Test on multiple occasions, preferably with spacing
There is substantial evidence that periodic testing helps learning and slows down forgetting. Regular quizzes, which can be quite brief and embedded in instructional materials, keep students constantly engaged. Quiz results can guide teachers in making decisions about what to teach. Students benefit more from repeated testing when they expect to need to use the tested knowledge or remember it for some reason—for example, for a final exam. Spacing tasks that make students retrieve information, such as tests, over time has been shown to improve learning.

Ground concepts in concrete experiences
It is important to link concepts that learners read or learn about to concrete perceptions and actions. For example, while reading instructions on assembling a piece of furniture, it helps to be able to view and hold the parts to which the instructions refer. New knowledge is built on existing knowledge and interpreted in light of it, and much existing knowledge comes from everyday activities. Stories are usually about everyday experiences and create memories similar to daily experience, and stories are easier to read, comprehend, and remember than other types of learning materials. As a result, they may be powerful tools for building and practicing comprehension skills and developing and reinforcing background knowledge across the lifespan. At the same time, genres other than narratives tend to be underused in literacy instruction, and literacy does require the ability to handle a variety of texts; students will need to practice these other forms as well.

Supporting Learners in Generating Content and Reasoning

Many learners are simultaneously learning to read and reading to learn. They need both to develop comprehension skills and engage deeply with subject-matter content. Learners should not simply be passive processors of material delivered to them; they should think actively about what they read and also generate their own reasoning as well as content. Learning of subject matter is enhanced when learners have to organize the information themselves and exert cognitive effort to acquire or retrieve it. Simply put, it is the student who should be doing the acting, thinking, talking, reading, and writing in order to learn. Encouraging learners to engage in deeper levels of thinking and reasoning is helpful. Learners need to develop these skills for education, work, and other purposes involving complex materials and tasks.

Encourage the learner to generate content

Learning is enhanced when learners produce answers themselves instead of reading or recognizing them. Learner-generated content can lack detail and contain misconceptions; instructors should monitor the content to ensure that students are learning enough and that they avoid learning incorrect information. Strategies that require learners to be actively engaged with reading material also produce better comprehension and retention over the long term. For example, learners can develop their own mini-testing situations as they review material. They benefit from generating content to improve learning that is rich, elaborative, and distinctive if they are learning in a field outside their previous knowledge and experience; these learners may need more support.

Encourage learners to generate explanations and resolve contradictions

Learning is facilitated when students need to construct explanations and arguments. Offering explanations—for example, the cause of an event, the rationale for an action, or the logic underlying a claim—helps students bring coherence to the material they read and understand why what they are reading is relevant and important. Students may be prompted to give their own explanations of the material by thinking aloud, or by answering questions that elicit explanations connecting the material to what they already know. Explanations of material and reasoning are elicited by deep questions—such as why, how, what-if, and what-if not—as opposed to shallow questions that require the learner to simply fill in missing words, such as who, what, where, and when. Training students to ask deep questions aids their comprehension of material from electronic media, extended texts, and classroom lectures. Presenting a challenging problem before students read a text can stimulate inquiry, curiosity, thinking, and deeper learning as they work to comprehend the text. Encourage the learner to construct ideas from multiple points of view and different perspectives. This approach can help learners develop greater understanding and cognitive flexibility in using a concept in a range of contexts. If a concept is understood in only a specific and rigid manner, it will be encoded, accessed, and used in a restricted way. When interventions help learners interconnect facts, rules, skills, procedures, plans, and deep conceptual principles, their cognitive flexibility increases, and they are more able to transfer knowledge and skills to other complex tasks.

Developing Metacognition and Self-Directed Learning

Learners who achieve expertise tend to be self-regulated: they formulate learning goals, track progress on these goals, identify gaps in their own knowledge, and search relevant information sources for answers; their "meta" knowledge of how and when to employ learning strategies is well developed. However, both explicit training, modelling, and guided practice are needed to help learners become more self-directed.

Structure instruction to develop effective use of complex learning strategies

Students can acquire complex learning strategies through instruction that is structured, explicit, intensive, and "scaffolded." Scaffolding means sequencing and structuring the content and tasks to be learned and providing the prompts that help a learner to develop a new skill. The instruction typically goes from simple to complex, with substantial practice at each step. Supports for learning are gradually phased out as learners develop new skills and become able to complete tasks on their own. For example, students might learn to solve mathematical problems by observing experts solve example problems step-by-step, or by alternating study of worked-example solutions with practice solving similar problems. Students learn more through these approaches than by simply attempting to solve problems on their own.

Combine instruction in complex learning strategies with learning of content

Strategy instruction should be deeply integrated with subject-matter content rather than being lists of abstract rules or scripted procedures that ignore the content. For example, it is a good strategy for readers to be asking the question "why" when reading texts because it encourages the student to build explanations of the content. This strategy is ideally implemented across the curriculum, so that students ask questions.

Providing accurate and timely feedback helps learning

Feedback helps learners modify their knowledge, skills, and strategies, affecting learning in a number of ways. It can be delivered by people or computers. Learners benefit from instructional interactions in which they receive feedback detailed and specific to the task at hand. The optimal timing of the feedback depends on the task. Immediate feedback has the advantage of helping students learn correct information instead of incorrect information. These effects can be reduced when learners receive feedback immediately after a test or while completing a task. However, a learner's motivation can be threatened by many incorrect responses and negative feedback. Feedback offered too soon also can prevent students from correcting their own reading errors and regulating their own learning.

Qualitative feedback is better for learning than test scores

Feedback should explain what's good about the student's performance, point out errors to the learner, and explain why the information is incorrect, rather than providing an overall score that does not offer information about needed improvements.

Using Adaptive, Interactive Learning Environments

Training in complex strategies, metacognition, and self-regulated learning may to some extent be accomplished by well-engineered training materials that guide all learners through the same regimen in a scripted fashion. However, students often need to be guided by knowledgeable tutors, mentors, and computer learning environments that adaptively interact in a way that is sensitive to the characteristics of the individual learner, especially as they encounter complex material. Indeed, research has shown learning gains through intelligent tutoring systems that adapt to the learner. Computer environments have promise because of the complexity of assessing and teaching to the needs of individual learners.

Learning is enhanced by opportunities to practice and use skills for a purpose

Real-world learning is likely to motivate learners who are sensitive to the value of their learning experience. And research on learning has shown that the likelihood of transferring a newly learned skill to a new task depends on the similarity between the new task and tasks used for learning. As a result, instruction is most likely to lead to durable, transferable learning if it incorporates real-world activities, tools, and tasks.

Key ideas
- Instructional design can be defined as the systematic process of translating principles of learning and instruction into plans for instructional materials and activities.
- There are many ways in which instructional design assist educators
- There are six basic steps in instructional design.
- There are many principles in instructional design.

Reflection
- Take a few minutes to think about why instructional design is important in teaching and learning, and consider how instructional design can be implemented within your classroom.
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
As a teacher you have developed instructional materials. What steps did you follow in designing your materials? Which of the principles did you use when designing your instructional material?

SESSION 3: INSTRUCTIONAL MODELS I

This session will be reviewing instructional design models similar to the previous session. However, more detailed information about each model will be discussed. The focus of this session will be on the various instructional design models. This session includes the definition of instructional design models. The ADDIE Model is described in this session. The process of prototyping and rapid prototyping is discussed.

Learning outcome(s)

By the end of the session, the participant will be able to:
a.   Define instructional design model
  b.   Describe the ADDIE model.
  c.   Explain the process involved in Prototyping.
 d.   Define rapid protyping.

Meaning of Instructional Design Model

An instructional design model is a tool, a framework to develop instructional materials. It is the practice of creating "instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing." The process consists broadly of determining the state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition. The outcome of this instruction may be directly observable and scientifically

measured or completely hidden and assumed. It helps instructional designers provide a structure and meaning to the learning material. It allows them visualize the training need and break down the process of designing training material into steps. An instructional design model is based on pedagogical scenarios. The only aim is to achieve instructional goals, so trainees can gain knowledge and then retain it. So, when instructional designers need to determine the exact steps of their training procedure, they turn to instructional design models. These models provide guidelines to ensure training addresses the learning objectives and meets the desired expectations. Instructional design models provide guidance on the processes that should be followed when designing instruction. They offer systematic steps to follow, and serve as a blueprint for developing and delivering instructional materials. Instructional design models help educators to make sense of abstract learning theories and provide a common language and guiding tool for course design. There are a wide variety of instructional design models available that suggest different approaches to the design and development of instruction.

ADDIE MODEL

The ADDIE model is one of the most common models used in instructional design as a guide to producing effective instructional materials. The ADDIE model is generic process traditionally used by training developers and instructional designers to plan and create effective learning experiences. Addie is an acronym for the five stages of a development process: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model relies on each stage being done in the given order but with a focus on reflection and iteration. The model gives you a streamlined, focused approach that provides feedback for continuous improvement. The five represent a dynamic, flexible guideline for building effective training and performance support tools. This model attempts to save time and money by catching problems while they are still easy to fix.
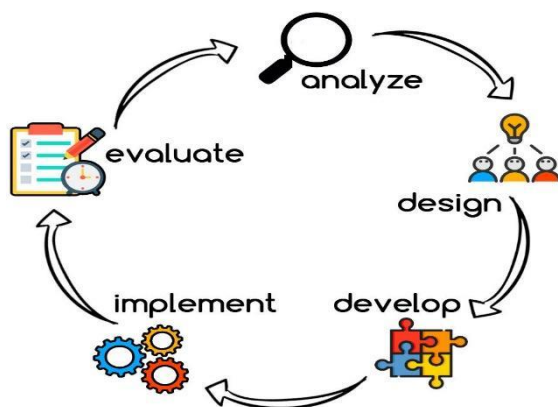
A= Analysis

In the analysis phase, the instructional problem is clarified, the instructional goals and objectives are established, and the learning environment and learner's existing knowledge and skills are identified.

Below are six questions needed to be address during the analysis phase:
- Who is going to receive your training? (Analyze your trainees)
- What will your training be? (The context of your training)
- When is it going to happen? (Set a time-frame right off the bat)
- Where is it going to happen? (Will you deliver it online or in a classroom?)
- Why are you doing this? (The objectives of your training)

- How are you going to achieve this? (The methodology and the requirements)

If you have a clear answer to each one of these questions as well as a general analysis of the current situation, then you have completed both your plan and the very first step. Let's move on!

D= Design
The design phase deals with learning objectives, assessment instruments, exercises, content, subject matter analysis, lesson planning and media selection. The design phase should be systematic and specific.

- Systematic means a logical, orderly method of identifying, developing and evaluating a set of planned strategies targeted for attaining the project's goals.
- Specific means each element of the instructional design plan needs to be executed with attention to details.

These are steps involved in design phase:
- Document the project's instructional, visual and technical design strategy
- Apply instructional strategies according to the intended behavioral outcomes by domain (cognitive, affective, and psychomotor).
- Design the user interface and/or user experience
- Create prototype
- Apply visual design (graphic design)

D=Development
Development of instruction
- Generate lesson plans (different from lesson planning) and lesson materials. Instructional designers and developers create and assemble the content assets that were blueprinted in the design phase.
- Complete all media & materials for instruction, and supporting documents.
- End result is a course or workshop ready for delivery. The project is reviewed and revised according to the feedback received.

I=Implementation
The delivery of the instruction.
- Purpose is effective & efficient delivery of instruction.
o The teachers should cover the course curriculum, learning outcomes, method of delivery, and testing procedures.
- Promote students' understanding of material & objectives, and ensure transfer of knowledge.
o Preparation of the learners includes teaching them on new tools (software or hardware).

E=Evaluation
This phase measures the effectiveness and efficiency of the instruction. Evaluation should actually occur throughout the entire instructional design process - within phases, between phases, and after implementation. Evaluation may be Formative or Summative.

- Formative Evaluation is ongoing during and between phases. The purpose of this type of evaluation is to improve the instruction before the final version is implemented.
- Summative Evaluation usually occurs after the final version of instruction is implemented. This type of evaluation assesses the overall effectiveness of the instruction. Data from the Summative Evaluation is often used to make a decision about the instruction (such as whether to purchase an instructional package or continue/discontinue instruction).

Meaning of Prototype

A prototype is a partial realization of a product constructed for the purpose of testing one or another characteristic of the design. Using prototypes to test products in the early stages of development is far less expensive than waiting until a great deal of time and energy is invested in the finished product: design flaws can be diagnosed and remedied early on; new ideas can be tried and either scrapped or fine-tuned before they must be replicated on a large scale.
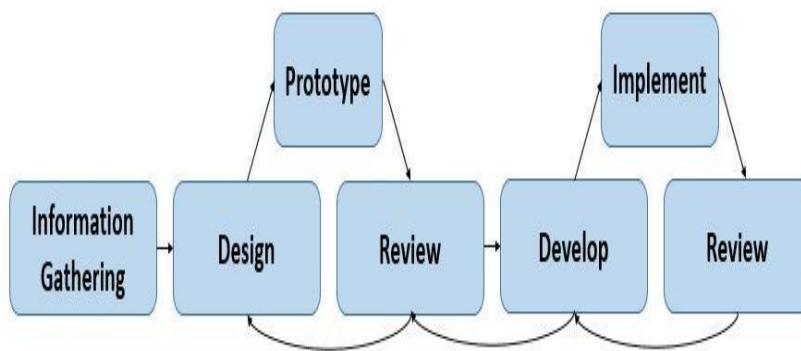

Here's the conventional three-step process of creating an effective prototype:
- Creating the Prototype: This is the stage where you create the mock-ups based on the learning needs of your audience, the instructional strategy decided beforehand, and the technical scope of the project.
- Reviewing: This is the stage where your clients and/or the end-users step in to have the first peek. They review the prototype for functionality and usability. This stage comes quite early in the developmental phase.
- Refining: This is your chance to make slight tweaks or revamp the prototype to match the feedback and recommendations of the users.

Meaning of Rapid Prototyping

Rapid Prototyping is an instructional design approach that combines the design, developmental, and evaluation phases. It is a non-linear approach that produces a *sample* working model that is a scaled-down representative version of the whole course. In a design process, early development of a small-scale prototype used to test out certain key features of the design. Rapid prototyping develop learning experiences in a continual design-evaluation cycle that continues throughout the life of the project. Rapid prototyping allows the designer to start with a low fidelity medium (such as paper and pen) and move to increasingly higher fidelity prototypes as time goes on. A primary goal of the prototype is to provide a general understanding of how the course will look and work like. It is built to test the instructional efficacy and/or usability of concepts or processes like interactive activities and the navigational framework.
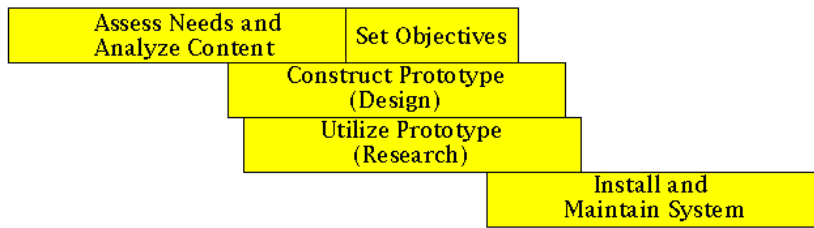
The idea of rapid prototyping as it applies to instructional design, is to develop learning experiences in a continual design-evaluation cycle that continues throughout the life of the project. This cycle, known as the spiral cycle or layered approach, is considered to be iterative, meaning that products are continually improved as they cycle continues. This can be seen more clearly by comparing Rapid Prototyping with a traditional development model. There are two types of Rapid Prototyping. They are:

Classic Design (waterfall) Model
a.   concept definition
b.   requirements definition
c.   preliminary design
d.   detailed design
e.   code implementation
f.   test and acceptance
   g.   griping because you now realize that there was something that got left out back in step 2

Rapid prototyping -- the spiral cycle:
   1. concept definition
   2. implementation of a skeletal system
   3. user evaluation and concept refinement
   4. implementation of refined requirements
   5. user evaluation and concept refinement
   6. implementation of refined requirements
   7. Etc, etc in a continuous cycle

How content can be organized in rapid prototyping
Step 1 Get attention: Grab attention by asking a relevant question on the subject or related to prior knowledge. Other ways to grab attention is by presenting a relevant fact, shock statement, image, video or important statistic.
Step 2 Set direction: Be clear about what you are going to cover and how it will benefit the learner.
Step 3 Present: Present all the relevant content concisely. In depth information should be added as attachments, additional resources or supplementary web links.
Step 4 Show and Try: Demonstrate the learning through example or case study how the knowledge should be used. Ask questions to check comprehension.
Step 5 Summarize: Give a clear wrap of the key information.
Step 6 Action and Support: Show what to do next and where to get more support.

Key ideas
- An instructional design model is a tool, a framework to develop instructional materials.
- The ADDIE model is one of the most common models used in instructional design as a guide to producing effective instructional materials.
- A prototype is a partial realization of a product constructed for the purpose of testing one or another characteristic of the design.
- Rapid Prototyping is an instructional design approach that combines the design, developmental, and evaluation phases.
- It takes six steps for content to be organized in rapid prototyping.

Reflection
- What experiences have you had when developing your instructional materials using an instructional model?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
You work for a small college that has been teaching a "computer technology" course for the last three years in the traditional classroom, face-to-face environment. The school administration wants to move the class platform to be taught completely on-line in order to both make the class more accessible to the current students and to hopefully attract more students from outside the local area. The new course is scheduled to be available during the next semester (which is 4 months away). Since the course has been taught for the last three years, there is a lot of existing content. However, given the field (i.e., computer technology), the administration wants you to both review the existing material and make any appropriate updates by replacing any "old" or "out of date" course content with more relevant, leading-technology content. Show how you would use the ADDIE model to help design instructional materials for the course.

SESSION 4: INSTRUCTIONAL DESIGN MODELS II

After refreshing our knowledge on few instructional design models, we continue looking at other instructional design models. Both go hand in hand. This session will briefly discuss other instructional design models that are considered when designing instructional materials especially Dick and Carey Instructional Design Model, Kemp Instructional Design Model, Merrill's Principles of Instruction and Bloom's Taxonomy.

Learning outcome(s)
By the end of the session, the participant will be able to:
   a. State the stages involved in Dick and Carey Instructional Design Model.
   b. Describe the Kemp Instructional Design Model.
   c. Explain Merrill's Principles of Instruction.
   d. Describe Bloom's Taxonomy?

Dick and Carey Model
The Dick & Carey instructional design model is a ten-step process for planning training and development initiatives. It is more detailed than the ADDIE model, and provides for ongoing revision and iterative development. The Dick and Carey Model is an instructional systems design (ISD) model

taking a systems approach and based on the research of Walter Dick of Florida State University and Lou and James Carey of the University of South Florida.

The Dick and Carey model prescribes a methodology for designing instruction based on a reductionist model of breaking instruction down into smaller components. Instruction is specifically targeted on the skills and knowledge to be taught and supplies the appropriate conditions for the learning of these outcomes.
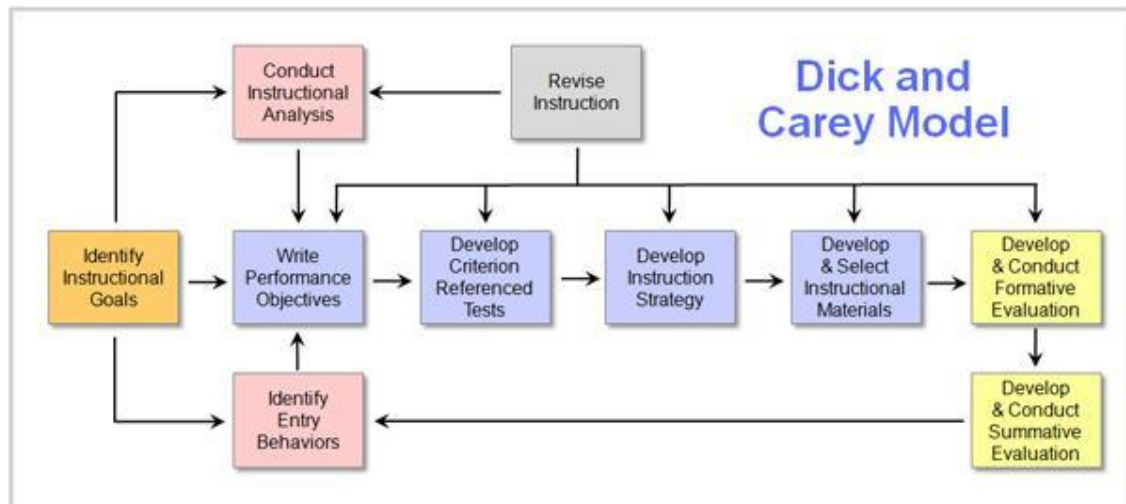
Stage 1. **Instructional Goals**-The first step is to determine the instructional goals. This means that you are able to, or will be able to, identify what it is the students need to learn.

Stage 2. **Instructional Analysis**- Instructional analysis is the second step. This means you are determining the skills that your students will need to learn what you plan to teach them.

Stage 3. **Entry Behaviors and Learner Characteristics**- Next you have to assess which skills the students have out of those that you previously determined are needed for this lesson. These skills will be crucial to the lesson's success with each student.

Stage 4. **Performance Objectives**- Next, you must figure out specific goals and objectives for the lesson. These objectives must be detailed. Details will help you make sure you are teaching your students what matters most from the lesson.

Stage 5. **Criterion-Referenced Test Items**-The fifth stage involves creating a test (consistent with the performance objectives) that will reflect what you're hoping to teach the students. Referring back to notes you have made will help you figure out what to test. These are meant to help the students understand what they have or have not mastered yet, and are a checkpoint for the parents or administrators.

Stage 6. **Instructional Strategy**- Sixth, you begin to outline your lesson plan. This means that you will be able to demonstrate what you want them to learn, add activities, and decide how each segment will be done. If you want to have group activities, now is the time to decide when and what materials will be covered by the activity.

Stage 7. **Instructional Materials**- Seventh, you make sure you have what you need ready for the lesson. If you have something you already know will work, use it.

Stage 8. **Formative Evaluation**- Next, you would have to evaluate how the lesson went. Were there some students who weren't too thrilled with the group work? Did your groups not work well? Did some students sit back while others did all the work, expecting to

ride along for a good grade? You could use this time to go for a field trip or to work in smaller groups. You could even do one on one if you have a small enough group.

Stage 9.   **Summative Evaluation**- Ninth, you revise. If all you do is teach a class on a topic, you have a good opportunity to revise the class.

Stage 10.   **Revise Instruction**: Use the data from the two types of evaluations to examine the validity of the instructional material and revise as needed.

The Kemp Instructional Design Model

The Kemp Design Model is circular, rather than linear (Akbulut, 2007). That is, the nine elements of this model are interdependent and are not required to be considered in an orderly way to realize the instructional learning systems design. It is also unique in its non-linear structure and the interrelated nature of those main components allowing for flexibility as the ID moves through the nine stages of this design. These stages can be addressed simultaneously, individually, or in some cases- not at all. The Kemp model encourages the designers to take the perspective of the learner so that their needs, priorities, and constraints are taken into consideration as the objectives, course material, and assessments are created and implemented.
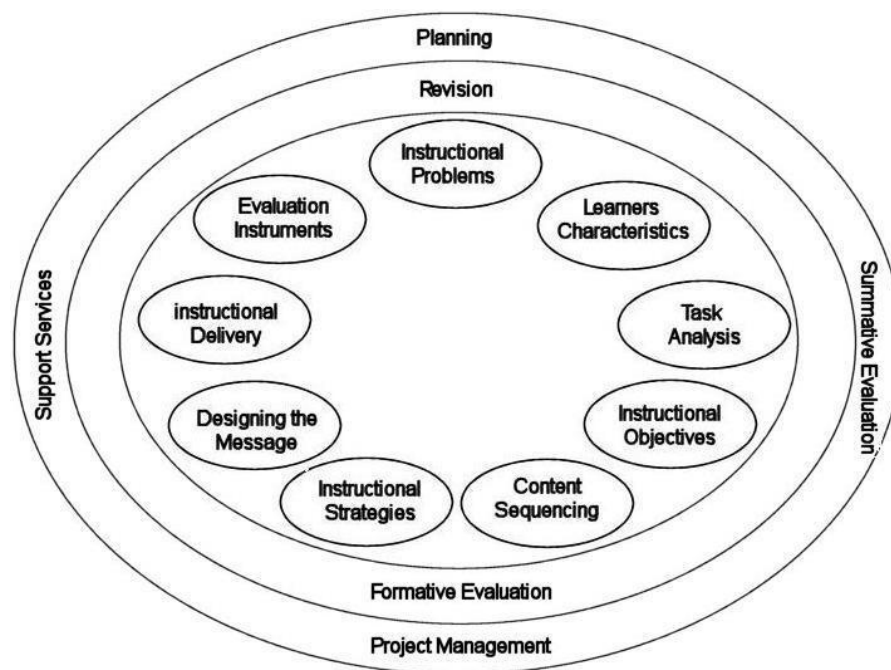
There are 9 core elements in the Kemp's model.

1. Determine the specific goals, and also identify potential instructional issues.
2. Identify characteristics of learners that should be taken into account during the planning process.
3. Clarify course content, and analyze the proposed task components in relation to the stated goals and purposes of the course.
4. Define instructional objectives and desired learning outcomes.
5. Ensure that content for each instructional unit is structure sequentially and logically to facilitate learning.
6. Design instructional strategies to enable individual learners to master the content, and achieve desired learning outcomes.
7. Plan the instructional message and the appropriate mode of delivery

8. Develop evaluation instruments suitable for measuring and assessing learners' progress towards achieving course objectives.
9. Choose the appropriate resources that will support both teaching and learning activities.

Merrill's Principles of instruction

Merrill's Principles of Instruction is one of the most straightforward, simplest instructional design models examined, yet it packs a lot of power because Merrill believed effective learning experiences are rooted in problem-solving. Merrill's First Principles of Instruction is a problem-based theory. Learners use four different phases in this design. The basic definition is that the principles of activation, demonstration, application and integration are necessary to the success of a learner. Educators need to show the learners what is going to be learned rather than telling them about it. They also must be given a chance to "do" and practice what they have learned through a variety of assessments and activities. Lastly, students must be encouraged and motivated to practice the lessons they have learned.
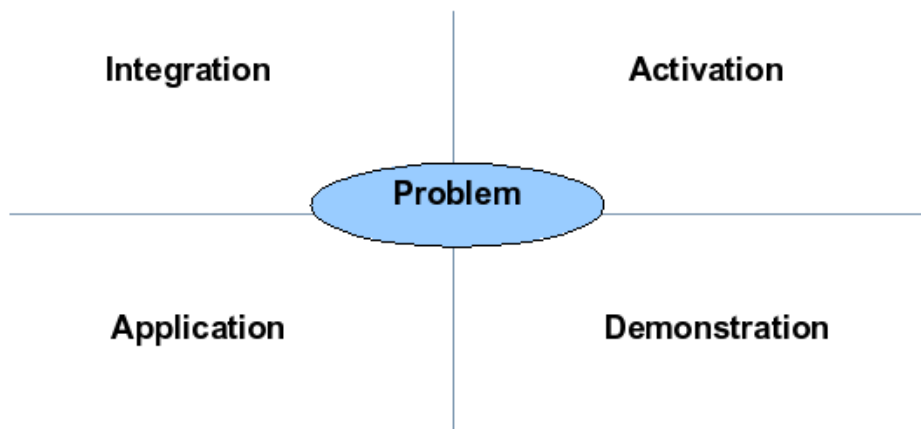
The principles promote learning in the following manner:

- Learning starts with real-world problems. Students should be able to relate to **problems and tasks** they can handle. (Task-centered)

- A course must **activate existing knowledge base** of the learner; hence aiding them connect previous knowledge with the new one. (Activation)

- A course must **demonstrate the knowledge** (both visually and through story telling) so that it leverages different regions of the brain, hence retaining it longer. (Demonstration)

- Allow them to **apply new information** on their own. Let them practice and learn from their mistakes. Let them see how your new material works in concrete situations. (Application)

- The course must offer possibilities for **integrating the knowledge** into the learner's world through discussion, reflection, and/or presentation of new knowledge. (Integration)

Bloom's Taxonomy

Bloom's Taxonomy, revised in 2001 by Anderson and Krathwohl, defines the six levels of cognitive learning starting with the simplest at the bottom and moving up through the levels to the most complex, or deepest learning. As an instructional design framework, Bloom's Taxonomy ensures that learners push through the lower levels of remembering and understanding new information, to being able to apply it, analyze it, evaluate its impact, and ultimately to solve unique problems by creating solutions that would not have been possible without the new knowledge. They took a more integrated approach and developed a taxonomy that focused on teaching and learning, in addition to assessment.
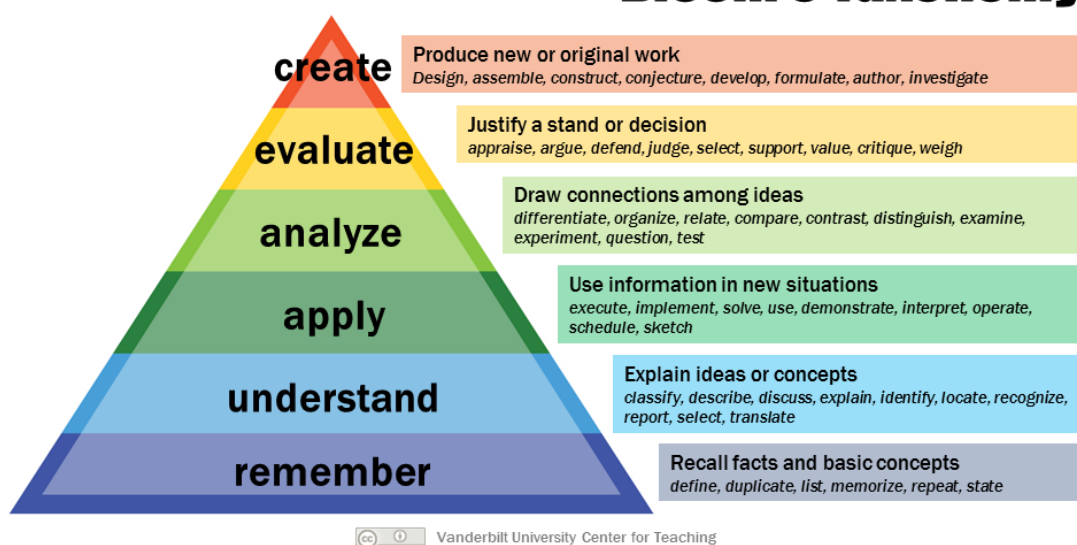
1. **Remembering**

   Definition: retrieve, recall, or recognize relevant knowledge from long-term memory. This is the most basic stage. You are giving the learner knowledge and you are hoping that they will absorb it. You can share a video or a piece of text. There may be a small question at the end to ensure that they have absorbed the information. They will just be answering a question related to the video. Appropriate learning outcome verbs for this level include: *cite, define, describe, identify, label, list, match, name, outline, quote, recall, report, reproduce, retrieve, show, state, tabulate, and tell*.

2. **Understanding**

   Definition: demonstrate comprehension through one or more forms of explanation. This is where you need to test the knowledge. Remember; knowledge is knowing something. Comprehension is about understanding something. Ensure that they have taken in the information that you have given them and they have understood it. Appropriate learning outcome verbs for this level include: *abstract, arrange, articulate, associate, categorize, clarify, classify, compare, compute, conclude, contrast, defend, diagram, differentiate, discuss, distinguish, estimate, exemplify, explain, extend, extrapolate, generalize, give examples of, illustrate, infer, interpolate, interpret, match, outline, paraphrase, predict, rearrange, reorder, rephrase, represent, restate, summarize, transform, and translate*.

3. **Applying**

   Definition: solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a new way. Appropriate learning outcome verbs for this level include: *apply, calculate, carry out, classify, complete, compute, demonstrate, dramatize, employ, examine, execute, experiment, generalize, illustrate, implement, infer, interpret, manipulate, modify, operate, organize, outline, predict, solve, transfer, translate, and use*.

4. **Analysing**

   Examine and break information into parts by identifying motives or causes. Making inferences and finding evidence to support generalizations.

   This is the stage where a person starts to develop a strong understanding of the subject matter. Most online education systems will have a discussion board in place, on which students will be able to interact with each other. This is brilliant, as it means somebody could go in and ask for advice (encourage them to do this), and the rest of the students could provide a solution. It is very informal, but it certainly fulfills the analysis criteria. You could even judge them a little on this. One of the best things about these discussion forums is that you will be able to tell which concepts you have not been enforcing enough. This can change the way in which lessons are planned going forward. Appropriate learning outcome verbs for this level include: *analyze*, *arrange, break down, categorize, classify, compare, connect, contrast, deconstruct, detect, diagram, differentiate, discriminate, distinguish, divide, explain, identify, integrate, inventory, order, organize, relate, separate, and structure*.

5. **Evaluation**

   Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Appropriate learning outcome verbs for this level include: appraise, apprise, argue, assess, compare, conclude, consider, contrast, convince, criticize, critique, decide, determine, discriminate, evaluate, grade, judge, justify, measure, rank, rate, recommend, review, score, select, standardize, support, test, and validate.

6. **Creation**

   Definitions: put elements together to form a new coherent or functional whole; reorganize elements into a new pattern or structure. Appropriate learning outcome verbs for this level include: *arrange, assemble, build, collect, combine, compile, compose, constitute, construct, create, design, develop, devise, formulate, generate, hypothesize, integrate, invent, make, manage, modify, organize, perform, plan, prepare, produce, propose, rearrange, reconstruct, reorganize, revise, rewrite, specify, synthesize, and write*.

- The Dick and Carey model prescribes a methodology for designing instruction based on a reductionist model of breaking instruction down into smaller components.
- The Kemp Design Model is circular nine elements model that are interdependent and not "required to be considered in an orderly way to realize the instructional learning systems design.
- Merrill identified and focused on these five principles: problem-centric, activation, demonstration, application, and integration.
- There are six levels of cognitive learning according to the revised version of Bloom's Taxonomy. Each level is conceptually different. The six levels are remembering, understanding, applying, analyzing, evaluating, and creating.

Reflection

- What experiences have you had when using the Revised Bloom's Taxonomy to develop an instructional material?
- What How have my experiences in this training session prepared me to be a better classroom practitioner? Which specific examples can I draw from the course to support my position?

1. What are the practical ways that teachers can incorporate the strategies from Merrill's Principles of instruction into a lesson?
2. How can you use the Revised Bloom's Taxonomy to develop your instructional materials?
What advantages does Kemp Design Model have over other models? What are the disadvantages?

SESSION 5: INSTRUCTIONAL DESIGN MODELS III

This session seeks to discuss Gagne's Nine Events of Instruction, Reigeluth's Elaboration Theory and Assure Model. These models are relevant for learners in their studies as well as teachers in their work and research activities.

Learning outcome(s)

By the end of the session, the participant will be able to:

a. Identify Gagne's Nine Events of Instruction.
b. Describe Reigeluth's Elaboration Theory.
c. Explain the Assure Model.

Gagné's Nine Events of Instruction

Gagne's Nine Events of Instruction is a highly-organized, action-oriented methodology that empowers educators with a solid framework they can use to increase teaching efficacy in virtually any setting. It's flexible enough to be modified for a wide range of circumstances. Gagne's model of instructional design is based on the information processing model of the mental events that occur when adults are presented with various stimuli and focuses on the learning outcomes and how to arrange specific instructional events to achieve those outcomes. This theory stipulates that there are several different types or levels of learning. The significance of these classifications is that each different type requires different types of instruction. These events should satisfy or provide the necessary conditions for learning and serve as the basis for designing instruction and selecting appropriate media (Gagne, Briggs & Wager, 1992) Gagné's Nine Events of Instruction can help build

the framework with which to prepare and deliver instructional content. Ideally, you should prepare course goals and learning objectives before implementing the nine events (the goals and objectives will actually help situate the events in their proper context). The nine events of instruction can then be modified to fit both the content to be presented and the students' level of knowledge.

1. **Gaining attention**
   Students enter class with their minds on other things, and it's the teacher's job to get them primed, focused, and ready to learn the topic at hand.
   A few tricks to set the mood include:
   - Asking a question they don't expect
   - Bringing up an interesting point
   - Challenging them with a problem
   - Using a loud and unexpected tone or other audio stimuli
   - An eye-catching visual stimulus
   - Establishing a student-to-student exercise

2. **Informing the learner of the objective(s)**
   Once you get their attention, you want to quickly educate the student about what they should expect to learn during the lesson. This further primes them and gets them ready to receive information and predict what they'll need to comprehend and deliver at the end. The best way to accomplish this step is to outline the concrete learning objectives and outcomes simply. This can be done any number of ways, including:
   - Providing measurable criteria they must meet at the end of the lesson
   - Explaining a task they'll be asked to perform
   - Drawing a clear connection between prior-stated objectives and later assessments
   - Involving the students themselves by asking for their input in determining ways to test knowledge and understanding

3. **Stimulating recall of prior learning**
   After you've gotten their attention and explained the lesson's objectives, it's time to prime them even further and draw out their prior-learned knowledge of the given topic. Having students remember what they already know provides a refresher, so they're ready to add to

that foundation via scaffolding techniques. This step also has several ways it can be completed. For example:

- Doing a quick summary or review of past lessons
- Prompting students to answer questions about things they learned before related to the subject
- Asking the students to explain what they recall
- Using engaging audiovisual presentations of material
- Incorporating elements of prior-learned information into the new lessons, as a bridge from one to the other

4. **Presenting the content**

Now that you've told the students what you're going to tell them and gotten them pre-engaged with the subject matter, it's time to present the lesson material and scaffold upon that prior knowledge base. Ideally, this presentation stage should be carefully planned out, but with enough flexibility to allow for spontaneous discourse. Teachers should strive to offer material using various delivery methods, such as audiovisual media, lectures, physical demonstrations when applicable, and hands-on practice whenever possible. It's also encouraged to incorporate technology when feasible, as most modern learners have grown up using devices and the Internet and are thus quite tech-savvy. Learning management system platforms are a great way to stay organized and keep track of work while enabling simple peer collaboration from a distance.

5. **Providing learning guidance**

Before and during the content presentation, it's beneficial to provide students with examples of suitable outcomes. This way, there is no confusion about what will be considered acceptable versus what falls outside that range. For instance, if you ask them to write an essay, it's handy to offer them a sample of what a perfect essay would look like for the purpose of the lesson. Giving an example of what not to do is an excellent way to offer contrast, so they can avoid making mistakes. Other aspects of this step include providing anything that helps the learner achieve their goal of understanding the lesson. Graphs, stories, role-playing, mnemonic memory tricks, or stimuli that facilitate memory by attributing value to the lesson concepts are all potentially useful. The point here is to help the information be understood in the present and stored deep enough so as not to be forgotten the moment they walk out the door. In other words, they must remember what is taught because that will be the foundation for the next lesson and the new round of scaffolding.

6. **Eliciting the performance (Practice)**

As the educator, you have just completed four critical steps in Gagne's Nine Events of Instruction. Now it's time for the students to do their part!

They must either practice or demonstrate their newfound knowledge in a manner you can assess. This is known as eliciting the performance, i.e., giving them the chance to show you that they did their job and learned what you taught. It's a critical step because it allows educators to gauge their success and lets the student practice and thereby reinforce knowledge. Repetition always helps with memorization as well as confidence-building.

A few ways to elicit performance include tests, quizzes, classroom presentations, essays, group projects, and application-oriented lab exercises.

7. **Providing feedback**

Instructor real-time feedback is crucial to completing the teaching-learning cycle. Generally-speaking, feedback should be personalized, constructive, positive, and immediate. There are a few unique types of feedback with specific purposes:

- **Confirmatory feedback** informs the student whether or not they are complying with guidance on how to complete an assignment, without exploring how well they did or what they might need to work on.

- **Evaluative feedback** lets the student know your current appraisal of their assignment's quality without getting into details about how they might do better.

- **Remedial feedback** is a type of feedback designed to adjust a student's line of thinking or course of action so they can come to find an answer on their own, without telling them that answer directly.

- **Descriptive or analytic feedback** is explicitly designed to boost student performance by offering additional assistance, including tips or exact action steps to take.

  Peer-evaluation helps students recognize differences between their work and that of peers to close the gap. **Self-evaluation** teaches ways students can spot areas for improvement on their own.

8. **Assessing the performance**

After the student demonstrates their level of understanding and has been given feedback, the teacher can do a comprehensive assessment to gauge the extent they met objectives. Keep in mind one performance cannot provide enough data to measure overall knowledge and abilities. Still, it will give enough insights to measure how well they learned and stored the information provided during a particular lesson.

Assessment techniques include giving oral quizzes or offering pre- and post-lesson quizzes to measure learning efficacy. No matter which methods are used, they should be objective, logical, and based on pre-established criteria outlined in rubrics when practical.

9. **Enhancing retention and transfer**

Once teachers have assessed the above steps' effectiveness, it is time to build upon them to increase retention and transfer. Here, retention implies the student's ability to internalize then remember what they learned, whereas transfer describes their capacity to apply the knowledge and skills in the real world.
Both are readily enhanced through an abundance of practice, though to the greatest extent possible such practice should be creative and not merely rote repetition, which tends to bore learners. Another potential problem educators can run into with this step is time itself, for it's often difficult to squeeze in meaningful practice at the end of lessons.

- A few practical tips for enhancement include adding questions about previously-taught content into future exams to keep students on their toes

- Finding ways to link concepts together versus isolating them
- Giving creative assignments that require students to think about the lesson in dynamic new ways
- Being transparent about goals and learning outcomes, so students can see exactly what they're supposed to learn for each lesson as well as by the end of all lessons

Reigeluth's Elaboration Theory

Elaboration theory is an instructional design theory that aims to help select and sequence content in a way that will optimize attainment of learning goals. It aims to help select and sequence content in a way that will optimize attainment of learning goals Content to be learned should be organized from simple to complex order, while providing a meaningful context in which subsequent ideas can be integrated. The use of motivators, analogies, summaries and syntheses leads to effective learning. It is intended for medium to complex kinds of cognitive and psychomotor learning.

1. Elaborative Sequence
↓
2. Learning Prerequisite Sequences
↓
3. Summary
↓
4. Synthesis
↓
5. Analogies
↓
6. Cognitive Strategies
↓
7. Learner Control
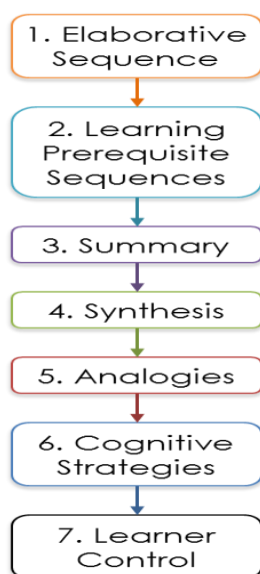
The Fundamental Strategies of Elaboration Theory

The Elaboration Theory involves a variety of fundamental strategies or tools that enable the learners to actively engage in the learning process and grasp all of the concepts, which can be applied to virtually any instructional design plan:

- **Organizing the Structure of the Coursework**
  The course must be organized in such a way that each lesson elaborates upon the previous lesson in the sequence. This can be done in one of three ways: conceptually, theoretically, or procedurally.

- **The simple to complex theory**
  Each lesson must go from simple to more complex, allowing the learners to build upon knowledge that they collected from the previous step in the process and then add elaborations in subsequent lessons.

- **Sequences within the lesson itself**

  The lesson must begin with a general overview, followed by a more detailed look. This can also be applied to abstract concepts, which are then viewed as more concrete or real-world based steps. It can also be simple to complex, abstract to concrete.

- **Summaries of the content**

  The instructor should encourage the learners to summarize what they have already learned and provide them with an overview of all previously learned steps at the end of each lesson.

- **Synthesizers**

  Presentation devices that help the learner integrate content elements into a meaningful whole and assimilate them into prior knowledge, e.g. a concept hierarchy, a procedural flowchart or decision table, or a cause-effect model .

- **Cognitive strategies**

  Learners acquire the knowledge better, when they use cognitive strategies either consciously or unconsciously. For example, the use of diagrams makes an impact on how the learner processes and interacts with the learning material (imbedded strategy). In addition, the instructor may lead the learner to a previously acquired cognitive strategy (detached strategy) by posing specific questions. A variety of cues - pictures, diagrams, mnemonics, etc. - can trigger cognitive strategies needed for processing of material.

- **Learner Control**

  The learners are encouraged to have complete control over how the instruction is carried out and the content being learned. Clear labelling and separation of strategy components facilitates effective learner control of those components.

- **Analogies or Metaphors**

  These allow the learners to relate the content to real world scenarios or learners' prior knowledge, use multiple analogies, especially with a highly divergent group of learners.

The ASSURE Model

The ASSURE model is a procedural guide for planning and delivering instructions that integrates technology and media into the teaching process. It also refers to a systematic approach of writing lesson plans that helps teachers in organizing instructional procedures. The ASSURE model is a six-step instructional guide for planning and delivering technology-supported lessons with great focus on addressing learner needs. It highlights six classroom procedures: Analyze learners, State objectives, Select methods, media, and materials, Utilize media and materials, Require learner participation, and Evaluate and revise.
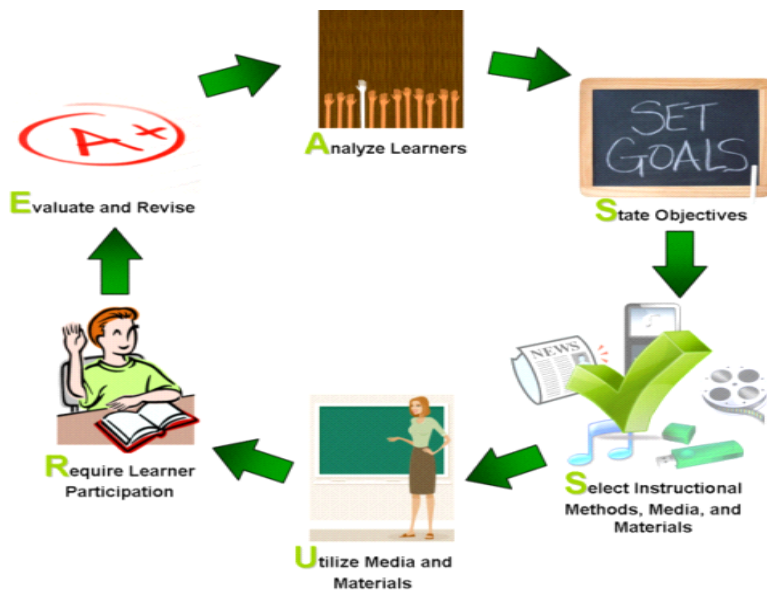
Key ideas
- Gagne nine events of include: gain attention, inform leaners of objectives, stimulate recall of prior learning, present stimulus, provide learner guidance, elicit performance, provide feedback, assess performance, and enhance retention and transfer.
- Elaboration Theory suggests delivering instruction beginning with simple, foundational concepts followed by more detailed, specific and complex concepts. Information should be chunked and sequenced to facilitate anecdotal connection and allow learners an element of control over consumption of information so they can independently decide what information requires more elaboration or attention in order to best master and understand concepts being taught.
- The ASSURE model is an instructional system or guideline that teachers can use to develop lesson plans which integrate the use of technology and media. ASSURE is an acronym for the description of six classroom procedures central to the informed selection and use of educational technology.

Reflection
- What are some of the experiences (i.e., cognitive, psychomotor, and affective) when using any of the instructional design models discussed in this session?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
1. Discuss one practical example that you can use to complete your lesson with Gagne's Nine Events of Instruction.
2. You want to implement an innovative training and development project that has been done before. How can you use the ASSURE model to help you? How might it hinder you?
3. How best can you use Elaboration Theory to teach a lesson in the classroom?

UNIT 2: CONCEPT OF TPACK

This unit presents information on how best the technological knowledge can be used to enhance teaching. The unit also explains the various constructs of the TPACK framework.

Learning outcome(s)
By the end of the unit, the participant will be able to:

      a.   Enumerate the importance of technology in teaching

      b.   Explain the various constructs of TPACK framework

SESSION 1: TECHNOLOGY IN EDUCATION

Technology in education is the biggest change in teaching we will ever see. For years, policy makers, teachers, parents and students alike have been weighing the potential benefits of technology in education. Let us look at a quote said by John Dewey: "If we teach today as we taught yesterday, then we rob our children of tomorrow." What do you think is meant by this? It simply means that we are now living in a technological era, therefore if you do not consider teaching your students with technology, then your students would be lagging behind. This session describes the terminology digital generation. It also discusses why technology is needed in education.

Learning outcome(s)
By the end of the session, the participant will be able to:

     a.   Describe digital generations.

b.   Identify why technology is used in education.

Digital Generation

How do we teach in Ghana? How do teachers teach in Ghana's education system? What goes on in some of our classrooms in Ghana. Traditional teaching methods where the teacher-centered approach dominates. In some classrooms, the teacher may not give students opportunities to have learner-centered activities to enhance their learning. In some Ghanaian classrooms, teachers do all the talking whiles students listen and write a lot of notes. Also, teachers type of questions require recalling of facts with heavy emphasis on assessment. Teachers may not even give students opportunity to take active participation that is, hardly any hands-on activities.

Since, we are in 21st century, there are certain skills that learners need to obtain, which includes and not limited to: Cooperation, Communication, Collaboration, ICT literacy, Social and/or cultural skills, Creativity, Critical thinking skills, Problem solving skills, Productivity, Learning to learn, Self-directed learning, Planning, Flexibility, Taking risks, Metacognition, Controlling / solving conflicts, Initiative and entrepreneurism as well as Interdisciplinary skills. These skills would give learners the potential to succeed in life, to compete well in industry and to engage in lifelong learning. This, hence, has made the use of technology very important in education. Because of technological advances and technology integration in education there is current crop of learners (Prensky, 2001).

Students in this dispensation have grown up in a world where they are surrounded by technology (Oblinger & Oblinger, 2005; Prensky, 2001, 2005). Their daily lives are influenced by technology and most of these learners use various technological devices way before they even start formal school (Green et al., 2005). Digital cameras, computers, videogames, video cameras, digital music recorders

and mobile phones are technologies to name a few that form part of the daily lives of students in this generation. Prensky (2001) held the view that in this generation there are learners who have been born into the technology and they are known as 'digital natives' and are therefore "native speakers" of the language of technology.

Students are digital natives. They've grown up with technology; it's woven into their lives. In fact, it's one of the basic 21st century skills that they'll need in school and the workplace. These students of this age already have a better understanding of computers and technology in general than their predecessors. Technology use has become the easiest way they learn, because it is such an integral part of their life. Engaging with technology in the classroom has not only helped them learn better, but they also acquire multi-tasking skills. At this day in age, they hardly know how to learn without it. This knowledge is important, because they would be way behind in the real world without it. Since students are already utilization technology in their daily lives, then it should fit into the principles of good teaching to use what students know and are good at to teach them.

Ways technology is used in education
Technology has been accepted into the education process because of the assumed affordances technology can provide. Affordance can be defined as the properties of a system that make certain actions possible and which go a long way to encouraging specific learner behaviours. Due to its affordances, technology has been found to affect the teaching and learning process in various ways.. However, in the integration of technology in teaching there the teacher needs to consider subject matter, class level, student background and teacher's technological expertise. The first stage of technology integration in education that needs to be considered is how digital devices can be utilized in order to present information to students. For example, you may use a projector to present notes or videos to students. You can then progress by allowing students to use technology, such as word processing programs, to complete tasks. The teacher can then advance by allowing students to search for information and transform the information to a form students decide on and then present. The teacher in this case would act as guide or facilitator. Some of the various ways technology is being used in education are identified below.

- **Technology has been found to possess abilities to foster effective pedagogy.**
  Appropriate use of technology by teachers has been found to improve teaching. Teachers can use various types of technology to facilitate their teaching. Technology can help teachers more tangibly and clearly explain difficult concepts and can help students who are visual or tactile learners better understand the concepts.

- **Technology can foster discovery learning.**
  Students can be asked to search for their own information from the internet without or with minimal support from the teacher. When this is done, students' discovery skills are sharpened.

- **Technology has the ability to encourage collaborative learning.**
  Students can be grouped and given a task in which each member of the group plays an active role. The idea of group study has been improved in the digital world. Presently, students don't have to get together physically; there are many ways to collaborate online. They can share files and notes, work together on documents, instant message or email. They can even use video conferencing

such as Zoom to discuss projects face to face. Students can then work together to put their information together and present it to the whole class or the teacher.

- **Technology provides interactive content.**
  The students of this generation are considered technological learners. They learn best being more interactive, and technology is capable of engaging learners in the teaching and learning process. Teachers allow students to interact with the technology being used. Having access to other information outside of the book gives students many different ways to learn a concept. Teachers can come up with creative ways to teach their students that keeps them engaged. Technology has changed the learning environment so that learning is more hands-on. Schools throughout the nation are diverse in income, and often kids don't always get the resources they need. The implementation of technology in schools helps close that gap.

- **Technology has the ability to enhance relationships between teachers and students.**
  Technological advancements such as data presentation software, word processor and other applications support both the teacher and students in their day to day classroom and out of classroom academic activities. When teachers effectively integrate technology into subject areas, teachers grow into roles of adviser, content expert, and coach. Technology helps make teaching and learning more meaningful and fun. Students are also able to collaborate with their own classmates through technological applications.

- **Technology has provided more efficient ways to communicate to and with students.**
  The internet has provided an easy and convenient way to send conventional educational or course materials to students in remote areas. Technology has made distance learning, be it synchronous or asynchronous, a little bit less laborious and difficult. Technology can change the classroom into a network where teachers post assignments progressively, and students can ask questions more easily–of teachers and of their peers–and reference a structured record of past discussions.

- **Technology makes learning more fun and effective**
  The utilization of technology has made learning significantly more fun than any other time in recent memory. Students are getting engaged in a diverse array of learning tasks that improve their retention of new concepts. For example, there is an incredible breadth of education applications that allow students to learn various concepts in a playful, interactive manner. Students that may struggle to understand a certain subject can search for a tutorial video online. Videos or live streaming content can offer an alternate approach to a thought and better understanding of a concept or subject. These videos can allow an interesting and interactive approach to learning that might be more easily digested.

- **Technology allows one to learn at their own pace.**
  Obviously, self-guided learning is another enormous advantage that students appreciate with the rise of technology in education. With the integration of technology in education, students may have the ability to slow down and go back over lessons and concepts, and more advanced students can move ahead. Despite the fact that there are some quick students who are fit for adjusting to new concepts quickly, there are others who must set aside considerable time to assimilate a thought. Such students can keep pace with their peers by using guided exercises and online syllabus to take on new concepts at their own pace, and to practice again later, at home.

Educational technology enables students to engage in an ongoing cycle of learning: before, during and after class.

- **With technology in the classroom, your students have instant access to fresh information that can supplement their learning experience.**
  There is value in having textbooks and course materials that are always up to date, which can even include additions suggested by students. This also fosters a more collaborative learning environment; students, networked together online, can share up-to-date information, work together on group projects, and interact with the instructor. Student response systems such as clickers can also help students apply their understanding of concepts covered in class and can indicate areas that need to be reviewed.

- **Technology can give teachers and students remarkable resources.**
  They have access to new opportunities for learning approaches to work together and to set aside additional cash. The use of technology has great potential to the teaching and learning process. The affordances of technology to teachers is vast.

Key ideas
  - Students' daily lives are influenced by technology and most of these learners use various technological devices way before they even start formal school. Digital cameras, computers, videogames, video cameras, digital music recorders and mobile phones are technologies to name a few that form part of the daily lives of students in this generation.
  - Technology has been found to affect the teaching and learning process in various ways. The integration of technology in teaching needs to consider subject matter, class level, student background and teacher's technological expertise.

Reflection
  - What are some of the experiences have you had with this digital generation? How have you been using technology in education?
  - How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
1. Discuss what digital generation means to you. What recommendations do you have for teaching such a group?
2. In the 21st century, technology plays a role in education. Discuss the various ways you have used technology in your lessons.

SESSION 2: CONCEPT OF TPACK
The mere introduction of technology into the classroom will not necessarily yield the needed results of students maximizing their learning. The teacher is required not only to have knowledge of specific technology but also the knowledge of the affordances and constraints of the technology, use adaptive strategies coupled with how to use these properties of technology to enhance comprehensive learning. In this session, you will be introduced to the knowledge constructs required in order to be able to successfully integrate technology in your classroom.

Learning outcome(s)

By the end of the session, the participant will be able to:

a.	Explain the various constructs of TPACK framework.

b.	Describe an activity that falls under each of the constructs of TPACK framework.

c.	State any three reasons why TPACK is used in teaching

Use of technology

Effective technology integration for teaching requires that teachers have knowledge not just of content, technology and pedagogy, but also of their relationship to each other. We have understood for a long time that teachers need to bring together their deep knowledge of subject matter with profound understanding of what is good for learning. The combination has been described as Pedagogical Content Knowledge (PCK) and is more than the simple addition of two parts. The fusion is what enabled 20th century teachers to transform subject content and represent it in ways that made it accessible to individual learners in their specific contexts. In the 21st century, Information and Communication Technology (ICT) is providing us with new ways to access and process knowledge in every field. ICT is also transforming pedagogy by providing new ways to engage learners. Even though studies from all over the world have shown the potential of ICT to enhance teaching and learning, but the situation in Ghana in some of the classrooms has limited or no ICT integration in our context and if we even utilize ICT it is stand-alone technology courses (at best).
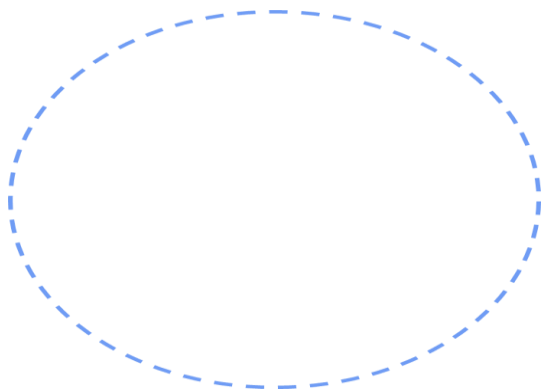
The TPACK framework

In the classroom, it is important that the teacher must consider the concepts taught, the best way to teach the subject and the technology that will enhance the lesson. Teachers should be able to bring together knowledge of subject matter, what is good for learning, and technology (ICT). The combination is described as Technological Pedagogical Content Knowledge (TPACK). It is more than simply adding ICT to traditional approaches. It depends upon deep knowledge of how ICT can be used to access and process subject matter (TCK) and understanding how ICT can support and enhance learning (TPK) in combination with PCK.

The knowledge required for successful integration of technology into the teaching and learning process is termed technological pedagogical content knowledge (TPACK). The TPACK concept builds on Shulman's idea of pedagogical content knowledge. TPACK refers to the knowledge that emerges from an understanding of an interaction of content, pedagogy, and technology knowledge.. The TPACK framework has seven constructs: Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Pedagogical Content Knowledge (PCK), Technological

Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and Technological Pedagogical Content Knowledge (TPACK). A brief description of the various constructs of the TPACK framework is provided below.
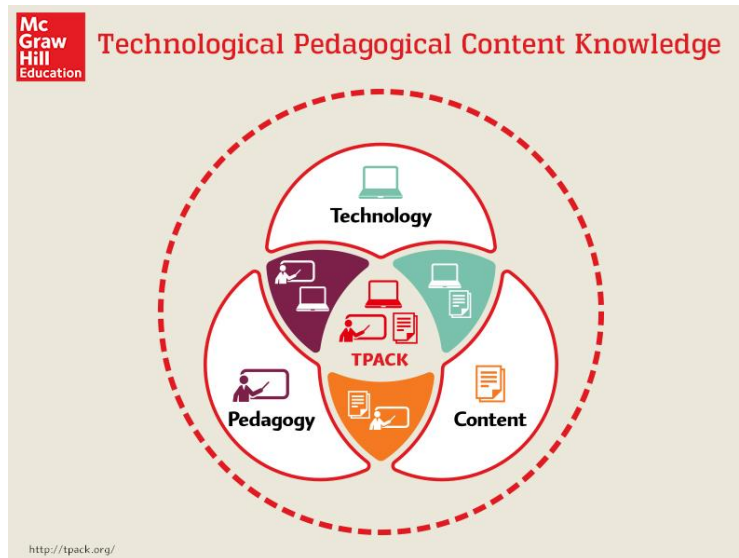
Technological Knowledge

Defining technology is notoriously difficult because it is always in a state of flux. Some authors define technological knowledge as knowledge of both old and new technologies such as black board, chalk, books, as well as internet and video conferencing. However, in this dispensation some technologies have become obsolete. Thus, it is important to define technology in terms of digital and emerging technologies. Technological knowledge is the ever evolving knowledge base of how to use different digital and emerging technologies in different settings. This means TK has no finality about it but rather assumes a developmental posture which means that it will be evolving over a time of generative interactions with multiple technologies. Technological Knowledge (TK) includes an understanding on how to use computer software and hardware, presentation equipment such as presentation documents, and other technologies in the context of education. TK also covers the ability to adapt and learn new technologies. The existence of this capability needs to be held in view of the ongoing developments and technological changes. For example, the development of computers that are constantly changing from the Personal Computer (PC) to the current notebook. Yet, these computers can be used for a variety of pedagogical tasks such as research, communication and others.

Pedagogical Knowledge

In order to teach effectively, a teacher must possess a repertoire of skills needed for teaching. Pedagogical knowledge encompasses knowledge of teaching approaches, theories and concepts underlying teaching. It includes knowledge of the nature of teaching and learning. Pedagogical knowledge includes the skills, beliefs and conceptions about teaching. It encompasses knowledge of how students learn, instructional planning and implementation, classroom management, and student assessment and thus encapsulates the conception of the overall purposes of education, values, goals and strategies of education as well as the processes and practice of teaching and learning. Teachers' understanding of the underlying philosophy and approaches to classroom management and organization constitute their pedagogical knowledge. Teachers with good pedagogical knowledge should be able to understand how students construct knowledge and learn as well as have appropriate and varying ways of assessing students. They should be able to meet the requirements and

responsibilities of their job and end up fostering effective learning in students. Pedagogical Knowledge (PK) describes the general goal of the specificity of knowledge to teach. It is a collection of skills that the teacher must develop in order to be able to manage and organize teaching and learning activities to achieve the expected learning goals. This knowledge includes (but is not limited to) understanding classroom management activities, the role of student motivation, lesson plans, and learning assessment. PK also describes the knowledge of different teaching methods including knowledge to know how to organize activities in the classroom so that the construction of student knowledge (learning) is conducive.

Content Knowledge

Content Knowledge (CK) emphasizes knowledge of the subject matter that is to be taught or learnt. This is the knowledge about the concepts, frameworks, and processes in a given field. For teaching to be effective, it must begin with how a teacher understands what he or she is going to teach. Teachers are expected to have mastery over the subject they teach. Teachers should be able to teach the concepts and theories of their subject areas as well as organize and supervise laboratory sessions, organize field trips, explain observations to students and lead them to make valid and reliable conclusions. Content Knowledge (CK) leads to knowledge or specificity of disciplines or subject matter. CK is different at each level (examples of differences in Primary and Secondary Schools). A teacher is expected to master this knowledge to teach. CK is also important because it determines the specificity of thinking from certain disciplines in each study.

Pedagogical Content Knowledge

Pedagogical Content Knowledge (PCK) indicates the manner in which the content can be represented and formulated to make it comprehensible to others. PCK goes beyond just pedagogy and content. It looks at how these two relate and interact for effective teaching. The relationship between pedagogy and content is a complicated one in which the boundaries between them are weak and porous. Thus, teachers' pedagogical and content knowledge are inextricably linked. PCK encompasses knowledge of pedagogies and the planning processes that are appropriate and applicable to the teaching of a given content at any given time. For effective teaching to occur, knowledge of teaching and learning, assessment procedures, awareness of students' prior knowledge and content-related misconceptions are very essential. The awareness of these issues constitutes teachers' PCK. It deals with how to design specific subject matter and teach it effectively to suit learners of diverse abilities.

Pedagogical Content Knowledge (PCK)

It refers to the statement of Shulman(1986) is that an effective teaching requires more than just a separation of understanding of content and pedagogy. PCK also recognizes the fact that different content will match different teaching methods. For example speaking skills in English is more appropriate with a student-centered approach so that learning is more meaningful. Unlike the lectures on art appreciation seminars, it is more appropriate to use teacher-centered. PCK has a meaning beyond just content experts or know general pedagogical guidelines, but more about understanding of the reciprocal influences between content and pedagogy. Technological Content Knowledge (TCK) describes knowledge from the reciprocal relationship between technology and content. Technology has an impact on what we know and an introduction to new things about how we can describe content (material) in a different way that was previously impossible. For example, now students can learn the relationship between geometric shapes and angles by touching and playing the concept on the monitor screen by hand on their portable equipment. The same thing happens in visual

programming software that allows students to design and create programming on their digital games. Technology enables discovery of new content or an overview of content.

Technological Content Knowledge

Technological Content Knowledge (TCK) represents knowledge of subject matter representation with technology. It is the realization of how technology and content influence and affect each other. This is the ability to determine how the content a teacher wants to teach is affected by affordances of technology and vice versa. The availability of specific technology can help make the delivery of certain content easy to learn, concrete and real to students. It is the knowledge of how to utilize an emerging technology to represent specific concepts in a given content domain

Technological Pedagogical Knowledge

Technological Pedagogical Knowledge (TPK) refers to knowledge of using technology to implement different teaching methods. It is good knowing how various technologies can be used in teaching and realizing that using technology may change how one teaches. TPK deals with the ability to realise how technology affects the methods and strategies of teaching and how effective teaching and learning can be achieved with technology. It includes the realisation of the constraints and affordances that technology can bring to bear on pedagogical strategies, approaches and designs (Abbitt, 2011). A teacher with TPK should be able to realise that the technology they want to use does affect their teaching approaches, methods and design.

Basically, it is the realisation and conceptualisation of how teaching and learning can be affected or changed when particular technologies are used in a particular manner. Technological Pedagogical Knowledge identifies the reciprocal relationship between technology and pedagogy. This knowledge makes it possible to understand what technology is appropriate for achieving pedagogical goals, and allows teachers to choose what equipment is most appropriate based on its feasibility for a particular pedagogical approach. Technology can also provide new methods for teaching that make it easier to apply in class. For example, the emergence of online learning requires teachers to develop new pedagogical approaches that are appropriate.

Technological Pedagogical Content Knowledge

Technological Pedagogical Content Knowledge TPACK depicts knowledge of using technology to implement teaching methods for different types of subject matter. TPACK treats technology, content and pedagogy in unison and blends these three constructs in a complex relationship. TPACK is the understanding that emerges from the interactions and interplays between and among technology, content and pedagogical knowledge that underlies meaningful teaching with technology. The complex relationships between the constructs provide a basis for understanding teacher knowledge that supports successful technology integration into classroom learning environments.

The constructs are intertwined and interwoven and therefore it is not sufficient for pre-service teachers to just learn about technology, content or pedagogy alone and independently of each other. It is therefore critical that teachers understand the complex relationship among the constructs and the contexts in which they are formed and co-exist to constrain and co-create each other. This could enable teachers to use technology in student-centred approaches to foster inquiry learning in students instead of using it to support teacher transmission of knowledge. These seven constructs constitute the TPACK framework. There is emphasis in the model on the interactions between and among the

three core components of technology, pedagogy, and content. Effective teaching with technology requires TPACK (Abbitt, 2011; Harris et al., 2009). TPACK helps us to conceptualise the movement away from relying on technological skills as the main ingredient needed for meaningful teaching with technology. It provides a framework for conceptualising instruction using effective technology integration that includes a consideration of appropriating the multiple uses of technology, in relation to content and effective pedagogy. TPACK describes the knowledge synthesized from each field of knowledge that has been described previously (Technological Knowledge, Content Knowledge, Pedagogical Knowledge, Pedagogical Content Knowledge, Technological Content Knowledge, and Technological Pedagogical Knowledge), focusing on how technology can be made specific which is suitable with a pedagogical need to teach the right content in a particular context. Each element of the knowledge field describes a need and the importance of these aspects in teaching. Yet, for effective teaching requires more than each part of it. For teachers with TPACK, technology knowledge, pedagogy, and content are synthesized and used to design student learning experiences. The TPACK framework also functions as a theory and concept for researchers and educators in measuring the readiness of prospective teachers and teachers to teach effectively with technology.

Why TPACK
- Learning "how to use" technology is different from knowing what to do with technology for teaching.
- A framework to understand teachers' knowledge required for effective technology integration.
- Allows educators to bring 'real world' applications to the classroom .
- Provides an opportunity for students to see and hear video clips and audio which can help to teach or reinforce concepts.
- Allows students to investigate, connect to and make discoveries previously unknown to the student.

Key ideas
- TPACK stands for Technological Pedagogical Content Knowledge. It is a theory that was developed to explain the set of knowledge that teachers need to teach their students a subject, teach effectively, and use technology. The TPACK model gives us a new framework for the integration of technology in education and how we can structure our classrooms to provide the best educational experience for students while incorporating technology.
- TPACK is an essential part of the education system today as it incorporates the growing demand on the use of technology in the classroom as well as continuing the focus on the content and how we teach it. Therefore it sets up education for the future as well as setting up the students for their future. Keeping technology as a separate knowledge set causes problems, but when we understand the framework of TPACK, we can integrate technology into the content and pedagogy of our classrooms. The integration will help our students learn more effectively.
- The most obvious benefit of TPACK is that it allows teachers to examine and reflect on their practice and how technology is integrated in the classroom. TPACK also recognizes the critical intersection between content, pedagogy, and technology.

Reflection
- How might the TPACK framework be used to enhance a lesson you want to teach?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

---

1. Describe one activity that falls under each of the constructs of TPACK framework.
2. Why is it important to use the TPACK framework for your lesson?

UNIT 3: POSSIBLE INTERNET RESOURCES AND SEARCHING SKILLS

This unit deals with possible internet resources and searching skills Do you need help in searching for resources in teaching? The use of the Internet in the educational environment has enabled easy access to many resources, and information sharing has, therefore, significantly increased. Moreover, the prevalence of this sharing has brought additional benefits in that these resources can be used in any location and any time.

Learning outcome(s)

By the end of the unit, the participant will be able to:
a.   Explain the three classification of ICT resources.
b.   Identify four websites where you can get access to science resources for your teaching.
c.   Use a diagram to show a search strategy for finding information on the internet.
d.   Develop internet skills for searching for appropriate information.

SESSION 1: POSSIBLE INTERNET RESOURCES

This session involves the studies of internet resources. This session will present to you an overview of internet resources and how to get great resources from the internet.

Learning outcome(s)

By the end of the session, the participant will be able to:
a.   Explain the three classification of ICT resources.
b.   Identify four website that could be used in teaching.

Internet resources

Internet has been an indispensable tool of the teaching-learning process for both teachers and students as it provides users with great opportunities to access information and communicate. As internet has become an important resource for the teaching-learning process, the importance of internet using skills for both teachers and learners increases along with the emphasis on information technology literacy skills such as accessing, retrieving, evaluating and applying information. Primarily you need to be aware of where to look for information, how to access it and how to use it. You must also be able to scrutinise your sources to check that they are relevant and of a suitable nature to be included for your teaching. There is a phenomenal amount of information available online, via web-pages, blogs, forums, social media, catalogues and so on. As there is so much information available and because such information can be published quickly and easily by anybody and at any time, it is important that you are vigilant in choosing reliable sources. For many subjects the internet can be a very important place to research.

In some disciplines the internet may be the most appropriate - or only - way of gathering information. This can be particularly true of subjects related to technology or current affairs. Whenever you use the internet for research, remember that the authorship, credibility and authenticity of internet documents is often difficult to establish. For this reason you need to be vigilant and take care when using the internet for academic research. A classification of ICT resources is presented in three main areas:

- information resources (e.g., webgraphy and online databases),
- collaboration resources (e.g., blogs and wikis)
- learning resources (e.g., webquest, repositories of educational resources, podcasts and m learning).

ICT Information Resources

ICT resources provide additional information to address a topic from basic to advanced levels. Teachers are facing a new scenario which offers ample flexibility and availability of data sources and direct access to web resources. ICT and information resources can provide updated data in different media formats. Some ICT Information Resources will include the following: Webgraphy, virtual encyclopedias, online databases, web 2.0 tools (e.g., social bookmarks, YouTube and Slideshare) and visual search engines based on web 3.0 (semantic web).

ICT Collaboration Resources

ICT resources for collaboration offer users the opportunity to participate in professional networks and co-create resources. Collaborative work allows the assessment of existing resources and their use in different contexts and then analyzes these resources to enable their creative use in collaborative learning contexts. Some collaborative ICT resources are mailing lists, groups and collaborative web 2.0 tools such as wikis and blogs. Webinar is a widely used tool for organizing online seminars.

ICT learning resources

ICT resources for learning offer the possibility of acquiring knowledge, attitudes and procedures during the teaching process. ICT resources offer various forms of work with content and activities. An integrated design of learning resources is an important part of the instructional process that helps achieve the expected learning outcomes. Some ICT learning resources are repositories of educational resources, interactive tutorials, online quizzes, web 2.0 tools (e.g., eBooks, podcasts) and open online courses.

Examples of websites with resources

In searching for materials for your teaching, you may use a search engine to search for information. For the purposes of our discussion we will use the Google search engine. When you search for any information from Google, it produces results that have news, images, videos, maps as well as books. You can then click on the images or videos depending on what you are looking for and get lots of information in that format. Teachers can then download such images and videos and used them in their classrooms. Aside the Google search, there are a lot of videos, animations and simulations on https://www.youtube.com/. Teachers just need to go the site and type in the concepts they want videos on in the search bar and a lot of videos will pop up. For YouTube videos, teachers may need a downloader to download them.

What should you do if you don't have a youtube downloader? If a teacher does not have a downloader on their computer, then the teacher can copy the Uniform Resource Locator (URL) i.e. the address of the video on YouTube and go to http://en.savefrom.net/. All the teacher needs to do is paste the URL in the box provided at http://en.savefrom.net/ and click on download. Other places where teachers can download YouTube videos are Savemedia (http://savemedia.com/) or Keepvid (http://keepvid.com/). The video will be downloaded by the computer and will be saved in the teacher's downloads folder on her computer.

Another site that teachers can make good use of is https://www.profweb.ca/en. This site contains digital resources for schools. This site is filled with inspiring publications such as stories of teachers from different programs who have integrated technologies into teaching and learning. It also offers some tools and services to make the integration of ICT in schools easier. The articles and resources found on this site help to keep you informed about pedagogical trends and research that has been developed in the school network. Profweb is a wealth of information when it comes to providing concrete examples of activities and tools linked to the skills. Another YouTube channel is called the Technology for Teachers and Students (www.youtube.com/technologyforteachersandstudents). In this channel you can easily watch clear and concise tutorials about educational technology as well as learn about exciting and new educational technologies, such as iPads, educational games, web 2.0 tools, social media, presentation tools and more. There is also https://www.pinterest.com/. This is a wonderful Pinterest board that is packed full of resources for teachers and students.

Another site called Microsoft Education (https://education.microsoft.com/en-us), help support and connect passionate educators to empower the students of today to create the world of tomorrow. On this website, you can enjoy a wonderful variety of the latest in innovations, product news, & updates. You can also peek behind the scenes at events, hear from other educators, and discover helpful tips and how-tos. This website also allows teachers to learn how to use Microsoft technology in the classroom in effective and engaging ways, focus on skill development for deeper learning in a topic, as well as find ideas, classroom materials and ready to use lesson plans to help students develop future-ready skills. Microsoft support multimedia online experiences that keep educators and students, and connected. Edutopia (https://www.edutopia.org/) is also a website dedicated to improving the learning process through innovative, replicable, and evidence-based strategies that prepare students to thrive in their studies, careers, and adult lives. Edutopia is a comprehensive website and online community that increases knowledge, sharing, and adoption of what works in education. There is also Learn ICT, https://www.learn-ict.org.uk/, which is a website with resources that encourage critical thinking.

Docsity (www.docsity.com) is an online social network designed for learning. It gathers students and teachers from all over the world. They can share document, notes, study materials, as well as gain access to published articles, and video courses. Students are encouraged to share by collecting points, which enables to them to download additional materials and build their reputation. The platform also has a Q&A section, and publishes all the latest news in education, which are read by over 500,000 students worldwide. Also, The world-famous TED talks (https://ed.ted,com) need no introduction. But, TED has a lot more to offer to students and educators with its TED-Ed platform. TED-Ed is basically a huge library of educational videos and lessons. Each user can build a custom lesson around a particular video and share it with other users. Both types of videos, those which are created by experts, and those which are created by users, are equally effective at enhancing your learning process inside the classroom or at home. There are a lot of other great resources for teachers on the internet that can be visited and materials downloaded for free. Teachers should make good use of the Internet in their quest to integrate technology in their teaching. This session was about taking a brief look at internet resources and also a few websites you can get access to materials that could be used in your teaching.

Key ideas
- A classification of ICT resources is presented in three main areas: information resources (e.g., webgraphy and online databases), collaboration resources (e.g., blogs and wikis) learning resources (e.g., webquest, repositories of educational resources, podcasts and m learning).   - In searching for materials for your teaching, you may use a search engine to search for information. There are many websites that could be used to give you valuable information in the area of education.

Reflection
- What are some of the websites that you use for teaching purposes?   - How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
Which ones of the mentioned websites have you used before? Describe the website(s). How did the website(s) help in your teaching? Describe other websites you use where you get resources for your teaching.

SESSION 2: INTERNET SEARCHING SKILLS

Have you ever searched for something on the Internet and weren't able to find what you were looking for or found something you weren't expecting to find? This session involves strategies used in finding information on the internet. Internet Search Engines, like Google and Bing, are continually improving their search abilities. This session also discusses how to search for appropriate information.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Use a diagram to show a search strategy for finding information on the internet.
b.   Conduct basic search strategy.
c.   Develop internet skills for searching for appropriate information.

Internet searching skills
A basic search, otherwise known as a search query, is an entry into a search engine that yields both paid and organic results. Basic search engines (Google, Yahoo, Bling) are useful when one needs background information or a place to start, but one must be cautious as limitless information leads to confusion and one does not always know where the information comes from. Searching the internet can be a frustrating thing. You enter a word or a phrase into a search engine and up comes a stack of irrelevant information. What you need is the ability to refine your search to get exactly what you want. However, by following a few basic search tips, you'll be able to find what you are looking for quickly and easily.

Basic Search strategy

The basic search strategies you could use in order to find information effectively.

1. **Think before your search**

   Think about the topic or question you would like to search.

   a. **Keywords**

      Think about how you would describe the topic and choose 3 or 4 keywords. Keywords are the terms that you use to find content on the internet. Making your keywords as specific as possible will help your search engine to track down the information that you want. You can further refine your search by including other specific keywords. If you add your location, for example, you'll likely find someone local.

   b. **Mapping the information landscape**
      - To understand the breadth of your research you must:
      o Plot the information landscape
        ▪ Subjects terms; concepts; ideas associated with research area
      o Identify what you know about the domain / sub-topics
        ▪ Brainstorming; iterative; may lead to dead-ends
      o Awareness of 'gaps' in knowledge / information needs will define search strategy

   c. **Mind map & Tree Structures**

      These are diagrams used to represent words & ideas that helps to generate, visualize, structure and classify ideas.
      - Using the mind-mapping / tree structure technique, you have:
      o Developed a search strategy through:
        ▪ Understanding / defining your information need
        ▪ Developed and refined your understanding of the topic or information need
        ▪ Understood the bigger picture & how to narrow down to a specific focus area
        ▪ Used visualisation tools to map the information landscape

Mind Map example: Computer
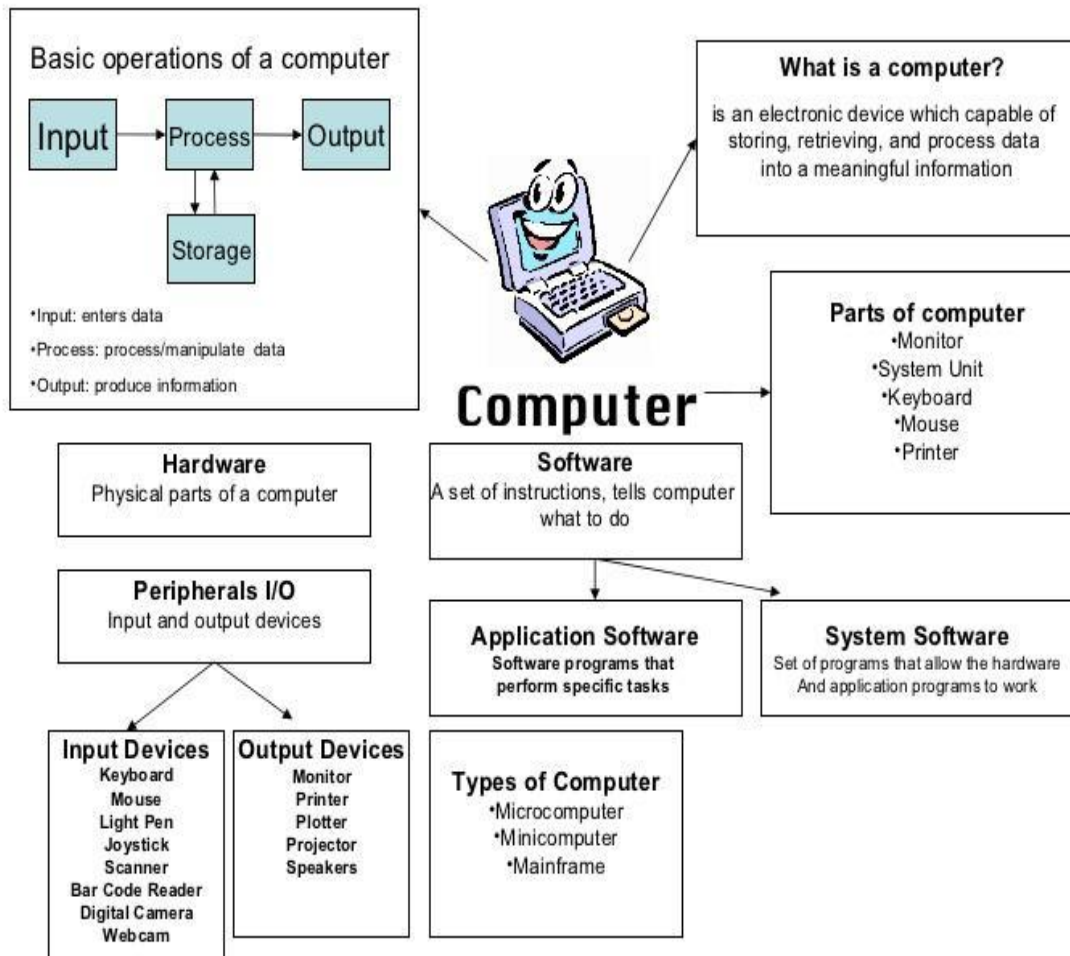
Tree Structure example: Classification of computers
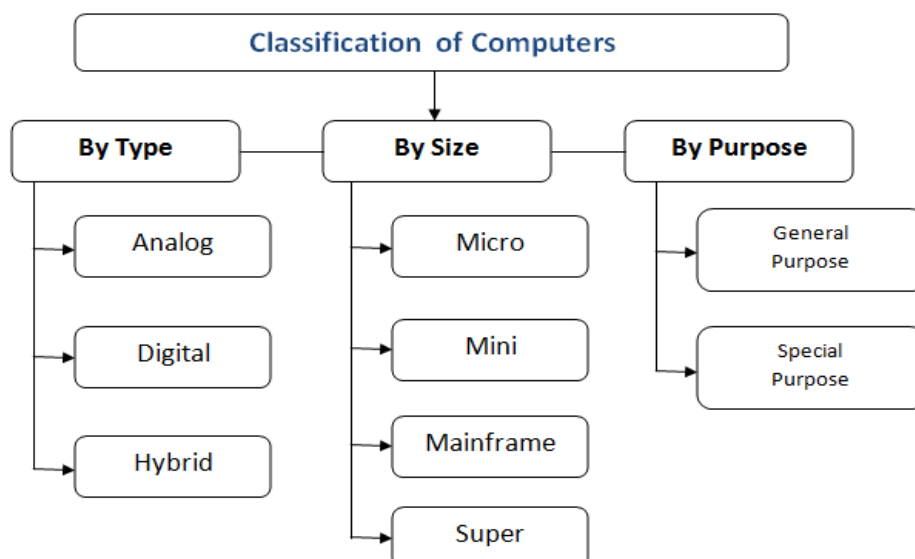
1. **Keep it simple**

   Describe what you want in as few terms as possible. Some engines include stop words in their searches. These are frequently used words such as prepositions (in, of, on), conjunctions (and, but) and articles (a, the), which mean that you'll end up with more pages in your search results than you need. So, it's usually best to eliminate stop words from your internet searches.

2. **Be specific**

   The more precise your search terms are, the more precise your search results will be. Avoid general or common words.

3. **Imagine how the webpage you are hoping to find will be written**

   Use words that are likely to appear on that page.

4. **Capitalization, punctuation and spelling don't really matter**

   In most cases, search engines will ignore capitalization and punctuation in a search and will generally auto-correct your spelling mistakes.

5. **Narrow your search results**

   There are several ways to help you narrow your search results to find exactly what you're looking for. Other characters or terms, known as operators, allow you to narrow down your internet search in more targeted ways. We explore a few, below:

   - *Wildcard Searches:* use the * symbol as a placeholder for another word. For example, searching for *** man in the world** returns results for the richest man in the world, the tallest, the oldest, and so on. Wildcard searches are also useful when, for example, you don't know the full text of a quote.

   - *Combination Searches:* the OR operator enables you to search for two or more terms simultaneously, and is most useful when those terms are very similar. Typing **hardware OR software**, for example, will return pages where either of the terms is used, without both needing to be present.

The OR one expands the search. We have used two terms that are synonyms and have expanded the results.

A AND B   A OR B   A NOT B
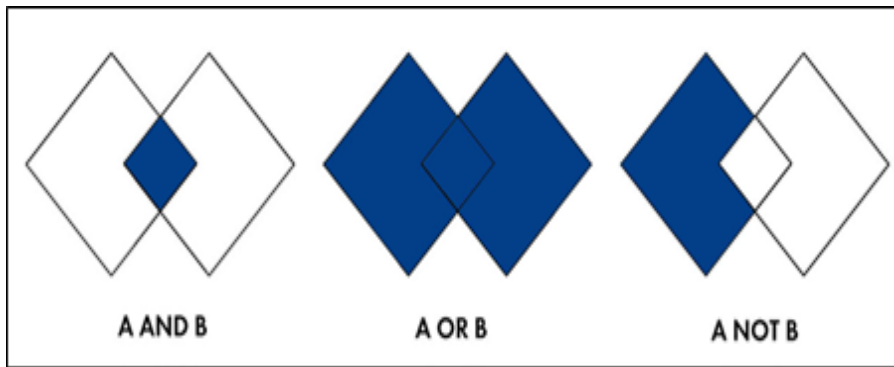
The **OR** is a means of combining synonyms e.g. Hardware OR Software- in each circle's area with the overlap in the middle having both search terms

- Another way to combine searches is to use AND. This operator ensures that you receive only search results that include two or more terms. For example, the search **"input devices" AND "output devices"** would only deliver search results that include the names of both types of devices.

  Using the AND operator makes this search more precise or limited.

A AND B   A OR B   A NOT B
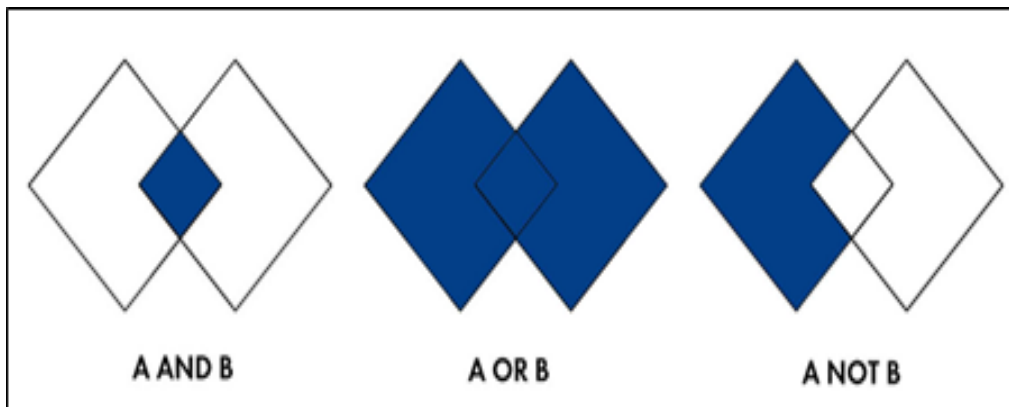
The **AND** operator is used to combine two concepts e.g. input devices AND output devices– results are in the combined area of the two circles.

- The NOT operator is exclusionary – it excludes specific search terms and so the query will not return any results with that term (or terms) in them.
  Example: If you were searching for an I.T. Project Manager, you may want to employ the NOT operator in order to eliminate false positive results – results that mention your search terms but do not in fact match your target hiring profile. In this case, you could run: "project manager" and not construction – this search will not return any results with "project manager" and the word "construction" contained within them

A AND B   A OR B   A NOT B
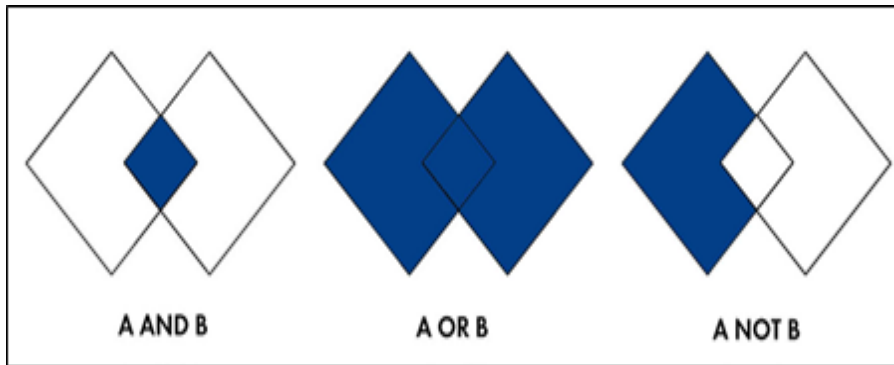
Project manager **NOT** Construction – in the shaded area; eliminates items in 2nd term (Construction) or both terms

6. **Enclosing a search term within quotation marks**. This prompts the search engine to search for that specific word or phrase.

   If the term is a single word, using quotation marks will cut out stemmed variations of it. For example, if you search for the word *director*, you'll likely receive a lot of results for direct, direction, directions, and so on, too. Typing **"***director***"** (with quotation marks), however, will ensure that you only get results for that stem word. If the search term is a phrase, your search will be for that specific phrase, rather than for all the component words as individual items. So, for example, if you search for the phrase ***director of human resources***, without quotation marks, your search will return results based on all of the words in the phrase (except of, which is a stop word.) Surrounding the term with quotation marks, however, will generate results that feature this specific term.

7. **Search a specific site.** If you're looking for a specific topic on a particular website, you can type site: followed by the URL of the website that you wish to search and a search term, you limit your search to a single website. For example, So, **site:mindtools.com "human resources"** will return all the pages from MindTools.com that feature the term "human resources."

8. **Search for a specific filetype.** If you know that you're searching for a particular type of file (a PowerPoint to use with your class for example) use filetype: to narrow your search results to a certain type of file. For example: filetype:pdf will find only PDFs, filetype:ppt will find PowerPoint presentations, and filetype:jpg will find jpg images.

How to evaluate a website

1. **Open the site**

   The first thing students need to do is open the site. When looking through your Google search results, you may want to teach students to open sites in new tabs, leaving their search results in a tab for easy access later (e.g. right-click on the title and click "Open link in new tab"). It can also be worthwhile to explain the anatomy of a Google Search result and the benefits of looking past the first few results.

2. **Skim read**

   Next, skim read the site and determine whether you can read and understand the text. If it's too complicated or difficult to understand, find another website. Decide whether this is the sort of site that *might* provide you with the information you're looking for. If the site is difficult to navigate, cluttered with ads, or has other red flags like poor spelling or inappropriate content you might want to leave straight away. Skimming and scanning is the default way most people now consume new content so this now holds an important role in literacy education. Scanning and skim reading can be worth practicing in the classroom. E.g. give students one minute to look at a text and then share what they think it's all about. This is something that could be tried with emerging readers right up to higher level students.

3. **Look for the answer to your question**

   If you think the site might prove useful, you now need to find out if the information on the site actually answers your question. You could use a search box, navigation menu, or pull up your own search box by pressing Control/Command F. Type in the keywords you're looking for. Stop skimming, and read more closely to see if this information is useful to you.

4. **Consider the credibility of the author or website**

   If the information is there, you need to consider the credibility of the author or website. Can you rely on the information? Here are some things you can look for on the website:
   - **Domain** — sometimes domains that include .gov or .edu come from more trustworthy education or government sources.
   - **Author information** — look at the author bio or About page. How qualified is this person?
   - **Design** — we can't judge a book (or website!) by its cover but sites that are cluttered, difficult to navigate, or look amateurish may be worth avoiding.
   - **Sources** — trustworthy articles usually link to other sources or cite where their facts come from.

5. **Consider the purpose of the site**

   The next step is to think about the purpose of the site and whether it meets your needs.
   - Is the author trying to make you think a certain way? Are they biased or one-sided?
   - Are they trying to sell you something? Sometimes ads might not be so obvious, for example, blog posts can be written to promote a product.
   - Is the author's tone calm and balanced? Articles fuelled by anger or extreme opinions are not going to be the best source of information.
   - Do the headlines match the article? Or are they simply designed to hook readers?
   - Is the author trying to educate the audience and present a balanced and factual picture? This is what you usually want.

6. **Look for the date**

   Finally, it's important to consider whether the information is current enough for your topic. You can look for when the article was written or it might tell you when it was last updated. Sometimes URLs include dates as well. Does it matter how old an article is? Well, that might depend on your topic. For example, if you're looking for the latest research on nutrition or a medical condition, the date might be very important. If the site is no good, bounce back…As

the flowchart demonstrates, if you're ever in doubt, just head back to your search results and try again. You might want to alter your search terms based on the results you're provided with. Sometimes you need to change your keywords or be more specific.

Crosscheck

When you overcome all these hurdles and find some information that looks useful and reliable, it can be a good idea to crosscheck the information. So, have a look at a few other websites to see if they corroborate the information you've found. It's important to remember that you can't believe everything you read and it's essential to consider multiple perspectives. Teachers need to evaluate websites quickly, intuitively, and effectively, in order to get updated and accurate information and resources to supplement their teaching. Evaluating website is part of internet skills that teachers need to master.

Key ideas
- Basic search engines (Google, Yahoo, Bling) are useful when one needs background information or a place to start, but one must be cautious as limitless information leads to confusion and one does not always know where the information comes from.
- There are basic search strategies you could use in order to find information effectively.
- There are important points you must consider when evaluating a website.

Reflection
- Use a diagram to show a search strategy for finding information on the internet.
- As a group, let's create a mind-map to answer the research problem: "Different types of a computer."
- Think of a 'real work-related scenario' where you would be looking for specific
- information.

  Define your information needs.
  Create a mind-map of the related terms.
  Begin to 'cluster' your concepts / terms.
  Create a search table & begin to search for the information.
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion

1. Students on their own will develop an Internet-based project with a focus on integrating technologies on the unit "Introduction to computers". This assignment is should include the following:

- A short outline of the unit *Introduction to computers*.
- A multimedia presentation which includes pictures, text, videos, audio and animation). The presentation should not be more than 15 slides (including title page and references)
- Information gathered authentic educational websites. Add links of where you obtained your information.

2. Look for good websites that you used in finding relevant information for the project in Question 1. Give the feature of the website and indicate how you can apply them in the field of education or in the classroom.

Name of the Website	Features	How you can apply it to your teaching?

UNIT 4:   PROFESSIONAL LEARNING NETWORKS – PLNS

This unit is an introduction to Professional Learning Networks. In addition, learners can follow the steps outlined building a PLN. The unit will also cover the ways educators can use PLNs for professional growth and interaction.

Learning outcome(s)

By the end of the unit, the participant will be able to:
a.   Describe PLN
b.   Site examples of PLN
c.   List the stages of PLN
d.   State at least three ways PLNS helps teachers

SESSION 1:   PROFESSIONAL LEARNING NETWORK

Learning doesn't always take place in the classroom. We have informal learning describes the growth that we undertake in our day to day interactions. There is also just in time learning ask for help on something you need now. And we cannot forget social learning where we learn by modelling and interaction with each other. Professional Learning Networks (PLNs) include these types of learning. Have you ever heard of PLN? Then, today you will learn something new. PLN stands for Professional, or Personal Learning Network. A PLN is a vibrant, ever-changing group of connections in a professional community in which teachers go to both share and learn together. Participating educators, worldwide, make requests and share resources. These groups reflect our values, passions, and areas of expertise. Your department is an example of a PLN. Let us discuss PLN even further in the session below.

Learning outcome(s)

By the end of the session, the participant will be able to:
  a. describe PLN
  b. site examples of PLN
  c. list the stages of PLN
  d. state at least three ways PLNs helps teachers

Meaning of Professional Learning Network
Technology is leading to a flattening of the world as resources, information, and knowledge are widely accessible to anyone with Internet access. Teachers from around the globe are using professional learning networks (PLNs) to connect with one another to share resources, seek help and feedback, and find collaboration opportunities. The PLN consists of relationships between individuals where the goal is enhancement of mutual learning. The currency of the PLN is learning in the form of feedback, insights, documentation, new contacts, or new business opportunities. It is based on reciprocity and a level of trust that each party is actively seeking value-added information for the other (Digeni, 1990). A PLN is a tool that uses social media and technology to collect, communicate,

collaborate and create with connected colleagues anywhere at any time. Any group of people sharing the same profession or interests that share ideas, questions opinions, knowledge, experience, and reflections. PLNs enable teachers and student teachers access to a wide range of experts and communities to support their professional learning. Teachers exchange methods and strategies. Online discussions and links enable access to materials that would not be revealed otherwise. Resources are accessible and exchanged through networked teachers. Teachers develop PLNs to maintain relevancy, following good ideas, rich discussions and resources.

P – It is building professional relationships with teachers, university professors and experts around the world. No matter your location in the world, there is always someone else to answer questions, and share their expertise.

L – It is about sharing ideas and resources, collaboration, and learning. We share our learning, ideas and expertise in different ways; using different media and tools.

N – It is a global learning network, enabling people to tap into and share diverse, global perspectives on teaching strategies, educational issues, and technologies. The internet allows us to form PLNs with more people and much more easily

The stages of PLN
1. Lurking/Skimming
   Lurking- A slang term for when an individual is a member of an online community or professional learning network who observes, but does not actively participate. They do not contribute much, but just *creep around* to get valuable ideas and information. Lurking allows new users to learn the culture of an online community, understand the communities' social norms and become familiar with the key members of the community, before they participate. Skimming- This allows individuals to get the needed information without wasting time. Individuals survey the text and roam words as they gather information in the most efficient way they know how. It is easy to get overwhelmed by the massive amount of information available from blogs, tweets, discussion forums, and wall posts. To prevent information overload, read the titles of posts, skim the first paragraphs of the blogs and the discussion forum threads and scroll down to check out the headings. . If you find something of interest, explore that blog post, thread, or tweet in-depth until your PLN time limit ends. Skimming is most individual's default method of absorbing content online.

2. Asking for help/opinions/questions
   Asking questions is an easy and effective way to spark conversation, create a sense of community and increase PLN engagement. Do not post questions that are too offensive and may start an argument.

3. Giving help/opinions
   Individuals should be given the opportunity to give opinions, tips and wisdom. Posting opinions and making contributions not only increases engagement but also creates a sense of community among members. Post meaningful and relevant contributions. If you notice a unique comment that really catches your attention share it with others.

4.   Starting something (group/discussion)
Invite people to join the conversation. It makes individuals that their opinions, insights and ideas are valuable. Stay abreast with current events and when you get a chance try to integrate yourself into the discussion. Share your thoughts on a topic.

5.   Joining every social network possible
Do not be afraid to join many networks. Try to join as many networks as you can. This way you obtain more ideas, opinions, help and so on.

6.   Finding the right balance
Obtain a balance and do not overload yourself with too much information from posts, forum, bulletins, etc. Learn to observe resources or information that would be relevant to you.

How to build a PLN
In order to build a PLN, four questions one must ask themself. These are:
What tools you use?
Who you connect with?
How you want to learn?
When you want to learn?

After answer the questions, then teachers should:
- Spend 20 minutes a day interacting and collaborating. Here's how:
- Start any PLN account that focuses on following educators.
- Build a circle of connected educators.
- Follow education blogs (read and comment).
- Follow education chats that are specific to your subject area.
- Join and participate in education groups such as Facebook and LinkedIn.
- Accept invitations to collaborate.

Five Steps to building your PLN via Twitter
1. Join
Sign up for twitter.com and create a username (Username should not be too long). Complete your bio so people know who you are, and add an image.
2. Follow
There are thousands of teachers around the world on Twitter. Once you have a few people to follow, look at who they are following and you will start to build a PLN.
3. Lurk
You'll need to spend some time checking out the streams of tweets and getting hang of Tweeting, Retweeting, Direct messaging and Hashtags.
4. Contribute
The more you put in, the more you get out. Make sure you reply people, retweet tweets, ask questions and strike up conversations.
5. Stick with it!
Check on Twitter daily for a month before you make decisions about whether it is for you.
It is about rapports with people and your professional world will be so enlightened.

PLNs and ICTs
PLNs can be facilitated through the use of a range of ICT tools
- Professional learning communities and websites
- Social networking sites (Facebook, Twitter, LinkedIn),
- Social bookmarking tools (Diigo, Delicious),
- Wikis (wetpaint, Wikispaces)
  - *NB. Pick one username, use the same email, and a consistent password for all of your PLN sites*

Social networking sites

Twitter
Twitter, the social media application, a popular PLN for educators who want to connect with each other professionally. The key to following people on Twitter is to focus on those whom you want to emulate. Follow too many people and the information flow can be too much to digest. Each 140-character post allows quick and easy transmissions of information to links yielding websites, videos, podcasts, blog posts, articles, interviews and excerpts -- dream resources for classroom professionals. Teachers stimulate discussions, new resources, and an ongoing supportive network. There are thousands of teachers around the world on Twitter. Once you have a few people to follow, look at who they are following and you will start to build a PLN. You'll need to spend some time checking out the streams of tweets and getting hang of Tweeting, Retweeting, Direct messaging and Hashtags.

By simply asking, teachers receive content and strategies from sources around the globe.

Facebook
Social networking site that not only allows people to keep up with family and friends but also connect and engage with professionals. The Facebook for Education page provides information on how educators can best use Facebook as a resource. Other groups worth following to strengthen a PLN include Edutopia and #EdChat. Each customizable page or group provides a variety of learning opportunities and growth options for educators.

LinkedIn
LinkedIn is currently the world's biggest professional network. They boast more than 400 million members in 200 countries and territories worldwide. They connect professionals everywhere in every field of expertise. It gives you access to people, opportunities, news, and insights to help you grow your success. Teachers adore LinkedIn because of its scope of community.

Social Bookmarking Site: *Diigo*
Social bookmarking is a method for storing, organizing, and sharing bookmarks online. Diigo is a free social bookmarking tool that allows users to share online resources like websites and web tools in a private or public group format. There are lots of different groups on Diigo, many for professional and educational use. Educators can even join groups and receive email updates when new bookmarks are added.

A place where you can store all your bookmarks, pictures, and notes too. Teachers use tags to classify and your school, district, department, class could set up a tag to collect all of your finds. You can install a toolbar to make it easy to maintain and share a single list of bookmarks from any computer.

Wikis
Collaborative websites that provide registered users with the ability to create and edit any number of interlinked web pages. Wikis encourage information sharing and collaborative learning. Educators can view and join some exemplary wiki models at Educational Wikis.

EdWeb.net
EdWeb.net is a feature-rich professional learning network specifically for educators and other leaders of education innovation. Its members are teachers, faculty, administrators, and librarians at K–12 schools and post-secondary institutions. It offers some fantastic personal learning network features and noteworthy free professional learning programs. They even offer personal training and support for educators embarking on edtech adventures.

Blogs
A blog is a way of sharing your knowledge with the world by writing regularly about your ideas in a particular area.
Steps in building a blog
- Decide what you are going to blog about
- Choose a domain
- Decide on the blogging platform
- Start your blog
- Design your blog
- Start blogging

Incredible sources of information that allow educators to reflect, share opinions, and discuss various topics. This is a common medium to discover best practices and examples of innovation as well as learn from professional experiences of both novice and veteran educators. Common blogging applications include Blogger and WordPress.

Digital Discussion Forums
Consist of communities of educators interested in similar topics. One of the most popular sites is called Ning, where educators can create or join specific communities. Ning sites offer a range of learning and growth options such as discussion forums, event postings, messaging, news articles, chat features, groups, and videos. Popular educational Ning sites include The Educator's PLN, Classroom 2.0 and Ning in Education. Other fantastic digital discussion forums are ASCD Edge (you must be a member of ASCD to join) and edWeb.net.

How can PLNs help teachers?

- Professional development – learn from content-area specialists and educators through blogs, etc.
- Locate unlimited resources for your classroom, such as free websites and software; (OER Commons Resources)

- Get lesson plan ideas from master teachers.
- Learn about new technology and how to integrate it into your teaching.
- Find collaborative solutions and share ideas, give their opinions and add their suggestions.
- Find interesting links to education news and learn latest trends in education.
- Collaborate globally on projects and make international connections.
- 24/7 learning offers the flexibility to learn and connect at a time that suits you.
- You can explore your own interests, needs, and passions.

Tips for PLNS

Keep the spirit of collaboration as your driving force.
PLNs are all about working together. Be resourceful. By buying into the process and sharing useful information, your PLN grows naturally. Collaboration creates a common ground and allows others to see your interests. Genuine interest builds a solid, authentic network.

Join an online community.
Nings are online rings of people with similar interests. Sharing ideas and contacting people for direct feedback is more effective in a community setting.   Communities such as, Classroom 2.0 and The Educator's PLN provide a meaningful circle of experts. They provide professional development resources, such as online events, and are a great place to start networking. Plus, using Edmodo, or Ning you can create your own virtual space to share pictures, documents, calendars, or projects.

Become a beacon of light
PLNs rely on open sharing of information. So if you know something, share it! It's best to start with a specific interest and then grow into other topics as time goes on. Become an expert in your niche by researching current trends. This will draw a larger following on your network, because you can provide a novel source of information. You might write a blog, share a free tool, or create a Youtube video.

Don't be afraid to ask questions.
Try to be specific and think of how a question might generate interest from others. For example, you may want to refer to an article or research study when asking a question. Be specific! This will generate the best answers.

Be an active participant.
Brain power is the main asset of a PLN. Spend some time to identify a specific cause and communicate it on your profile. Let your knowledge of a specific cause help grow your PLN. Keep up to date with your niche. Stay relevant. Try to post at least once a week.

Remember to be polite and acknowledge contributions to the rightful owner.
Show common respect for the people in your network. This may seem like common sense, but can be a pitfall. It took me some time to learn "web etiquette" over the years, but it has helped me tremendously.   Send thank you notes, acknowledgements, and use your true voice. Not only does it make the other person's day, but it will help you gain more meaningful connections.

Designate a professional and personal account. Teachers can keep their social life on Facebook and their professional life on Twitter, LinkedIn, and Google+. There can be some crossover, but it's best to keep it minimal so things are easy to find. Certain groups will appreciate different types of content. Your Facebook friends might find your baby's stories adorable, but your Twitter followers might not appreciate extra messages cluttering their inbox. Do this in ways that are comfortable to you. You might designate accounts for each sphere of your life.

Key ideas • A PLN is a tool that uses social media and technology to collect, communicate, collaborate and create with connected colleagues anywhere at any time. Any group of people sharing the same profession or interests that share ideas, questions opinions, knowledge, experience, and reflections. • The stages of PLN include: Lurking/Skimming; Asking for help/opinions/questions; Giving help/opinions; Starting something (group/discussion); Joining every social network possible and finding the right balance. • PLNs can be facilitated through the use of a range of ICT tools such as professional learning communities and websites, social networking sites, social bookmarking tools and wikis. • There are various ways in which PLNs can help teachers.
Reflection • What experiences have you had with Professional Learning Networks in your school? What did you discuss? How did that help you support your teaching? • How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
1. Each participant will create his or her professional learning network (PLN). A PLN is a group of people with whom one connects, communicates, and collaborates in the sharing and exchanging of information and ideas, and through whom one increases one's knowledge and understanding of topics of interest. Depending on your interests, members of your PLN may be known or unknown to each other and may have a set of disparate or similar interests or ideas. Most often, they are an extended community of people that stretches across the globe. A key feature is that members of your PLN meet your specific needs for information, knowledge, and ideas. Task each participant to work with his or her group to accomplish the following assignments:
a. Ask each participant to create a Facebook account (If they don't already have one) .
b. Ask each participant to identify and follow at least five blogs from the following:
    • Google for education
    • Technology Teaching Resources with Brittney Washburn
    • TeachThought
    • Education to the core
    • Ghana Education Service
    • MindShift
    • Edutopia
    • Teach with Tech
    • Edutech for teachers
    • EdHelper
    • eLearning Industry
  Create a Youtube Account
  Create an account on The Educator's PLN

Create an account on EdWeb.net

Create a Google account and begin using Google Drive to promote student engagement
These PLNs should be followed for 2 weeks and then make a report.
2. Join a discussion forum. Look or a forum which discusses a topic of your interest. Join
   the forum and answer the following questions.
   a. Discuss the topic of the forum.
   b. Who are the people in the forum?
   c. What insights did you share?
   d. How did the people respond to your insights?
   e. What learning did you get?
   f. How do you find joining a forum?

UNIT 5:   USING INSTRUCTIONAL SOFTWARE IN TEACHING AND LEARNING

This unit would define instructional software. Instructional software was first used as a tutoring tool for students in the 60s and 70s, but over the past 30 years, it has evolved into software that incorporates some or all of the five functions for helping students learn. Instructional software is any type of software that is designed specifically to deliver instruction and promote student learning. It is designed to assist with student instruction on a topic. Todays' instructional software also uses both objectivist and constructivist learning concepts in its design, which benefits the learner since both concepts are valuable to accomplishing educational goals for students. This unit would also describe five types of instructional software, which are: drill and practice, tutorials, simulations, educational games, and problem solving.

Learning outcome(s)
By the end of the unit, the participant will be able to:
a.   Define instructional software
b.   Describe any five principles in designing instructional software
c.   Explain Drill-and-practice software
d.   Describe Tutorials software
e.   Differentiate between the various types of simulations software
f.   Explain the types of educational game software
g.   Describe the six steps that assist teachers to integrate Problem-Solving courseware
h.   List seven steps for integrating problem-solving courseware

SESSION 1:   INSTRUCTIONAL SOFTWARE
This session involves the definition of instructional software and types of instructional software. The importance of instructional software and principles of instructional software was also discussed.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define instructional software.
b.   List five examples of instructional software.
c.   Explain any two reasons instructional software are important.
d.   State any five principles of instructional software.

Meaning of instructional software
Instructional software are programs that are designed to teach skills or information through demonstrations, examples, explanations, or problem solving. Instructional software is one of many resources' teachers can use to implement educational technology into the classroom.   Instructional software can be found in many formats: purchase hard copies, downloaded or used virtually. The purpose of having software in the classroom is to help students learn content and/or skills on a variety of topics. When instructional software is integrated into the classroom, it can help support student learning in the classroom. Instructional software can reinforce concepts from the classroom, by engaging students in supplementary activities such as games, simulations, review questions, and

tutorials. Instructional software can also be used to help differentiate in the classroom. Instructional software can be adaptive, which allows students who are exceeding to move on and practice more difficult topics, while those who are struggling can spend time mastering confusing topics. Many instructional software allow educators and parents to track student progress and identify areas in which additional instruction may be necessary. Unfortunately instructional software is not always readily available in schools and homes. Instructional software is best used to increase classroom curriculums, but in most cases, should not be the only instructional method for learning. Instructional software no longer is thought to be a replacement for teachers, but a TOOL that helps teachers do a better job of teaching their students. Instructional software is valuable to all ages of students for many reasons including: making learning more fun, motivating students, helping with long-term memory of the material, and providing a thorough educational experience that incorporates many proven learning concepts into the curriculum.

Types of instructional software

Drill & Practice software allows learners to learn through repetitive practice. Drill & Practice can be a simple or small task that can consist of memorization, vocabulary, arithmetic problems, historical terms, etc. The more the learner applies drill & practice skills the more ingrained learning becomes to the learner hence, practice make permanent. Tutorial software can be viewed as an electronic instructor that delivers information and teaches step by step instruction either through online web based instruction or through software for a specific content or academic area. The great advantage of tutorials is that the learner can view a specific task over and over when remediation is needed. Simulations are virtual models that can show or demonstrate through either ideas, concepts, procedures or methods. Learners can interact and practice skills through emulating the tasks. Simulations can be categorized in two areas; teaching about something and teach how to do something. Instructional games can increase enthusiasm and foster motivation through game based components that can incorporate both drill / practice and simulations. This type of instructional software can be very stimulating to the learner because of its game qualities which can also stimulate competitiveness. Problem solving Software teaches the learner through step by step procedures to solve the problems at hand. The learner recognizes the objective, thinks of the steps in order to achieve it. It can be through guided practice with explanations and reasoning supported by the electronic tutor.

Importance of instructional software

There are many great reasons why instructional software is important. These are:

Improves engagement

When instructional software is integrated into lessons, students are expected to be more interested in the subjects they are studying. Instructional software provides different opportunities to make learning more fun and enjoyable in terms of teaching same things in new ways. For instance, delivering teaching through educational games, taking students on virtual field trips and using other online learning resources. What is more, instructional software can encourage a more active participation in the learning process which can be hard to achieve through a traditional lecture environment. Instructional software integrates multimedia content and provides users a high interactivity level. The two features distinguish them from traditional teaching practices. Multimedia content, such as graphics, pictures, and sound help engage students in their lessons. Increased enjoyment of learning because students shift from the passive role of receiving knowledge to the more active role of becoming seekers of knowledge. Furthermore, an instructional software benefits

teachers, allowing them to better connect with the students and help them keep students interested in a lesson.

Improves knowledge retention
Students who are engaged and interested in things they are studying, are expected to have a better knowledge retention. . Increased retention from the enhanced engagement and participation of the learner. As mentioned before, instructional software can help to encourage active participation in the classroom which also is a very important factor for increased knowledge retention. Different forms of instructional software can be used to experiment with and decide what works best for students in terms of retaining their knowledge.

Encourages individual learning
For instance, this software will enable your students to become more effective independent learners**.** No one learns in the same way because of different learning styles and different abilities. Instructional software provides great opportunities for making learning more effective for everyone with different needs. For example, students can learn at their own speed, review difficult concepts or skip ahead if they need to. What is more, v can provide more opportunities for struggling students.

Students can learn useful life skills through technology
By using instructional software, both teachers and students can develop skills essential for the 21st century. Students can gain the skills they will need to be successful in the future. Modern learning is about collaborating with others, solving complex problems, critical thinking, developing different forms of communication and leadership skills, and improving motivation and productivity. What is more, instructional software can help develop many practical skills, including creating presentations and designing materials for their own learning. This promotes a productive learning environment. These are very important skills that can be developed in the classroom.

Increases cost-effectiveness
This software can also enable students to gather information that otherwise would have been impossible, time-consuming or costly. For instance, data from outer space can now be utilized. Students can also experiment with the changing aspects of a model like increasing or lowering interest rates in order to see how this affects the economy.

Enhances sale-paced instruction
Self-paced instruction encourages the student to invest the time in weak areas rather than in areas they have already mastered.

Principles of designing instructional software

Required Instructional Design and Pedagogy
- Appropriate teaching strategy, based on best-known methods.
- Presentations contains nothing that misleads or confuses students.
- Comments that are not abusive or insulting.
- Readability at an appropriate level for students.
- Graphics that are not distracting to learners.

Required for content
- No grammar, spelling, or punctuation errors on the screen.
- Accurate, up-to date content.
- No racial or gender stereotypes.
- Social characteristics exhibiting sensitivity to moral values.

Required for User Flexibility
- User has some control of movement within the program.
- User can turn off sound, if desired.

Required Technical Soundness
- Program loads consistently, without error.
- Program does not break, no matter what the student enters.
- Program does what the screen says it should do.

Optional Student Use Criteria
- Student ease of use
- Required keys
- Input devices
- Directions
- Supportive materials
- Optional assistance
- Optional directions
- Creativity
- Summary feedback

Optional Teacher Use Criteria
- Teacher's ease of use
- Management
- Teacher manuals
- Ease of integration
- Teacher assistance
- Adaptability

Optional presentation criteria
- Graphics features
- Screen layout
- Speech capabilities
- Required peripherals

Optional Technical criteria
- Response Judging
- Timing
- Portability
- Compatibility

- Technical Manuals

Key ideas
- Learning Instructional software are programs that are designed to teach skills or information through demonstrations, examples, explanations, or problem solving.
- There are five types of instructional software, which includes: drill and practice, simulations, educational games, tutorials and problem-solving software.
- There are many great reasons why instructional software is important.
- It is important to consider the principles in designing instructional software.

Reflection
- What experiences have you had in developing any instructional software? What principles did you consider in your design?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
You have probably downloaded types of instructional software to support your teaching. Describe some of the instructional software you used in your teaching. What principles did they consider in their design?

SESSION 2: DRILL-AND-PRACTICE
This session involves the definition of drill-and-practice software. The basic procedure and reasons for using drill-and-practice software would also be discussed.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define drill-and-practice software.
b.   Describe reasons for using drill-and-practice software.
c.   State the basic procedure of a drill-and-practice software.

Meaning of drill-and-practice instructional software
Drill and Practice software allows learners to work problems or answer questions and get feedback on correctness. Drill and practice software provide students with the opportunity to practice previously learned concepts by presenting items for students to answer. This type of software will typically provide immediate feedback to the student. The feedback is usually as simple as "OK" or "No Try Again". There are many benefits to this software. A few are that it gives immediate feedback, its motivating because the kids enjoy being on the computer, and it saves the teacher time. Teachers can use this software for the replacement of worksheets or even as homework. The best way might even be to help the student prepare for test. This type of software utilizes working examples that allow for the user to practice solving the problems. The software provides feedback on whether the exercise was done correctly (Doering & Roblyer 2010). This type of software provides students with immediate feedback, which can increase student motivation for learning and also save teacher time, since teachers don't need to check drill and practice. Drill and Practice software allows

students to work example items one at a time. Students benefit from these activities because they gain automaticity of basic skills with repetition (Roblyer & Doering, 2013). A create your own drill and practice website, http://www.quizlet.com, allows teachers (or students) to create their own drill and practice items, which can include math facts, vocabulary, subject-specific content, and even standardized test content.

Reasons for using drill-and-practice
- Help learners master materials at their own pace.
- Repetition is used as a reinforcement tool.
- Immediately informing the learner whether each of his/her responses were correct/incorrect.
- Keeping of accurate record of missed items for later presentation.
- Presenting additional practice when needed.
- Adjusting the speed of presentation when it is regarded as important.
- Presenting the information to be learned in a manner that will make it easier to remember.
- The sound, colour, animation and other capabilities of the computer may add value to drills.
- Teaching of certain memory strategies such as mnemonic devices may be undertaken with computer-based drills.

Basic Drill Procedure
Drills usually start off with an introductory section, followed by a cycle which is repeated many times. Each time the cycle is repeated the following actions generally take place:
- An item is selected.
- The item is displayed.
- The learner responds.
- The program judges the response.
- The learner receives feedback about the response.

Some drills select items randomly while others select them in a specific order. After a number of items the program terminates. Although most drills follow this basic procedure, there are many variations.
Some drills terminate after:
- a set number of items, e.g. hundred items
- a set period, e.g. 15 minutes
- a learner's performance reaches an acceptable level of quality, e.g. speed/accuracy.

Key ideas
- Drill and practice software provide students with the opportunity to practice previously learned concepts by presenting items for students to answer.
- There are many reasons drill-and-practice software should be used in teaching.
- Drills usually start off with an introductory section, followed by a cycle which is repeated many times.

SESSION 3: TUTORIAL SOFTWARE

This session includes definition of tutorial software. This session also discusses the structure of tutorial software. The elements of the tutorial software was also described.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define tutorial software.
b.   Describe the structure of a tutorial software.
c.   State the elements of a tutorial software.

Meaning of tutorial software
This type of software envelops the entire instructional sequence, from beginning to end of a lesson. This is intended to be self-contained and not require outside sources for additional instruction to master the lesson. This is a true teaching software (Doering & Roblyer 2010). Tutorials give instruction without the teacher. Good tutorials include a practice section with immediate feedback to check comprehension, provide user-control, cover content adequately, and allow students to answer appropriately (Roblyer & Doering, 2013). Tutorials have the benefit of self-paced instruction that is self-contained. They are beneficial for students who may need extra practice or extra instruction if they miss a class. Students should be able to stop and start tutorials to fit their needs, and they can be used for differentiated instruction. Tutorials (teacher-directed methods) deliver traditional instruction in skills rather than letting students create learning experiences through generative exercises and project development. Gagne said that good tutorial software should address all nine instructional events. There are two categories when talking about tutorials. The first is linear, its simple and gives the same instruction and feedback to everybody in the class. Branching is a little more complex. It directs students on different paths based on the answers that students gives. Teachers should note that tutorials should not replace the teachings form the teacher. It can be used as a review of the instruction, another learning strategies and can be used when the teacher is not available. Tutorials in teaching are self-paced reviews of instruction, an alternative learning strategy and permit instruction when teachers are unavailable. For example, https://www.khanacademy.org/. Khan Academy provides tutorial videos on various content areas idea for students who have missed lessons or need extra practice.

Structure and sequence of a tutorial programme

All tutorial programmes aim to satisfy two key things:

    i. Information is presented or skills are modelled

    ii. The learner is guided through initial use of the information or skills.
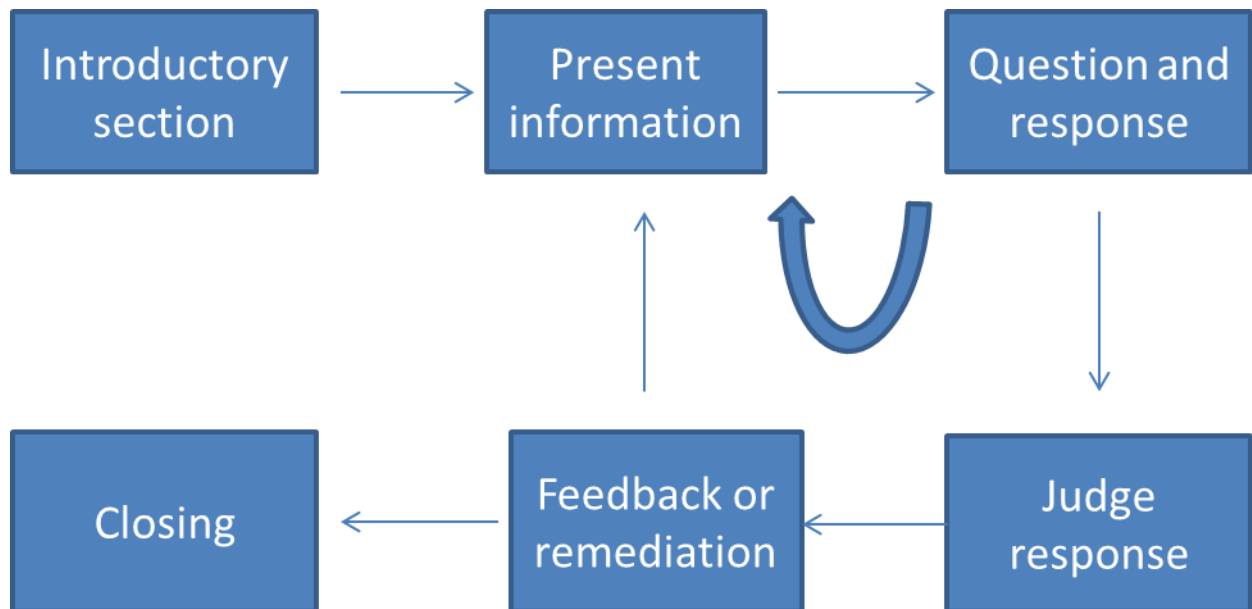
A.   **Introduction**

Apart from the title pages and directions, the introduction of Tutorial programmes must have 3 important areas to look at:

1. Presentation of objectives
2. Stimulating prior objectives
3. Pretesting

B.   **Questions and responses**

A tutorial that presents information without interaction with the learner cannot be successful. Here, the most common method of interaction is to pose questions that the learner must answer. They keep the learner attentive to the programme, provide practice, encourage deeper processing and assess how well the learner remembers and understands information. Questions provide a basis for programme sequencing, i.e. a programme can change what is presented next based on a learner's response.

Frequency of questions and the four-part cycle

Questions (or other interactions requiring thoughtful response) should occur frequently. Sequences of information presentation should be kept short. The learner reads or inspects small amounts of information and then answers questions thus enhancing comprehension and recall. **The four-part cycle** (*present information, question and response, judge response, feedback or remediation*) **should occur frequently.**

C.   Judgment of Responses

Judging is the process of evaluating a response to give feedback, to make programme sequence decisions and to store performance data.

Types of judgement

- The response is correct
- The response contains an expected error
- The response contains an unexpected error
- The response is partially correct i.e. it contains some but not all of the correct information
- The response is neither right nor wrong.eg. names

D.   Feedback

Feedback is the reaction of a program to a learner's response and may take many forms.

- This includes text messages and graphic illustrations, audio and video clips as well as markup.
- The ultimate aim is to inform the learner about the correctness of a response.
- Providing reinforcement for the learner should follow correct responses.
- Providing correction with the purpose of improving future performance , should follow incorrect responses.

The Elements of Well-Designed Tutorial Software

Tutorials are geared toward learners who can read fairly well and usually older students or adults.

- Extensive interactivity.
- Thorough user control.
- Appropriate and comprehensive teaching sequences.
- Adequate answer-judging and feedback capabilities.

Key ideas

- Good tutorials include a practice section with immediate feedback to check comprehension, provide user-control, cover content adequately, and allow students to answer appropriately.
- The structure of a tutorial software has four aspects, which are; introduction, questions and responses, judgment of responses and feedback
- There are four elements of a well-designed tutorial software, which include interactivity, user control, teaching sequence and judging/feedback capabilities.

Reflection

- What experiences have you had with downloading or designing a tutorial software?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

SESSION 4:   SIMULATION SOFTWARE

This session defines simulation software. This session also describes the types of software and reasons simulations are used in education.

Learning outcome(s)

By the end of the session, the participant will be able to:

a.   Define educational simulation.

b.   Explain the types of simulations.

c.   State five (5) reasons simulations are used in education.

Meaning of simulation software

A simulation is a computerized model of a real or imagined system designed to teach how a certain task or situation or a similar one works. This is best described as a computerized model of a real or imagined system that is designed to teach how the system works. Most simulations make the student choose tasks to do or the order in which to do them. By duplication real world situations, learners are not only motivated, but learn by interacting with simulations in a manner similar to the way they would react to the real world. In this simplified world, the learners can solve problems, learn procedures, come to understanding of the characteristics and phenomena and how to control them, or learn what actions to take in different situations. For example, http://bridgecontest.usma.edu/download.htm - this allows for the learner to build different types of bridges, test the bridges and analyzę the testing information. http://thesims.ea.comhttp://thesims.ea.com - this software allows the user to control and see the effects of changing elements to a realistic scenario effects the outcome of the sims.

Types of simulations

Simulations may be divided into two groups, namely simulations that teach about something, i.e.:

- Physical simulations
- Process simulations

Simulations that teach how to do something, i.e.:

- Procedural simulations
- Situational simulations.

Physical simulations

A physical object or phenomenon is replicated on the screen, giving the learner an opportunity to learn about it. Typical examples are glaciers, light through lenses and prisms and transmission of electricity through power lines.

Process simulations

Process simulations are used to inform learners about a process or concept that does not manifest by itself visibly, e.g. functioning of the economy, laws of supply and demand and population growth and decline. Process simulations are usually not as interactive as other types of simulations. The learner usually selects values and then evaluate the process without any further intervention. The values can be reset and the process repeated. Process simulations can accelerate or slowdown a version of the real process. e.g. genetic processes.

Procedural Simulations

The purpose of most procedural simulations is to teach a sequence of actions that constitute a procedure, e.g. operating a hand-held calculator, performing titration, diagnosing equipment failure and landing a space shuttle. The simulations are designed to meet procedural requirements, not necessary how the object looks like. Many medical simulations fall within this category, as well as the diagnosing of faults in electronic equipment, etc. In all of these cases, whenever the learner acts, the computer program reacts, providing information or feedback about the effects the action would have in the real world.

Situational simulations

A simulation is a computerized model of some phenomenon or activity designed to teach how a certain task or situation works. By duplication real world situations, learners are not only motivated, but learn by interacting with simulations in a manner similar to the way they would react to the real world. In this simplified world, the learners can solve problems, learn procedures, come to understanding of the characteristics and phenomena and how to control them, or learn what actions to take in different situations. A primary characteristic of procedural simulations is that there is one or more correct or preferred sequences of steps which the learner should learn to perform. A procedural simulations provides the opportunity to explore the various different operational paths and their associated effects.

The rationale for using simulations

Enhances Safety

Many experiments cannot be carried out in the classroom because they are dangerous, and yet learners will need these skills in the workplace. Simulation programs can represent these dangerous events without the hazards If the learner were to make a mistake, the experiment can be repeated without injury.

Experiences not readily available in reality

Real-life experiences are not readily available, but a simulated trip in the past brings the learner some feeling of what it must have been like.

Modifies instructional time frames

In some circumstances it is helpful to accelerate the passing of time and sometimes it is very useful to slow down time. Some actions happen too fast to see, such as the movement of a bat. Other take so long that it is difficult to gain perspective of the process, such as the metamorphosis of a

butterfly. It is much easier for a learner to conceptualize what is occurring when it is presented in a time frame that highlights the changes.

Controls level of complexity

Simulations can control the complexity of the learning situation for instructional benefit. It thus provides the learner with an environment that is more conductive to learning than the real one. Distractions are filtered out and the learner is left with a situation in which attention is being concentrated on aspects actually relevant to the immediate task at hand. This model should not be simplified to the extent that the learning experience becomes distorted. It should not be so complex that learners of the intended level are unable to master it.

Introduction of new topics

Simulations can help to introduce a new topic. The introduction of a new topic to a class can be a problem, as there is often much information to be covered before the learners have enough knowledge to do anything interesting. An extensive introduction can be boring for the learners and they may loose interest in the topic. A simulation can assist in introducing the topic and raising questions.

Motivation

A good simulation program motivates learners because it is inspiring. Short from the real situation in question, no other learning material allows the learner to enter and explore the situation to the same extent.

Simulates instruction

The instructor can also be simulated. The simulated instructor is always available and infinitely patient. The simulated instructor can: monitor learner performance, identify errors and attempt to diagnose conceptual problems.

Saves money

Simulations can save money, e.g. it is uneconomic to: Build boats to obtain the best hydrodynamic shape; Use large quantities of expensive raw materials in various versions of manufactured articles; Crash land airplanes every time the learner pilot makes a mistake.

Simulates the not possible

It can simulate the not-possible, e.g.: Trying different patterns of industrial development in an area (e.g. SimCity); Changing the weather to see the influence on agriculture.

Eliminates frustration

Learners often encounter experiments that do not work as the result of faulty apparatus or techniques. A simulated experiment can be repeated many times without concern of materials and apparatus. Medical treatments can be repeated until the correct treatment of a sick patient is learned. Finding patients with "ideal" symptoms are difficult.

Discovery learning

The introduction of discovery learning has been strongly advocated for a number of years. What-if questions can be asked effectively, e.g. 'what would happen if I doubled the dose prescribed?'

Learners have more interaction with the content and are thus more likely to assimilate the knowledge, skills and concepts involved.

Social interaction and social skills
Situational simulations allow learners to explore the effects of different approaches to a situation, or to play different roles in it. The learner becomes an integral part of the simulation, taking one of the major roles. Other roles may be taken by learners who interact with the same program, or by the computer playing the role of a person. The interaction of learning together allow learners to view other people as individuals and accept that others will act in ways that cannot be anticipated.

Transfer of learning
Simulations can help in the transfer of skills or knowledge learned in one situation and applied in other situations. Traditional instruction provides the learner with information, tips, hints and exercises. Simulations provide the learner with actual practice and immediate feedback.

Efficiency
Research has shown that simulations are more efficient in the sense that: more transfer occurred per unit of learning time with simulations than with formal lectures.

Higher-order thinking skills
It has been suggested that verbal interactions between learners, when using simulation software facilitate higher-order thinking, as learners readily interact with their peers to solve problems.

Key ideas
- A simulation is a computerized model of a real or imagined system designed to teach how a certain task or situation or a similar one works.
- There are four types of simulation software which includes physical, process, procedural and situational.
- There are many reasons why simulations are used in education.

Reflection
- What experiences have you had with downloading or designing a Simulation software?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
Describe a simulation software you downloaded or designed? How did it support your teaching?

SESSION FIVE: EDUCATIONAL GAMES
This session includes the meaning of educational games software and types of educational games software. The factors and pitfalls of educational games software is also discussed. The session also looks at the benefit's educational games software.

Learning outcome(s)

By the end of the session, the participant will be able to:

a.   Explain educational games software.
b.   Describe the types of educational games software.
c.   Describe any four factors in educational game software.
d.   Explain the pitfalls of educational games software.
e.   Describe the benefits of educational software games.

Meaning of Educational games

Educational games are those intentionally designed for the purpose of education, or those entertainment games that have incidental or educational value (IGI Global dictionary). An educational game, one designed for learning, is a subset of both play and fun. It is a melding of educational content, learning principles, and computer games (Prensky, 2001).This type of software bridges the worlds of gaming, entertainment, and education in an attempt to deliver fun and interactive learning (Doering & Roblyer 2010). Technology based games link the world of gaming, entertainment and education, i.e. edutainment, together in ways that encourage both fun and learning. Instructional games provide the means for learning activities that have rules and can provide a sense of competition. The whole purpose is to keep students motivated and engaged while actually working on a curriculum topic. They can be used in place of worksheets and exercises, to be used in group work, and/or as a reward / competition. Educational games provide students with competition during instructional activities. When students know they're playing a game, they're more likely to be excited and engaged in learning. The functions of games are designed to help students understand concepts, learn domain knowledge, develop problem-solving skills and hold student's attention or supply a reward for accomplishing other activities.

An example is "Where in the World is Carmen Sandiego?" This program lets student's travel to different cities all over the world and learn interesting facts about each city's geography, history, and people. It would be good for students to solve cases or gather information for school assignments, a rich electronic database is included, featuring narrated video clips, regional music, maps, and comprehensive essays. Students will get a chance to test their knowledge of world geography, developed vocabulary and deductive reasoning skills, and practice map-reading. This program has logic and memory testing puzzles that you had to solve in order to get clues. The program is not only introducing knowledge of geography and different cultures, but is also really exercising your thinking skills. Another example is Mavis Beacon Typing, it has educational games which allows the learners to increase proficiency and pace in typing whiles having fun.

Types of Educational games

Adventure and Role-playing Games: it is a game in which the player assumes the role of a character in a situation about which little is known. The objectives of these programmes include learning about *history, culture, geography, trip planning, money management, safety, problem solving, math, reading, science and languages.*

Business games: Used by adults in business and economics.eg. Capitalism, Capitalism Plus. They apply the principles of running a business, such as economics, personnel management, accounting

but also incorporate competitive aspects such as producing better and cheaper products than other companies, serving customers better and advertising more wisely than other competitors. It helps teach about the competition and teamwork that are a large part of the business world.

Combat games: Although very popular, they have become very unpopular as a vehicle for education, because of its violence and destruction of things. However, others have succeeded in educating users. Eg. Math blaster, reading blaster, science blaster. These are drill games that require learners to practice skills and to use information such as maths, reading or science information. The player destroys space garbage, solves math problems, or tries to escape from monsters and enemy spaceships.

Logic games and puzzles: They are those that require the learner logical problem solving to succeed. Eg. The lost mind of Dr. Brain. Here, the learner must solve a variety of visual problems and puzzles that include patterns, sequences and cause-effect relationships. Logic games teach problem-solving skills such observation, collecting information, formulating solutions and trying them out. Logic games can also incorporate practice for reading, math and other content areas.

Word games: They challenge learners with a variety of activities requiring the recognition, production or analysis of words. It can come in the form of words and their meanings to teach vocabulary. Other word games include crossword puzzles and activities based on popular non computer games such as Scrabble and Password.

Factors in educational games
There are seven important factors that are considered in games. The more these general factors are present, the more game-like an activity is considered to be.

Goals

- Every game has a goal to which a player strives to achieve at the end.
- This includes scoring points, solving mysteries, discovering unknown lands, guessing words or solving problems.
- The game goals must have a relationship with the learning goals.

Rules

- Rules define what actions are allowed within a game and what constraints are imposed.
- Rules must be designed to make a game interesting, challenging and fair for multiple players.

Competition

- Games usually involve some form of competition either against a human opponent, against the computer, against oneself, against chance or time.
- Many games combine these elements.
- Competition is the characteristic most strongly identified with games.
- Competition against the computer, imaginary characters or among teams is used more frequently.

Challenge
- People play most games to be challenged.
- Challenge differs from a goal in that challenge is what one has to overcome or succeed at to reach a goal.
- A learner may begin at the easiest level but in order to win a game, he/she must solve problems at the highest level of difficulty.
- This technique is a good application of challenge for motivation.
- It allows learners to be challenged at their current level of skill and to adjust the difficulty of the challenge as they progress.

Fantasy
- Games generally rely on fantasy for motivation.
- Degree of fantasy can range from a close representation of reality to a more distant representation, a totally imaginary one.
- Realistic fantasy – imagining yourself in a desirable and possible situation is more appropriate for adults.
- Imaginary fantasies are more acceptable to children.

Safety
- Games often serve as analogs for real-life activities and at the same time provide a safe way of participating in a more dangerous or expensive reality such as in combat games or business investment games.
- The safety of a game encourages learners to explore alternative approaches with the knowledge that failure at worst means losing the game.

Entertainment
- Almost all games are entertaining even though that is not necessarily their primary purpose.
- Learning games, although primarily intended to facilitate the acquisition of new knowledge and skills, use their entertainment appeal to enhance motivation and learning.
- To increase the entertainment value of a game, use multimedia techniques.eg. Video, 3D animation, sound effects.

Pitfalls Associated with Creating and Using Games

There are some of the pitfalls associated with educational games. These are:

Difficulty in making games fun

Designing and implementing enjoyable games is difficult. It requires an understanding of human nature, the activities that are considered fun for your target population and an artistic touch. Many students and professional designers adhering to accepted design guidelines have attempted to create motivating games. We have seen only a few that were fun for people besides the designers. Telling learners that an activity is fun will not make it so.

You may consider a game to be fun and to fit your definition of a game but if learners disagree they may see your efforts to convince them as an attempt to trick or deceive them.

Conflict between educational goals and the characteristics of games

Winning versus losing is the characteristic most central to an activity being considered a game. It is also the feature that frequently conflicts with learning goals. A game's goal (winning) must be consonant with the learning goals and the activities that facilitate learning. An example of such consonants arises in the decision to design a simulation versus a simulation game. Simulations are often employed to encourage experimentation.

But if the simulation is embedded in a game the goal of winning the game will almost always take precedence over the goal of experimenting. Other game characteristics that may conflict with educational goals are luck, penalties and fantasy.

Efficiency of learning in games

Games are almost always less efficient than other methodologies. An adventure game can make learning Spanish vocabulary much more fun than a conventional drill. However, more words will be learned per hour with the drill than with the game. A significant amount of time is spent reading directions, taking turns, obeying rules and generally attending to the scenario of a game.

Disagreement about whether games are intrinsic or extrinsic motivators

The common assumption is that a game that is fun is intrinsically motivating. Based on that assumption, one might embed a lesson on world ancient history to increase intrinsic motivation. But what is the intrinsic motivation, playing the game or learning the history? It is plausible that the learner is intrinsically motivated to have fun and to win the game but he is extrinsically motivated to learn history.

Educators' negative beliefs about games

There are a variety of negative perceptions of games among educators. Some believe that learning of a content area should be motivating by itself and should not require games. Other believe that learning is serious word and should not be demeaned with games. Some worry about the effect of games on classroom environment or the opinions of parents who hear that their children are playing games in school.

Benefits of Educational games

Increases a Student's Memory Capacity

Educational games often revolve around the utilization of memorization. This not only relates to games whereby students have to remember aspects in order to solve the game, memorize critical sequences, or track narrative elements.

Computer & Simulation Fluency

This is something which is very important because we live in a world which is dominated by technology. Playing educational games via the internet allows students the opportunity to get used to how a computer works and thus it becomes second nature to them. There are websites, which provide students with entertaining and stimulating educational games which also teach them to utilize the mouse and keyboard properly, not to mention browsing, username and passwords, and general internet navigation.

Helps With Fast Strategic Thinking & Problem-Solving

Most educational games, especially logic and puzzles, require students to think quickly. Moreover, they have to utilize their logic in order to think in order to solve problems and complete levels. This is great because it is something which helps students in their later years as they develop their logic, their accuracy and their ability to think on their feet and outside of the box. This means that the player has to think carefully before making any move to ensure that they stay within the required rules of that particular game. The player needs to make split- second decisions that will determine whether or not he or she will advance to the next level

Skill-Building (e.g. map reading)

Most educational games contain certain aspects which help children with specific skills. For example, adventure games usually contain maps which students will have to read. This obviously helps their map reading skills and practical thinking. Moreover, there are games, such as business management games, which introduce students to managing finances and general project management.

Improves coordination

When a student is playing an educational game, he or she is not only staring at the computer inactively. The activities and actions on the screen provide a lot of mental stimulation. For one to play, he or she will need to coordinate their visual, audial and physical movement.

Enhances multitasking skills

An action educational game, for example, may require you to be very observant. It requires you to be able to move your joystick or keys while looking at the various features on your screen such as energy levels, oncoming adversaries, ammunitions left, available time among other factors, all which are vital to winning. This ensures that the player can observe and react accordingly to all requirements of that particular game.

Improves social skills

Educational games enables many players to engage in a particular game simultaneously. As such, there is constant communication between the players which in turn results in the development of meaningful as well as casual relationships among them. This helps players meet new friends while also strengthening bonds with their old friends.

Key ideas
- Educational games software is a term used for any computer software which is made for an educational purpose.
- The types of educational games software includes adventure and role-playing games, business games, combat games, logic games and puzzles and word games.
- There are seven important factors considered in games which include goals, rules, competition, challenge, fantasy, safety and entertainment.
- There are some of the pitfalls associated with educational games which involve difficulty in making games fun, conflict between educational goals and the characteristics of games, efficiency of learning in games, disagreement about whether games are intrinsic or extrinsic motivators and educators' negative beliefs about games.

• There are some of the benefits associated with educational games which involve increases a student's memory capacity, computer & simulation fluency, helps with fast strategic thinking & problem-solving, skill-building, improves coordination and enhances multitasking skills as well as improves social skills.

Reflection
• What experiences have you had with downloading or designing an educational game software?
• How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
Describe an educational games software you downloaded or designed? How did it support your teaching?

SESSION 6: PROBLEM-SOLVING COURSEWARE

This unit involves in the definition problem-solving software. The steps involved in helping teachers integrate problem-solving courseware is described. The steps for integrating problem-solving courseware is also discussed.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define Problem-solving software.
b.   Describe the steps involved in helping teachers integrate problem-solving courseware.
c.   List the steps for integrating problem-solving courseware.

Meaning of problem-solving courseware

Synonyms term for *problem-solving* include: critical thinking, thinking skills, higher level thinking, higher-order cognitive outcomes, reasoning, use of logic, decision making, and inference skills. Problem-solving is a teaching-sequenced planning to solve problems to high ability learners could interfere with their own effective processing (Mayes, 1992). Problem-solving software is designed for the use of problem-solving. The software focuses on skills and approaches specifically to problem-solving ability. The purpose would be to strengthen a student's ability in observing, recalling, information, sequencing, analyzing, finding and organizing information, inferring, predicting, outcomes, making analogies and formulating ideas.

One example is, PlantingScience.org is a project-based learning program which uses the internet to connect students with distant peers and plant scientists, and uses MS Word, Excel, and PowerPoint to   present   and   compare   plant   observations,   questions,   and   findings

http://www.plantingscience.org/index.php.   Students have the opportunity to engage in hands-on plant investigations, working with peers and scientist mentors to build collaborations and to improve their understanding of science. This courseware is collaborative, interactive and authentic. Problem-solving courseware functions in a way of fostering component skills in or approaches to general problem-solving ability, or it may provide opportunities to practice solving various kinds of content area problems (Doering & Roblyer 2010). The problem-solving software is used for providing opportunities to practice solving various kinds of content area problems. If a student is having a hard time in one subject this might be a good software to use to help them. Some benefits to this software is that it helps improve interest and motivation and also prevents inert knowledge. Teachers may use this software to teach component skills, provide support in solving problems and it also encourages problem solving. Another example is http://www.adaptedmind.com/p.php?tagId=995#. Three components include recognizing a goal, a process, and mental activity (Roblyer & Doering, 2013). Relative advantages of problem-solving software: helps students to visualize concepts, provides student engagement and motivation to learn, makes knowledge and skills more meaningful for students and opportunities for discovery learning. One example is http://www.criticalthinking.com which provides software for memory skills in reading and math.

Steps Help Teachers Integrate Problem-Solving Software
1. Identify problem-solving skills or general capabilities to build or foster:
    a. Solving one or more kinds of content - area problems.
    b. Using a scientific approach to problem solving.
  b. Components of problem solving.
2. Decide on a series of activities that would help teach the desired skills.
3. Examine courseware to locate materials that closely match the desired abilities.
4. Determine where the courseware fits into the teaching sequence.
5. Demonstrate the courseware and the steps to follow in solving problems
6. Build in transfer activities and make students aware of the skills they are using in the courseware

Steps for Integrating Problem-Solving Software
1. Allow students sufficient time to explore and interact with the software; provide some structure in the form of directions, goals, a work schedule, and organized times for sharing and discussing results.
2. Vary the amount of direction and assistance depending on the needs of each student.
3. Promote a "reflective learning environment;" let students talk about their work and the methods they use.
4. Stress thinking processes rather than correct answers.
5. Point out the relationship of courseware skills and activities to other kinds of problem solving.
6. Let students work together in pairs or small group.
7. If assessments are done, use alternatives to traditional paper-and pencil tests.

Key ideas
- Problem-solving software is designed for the use of problem-solving. The software focuses on skills and approaches specifically to problem-solving ability.
- The purpose would be to strengthen a student's ability in observing, recalling, information, sequencing, analyzing, finding and organizing information, inferring, predicting, outcomes, making analogies and formulating ideas.
- There are steps involved in helping teachers integrate problem-solving software and for integrating problem-solving software.

Reflection
- What experiences have you had with downloading or designing a problem-solving software?

How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

Discussion
Describe a problem-solving software you downloaded or designed? How did it support your teaching?

UNIT 6:   EFFECTIVE PRESENTATIONS

This unit discusses effective presentations and the seven stages in planning a presentation. Common mistakes in preparation of presentations and visual aids are also discussed in this unit. This unit takes one of the most popular and powerful presentation applications and takes learners through common mistakes in presentations as well as tips for designing effective presentations for teaching. In this unit, Microsoft PowerPoint will be discussed to guide learner create their own presentations for future purposes. The strategies to effective PowerPoint presentations are also discussed.

Learning outcome(s)
By the end of the unit, the participant will be able to:
a.   Define effective presentation.
b.   Explain the seven stages of planning a presentation.
c.   Identify common mistakes presenter usually make in preparation of presentation.
d.   Explain visual aids in presentations.
e.   Define Microsoft PowerPoint.
f.   Describe the strategies to effective PowerPoint presentations

SESSION 1:   EFFECTIVE PRESENTATIONS
This session defines effective presentation and discusses the seven stages of planning a presentation.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define effective presentation.
b.   Explain the seven stages of planning a presentation.

Meaning of effective presentation
An effective presentation makes the best use of the relationship between the presenter (teacher) and the audience (students). It takes full consideration of the students' needs in order to capture their interest, develop their understanding, inspire their confidence and achieve the teachers' objectives. Careful planning is essential.

Seven stages in planning a presentation
When planning a presentation, we will be looking at seven stages, which are:

1.   **Preparation**
      Many factors affect the design of your presentation. A powerful presenter will acknowledge and address each of the following:
      - objectives;
      - audience (students);
      - venue;

Objectives

Why you are making your presentation? Bear in mind what you want to achieve and what you want your students to learn in a certain topic. Once you have decided upon your objectives, you are in a much better position to make strategic decisions. Ask yourself:

- What do you want your students to have understood?
- What action do you want your students to take following the lesson?
- How can you best design your presentation to meet your objectives?

Audience

In this case, the audience are students. Students will have a variety of different experiences, interests and levels of knowledge. A powerful presenter (teacher) will need to acknowledge these and prepare for and respond to them accordingly. Ask yourself:

- How much will your students already know about your topic?
- How can you link new material to things they might already understand?
- Will you need to defend a particular point of view?

Teachers should have enough information to ensure that they have the needed material at the right level for students' needs. This might involve avoiding technical jargon or explaining abstract concepts with clear practical examples. Considering students' needs, will appeal to their interest and imagination.

Venue

Where will you be making your presentation? What will the room be like? What atmosphere will the physical conditions create? A classroom, computer lab, library, etc. Ask yourself:

- What kind of atmosphere do you wish to create?
- How might the room arrangement affect your relationship with the students?
- Can you do anything to change the arrangement of the room to suit your objectives?
- What audio-visual aids can you use?

2. **Choosing your main points**

   Once you have thought about the design of your presentation, you can define your main points. Try presenting no more than six main points in forty minute lesson. Always allow time for an adequate introduction and conclusion.. A powerful presentation delivers information in a logical, structured manner, building on the previous point and avoiding large jumps in sequence. Ask yourself:

   - What are the main points you wish to make?
   - Are these points structured in a logical, coherent way?
   - Do these main points reflect your own objectives and take account of the needs of your audience?

3. **Choosing your supporting information**

   The supporting information helps your students understand, believe in and agree with your main points. This evidence might take the form of factual data, points of detail or an explanation of

process. It might be presented in imaginative ways using diagrams, pictures or video segments. Think about:

- What will add *clarity* to your argument (explaining complex terms, reminding your audience of any supporting theories)?
- What will add *authority* to your argument (making connections with other people's work, quoting experts, offering evidence from your own research)?
- What will add *colour* to your argument (showing a video clip or a slide, using a practical example or a vibrant analogy)?

4. Establishing linking statements

The next stage is to develop the linear flow of your presentation. This can be achieved by using linking statements to show clearly how your main points fit together. Common linking statements include:

- *"The next stage in our lesson was to …";*
- *"Another important issue of consideration was …";*
- *"By following this argument we can now see that …".*

Linking statements send signals to the students, highlighting the next point in your argument, linking to earlier ideas or clarifying the stage you have reached in your argument overall. This may be of particular importance in a lengthy presentation where even the most effective teacher has to work hard to keep students involved.

5. Developing an opening

The introduction to your presentation is crucial. It is your first point of contact with your students; you can either capture or lose your students' interest in a matter of seconds. Use your introduction to lay a clear foundation for the presentation to follow. Try using the following structure:

- State *what* you will be talking about (objectives);
- State *how* you will be talking about it (methods of delivery);
- State what you intend to be the outcome of your presentation (an informed group, a lively discussion);
- State what you expect your students to do (listen, take notes, read a handout, ask questions before/during/after).
  Always give your students a moment to absorb this information before moving into your first main point.

6. Developing a conclusion

Your conclusion is another important stage in your presentation. You can use it to remind the students of your main points by summary, draw these points to a stimulating conclusion.

7. Reviewing your presentation

Once you have written your presentation make sure that you review its content. Ask yourself:

- Does the presentation meet your objectives?
- Is it logically structured?
- Have you targeted the material at the right level for your students?
- Is the presentation too long or too short?

<table>
<tr><td>

Key ideas
- An effective presentation makes the best use of the relationship between the presenter (teacher) and the audience (students).
- When planning a presentation, we will be looking at seven stages, which are: Preparation; Choosing your main points; Choosing your supporting information; Establishing linking statements; Developing an opening; Developing a conclusion and Reviewing your presentation.

</td></tr>
<tr><td>

Reflection
- What experiences have you had with preparation of effective presentations?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

</td></tr>
<tr><td>

Discussion
What preparation have you gone through to prepare and effective presentations? What stages did you go through in planning for the presentations?

</td></tr>
</table>

SESSION 2:   COMMON PRESENTATION MISTAKES
This session will guide you to understand the common mistakes made in presentations.

Learning outcome(s)
By the end of the session, the participant will be able to:
- Describe the common mistakes made in presentations

Common presentation mistakes
At some point, most of us have sat through a boring, dull, or confusing presentation. Chances are you were doing everything *but* listening. You may have been scrolling through your phone, checking an email, making a grocery list, or even nodding off. The fact is, no one enjoys sitting through a bad presentation. That's why it's so important to spend some time perfecting your presentation skills. Regardless of how much presentation experience you have, there is always room for improvement. Everybody makes presentation mistakes, even the most trained presenters. In this guide, the top ten most common mistakes are briefly explained, so you can avoid them next time you give a presentation.

Not preparing enough
Though one of the key points to delivering a presentation or pitch is spontaneity and flexibility, the best presentations are concisely well-structured. Preparing your presentation to a higher level helps you in structuring your presentation, handling your confidence and allows for you to divert your attention from the content of your presentation to delivering your presentation.

Not familiarizing yourself with the venue and equipment
Imagine that your presentation starts in an hour. You arrive at the venue and, to your horror, the projector won't work with your laptop. Whenever you prepare a presentation, know your setting. You can avoid a situation like this by taking time to familiarize yourself with the venue and available

equipment at least once before your presentation. This way, you will minimize unwelcome surprises like a non-functioning projector.

Paying too little attention to your audience

Sometimes, speakers can get so wrapped up in delivering their presentations that they forget about the needs of their audience. Start your presentation by telling your audience what to expect. Let them know what you'll cover first, whether and when you'll stop for a break, if you'll be taking questions during the presentation, and so on. The goal of a presentation is to deliver your ideas or views to your audience. That also means, that the message you try to convey is tailored to your audience. Be sure to check with your audience that your points have come across and that they understand them. By starting off your presentation with its structure, your audience will know what to expect and they know whether they can intervene during your presentation, or when they are able to ask questions. Paying attention to your audience is thus very important. Make contact with your audience, visually (eye contact) to see whether they understand what you mean. If they look puzzled or confused, be sure to ask where the problem lies and further explain your points

Not tailoring your content to your audience

It is very important to know your audience before you construct a presentation. You will have to present differently to a group of first-graders than to a group of adults. Your presentation will be different when speaking to your peers, compared to a group of laymen.
Try to adapt your presentation to your audience by viewing yourself through their eyes. What is their background, and how up-to-date is their knowledge concerning the topic of your presentation.

Stretching out your presentation

Try to limit your presentation to a few key points. Presentations will appear dull and endless when you try to address too many subjects and topics. Construct a clear idea of what it is exactly you wish to convey to your audience, and use that as a template for your presentation, and build on from that. In that way, you will be short, but concise and deliver your information and ideas most efficiently.

Ineffective graphics

Make sure that the graphics you use in your presentations (e.g. pictures, graphs, videos, animations) are in line with your presentation. When these aids are not alligned, your presentation will seem sloppy and cheap. To prevent this, pay careful attention to the colors you use and make sure they match. Pay attention to the pictures you pick, and make sure they are of sufficient quality. This way, they will not be overstretched and appear pixellated.

Not concentrating on your text

One major pitfall in presenting with a Powerpoint presentation is trying to cram all your information on a slide. A slide is not a cheat sheet from which you can read off your text, so you don't have to know your scripted text by heart. A slide should be intended to assist you in conveying your message to the audience. Easiest guideline to follow is keeping it simple and clear. Try to limit the points you address on a single slide to a minimum (few bullet points) and only use the slide as a supplementary information or a summary. Don't try to cram too much information into your slides. Aim for a maximum of three to four words within each bullet point, and no more than three bullets per slide. This doesn't mean that you should spread your content over dozens of slides. Limit yourself to 10

slides or fewer for a 30-minute presentation. Look at each slide, story or graph carefully. Ask yourself what it adds to the presentation, and remove it if it isn't important.

Avoiding eye contact

Have you ever been to a presentation where the speaker spent all of their time looking at their notes, the screen, the floor, or even at the ceiling? How did this make you feel?

Meeting a person's gaze establishes a personal connection, and even a quick glance can keep people engaged. If your audience is small enough, try to make eye contact with each individual at least once. If the audience is too large for this, try looking at people's foreheads. The individual may not interpret it as eye contact, but those sitting around them will.

Too many animations

Subjecting your audience to a presentation with nonstop animations and transitions is akin to torture. Seriously, try watching your presentation yourself and see if you can last till the end without getting dizzy, or worse, throwing up! Animations, when used sparingly and carefully, can do a lot of good to your presentation. You can get people to re-focus their attention on you. A subtle movement every now and then can emphasize important points in your presentation. Applying animation effects to every single element on your slides is just plain overkill.

Reading the presentation slides

Trust me when I say you're disrespecting your audience by reading whatever is on your slides. It's like you're assuming they don't know how to read for themselves!

What's even worse is when your slides are so crammed with text that the font size becomes reduced to near-infinitesimal levels!

Insufficient knowledge of presentation topic

People attend your presentation because they want to learn something new from you. So, if you show up to your presentation without doing your research or your homework, then you're essentially wasting their time. It's important to be prepared for your presentation. But don't just cover the basics and then gloss over the details. Be prepared to go as in-depth as possible and cover all possible angles. Now, I don't mean you need to know everything about the subject, but do try to be as well-informed as possible.

Key ideas
- In the beginning, you may find yourself committing these mistakes over and over again. That's okay. Don't be frustrated. Take it as a challenge to continue improving. These mistakes are called 'common' for a reason.
- Some of the common presentation mistakes are failing to master your topic, getting another person to prepare the presentation for you, stacking in too much information, poor font and colour choices, using extraneous photos and graphs, using too many slides in one presentation and hardware glitches (Projector or computer fail you).

SESSION 3: USING VISUAL AIDS

This session will guide us through the art of using visual aids. Remember, a slide presentation is best understood as a visual aid. It is not the core of the presentation. And it cannot substitute for poor mastery of the topic and poor delivery. The types of visual aids would also be discussed. This session will also teach students the art of adding slides to newly created presentation files, selecting specific slide layouts, adding text and formatting it. This session will also show students how to add transition and animation effects to their slides.

Learning outcome(s)

By the end of the session, the participant will be able to:
a.   Define visual aids
b.   Describe the types of visual aids
c.   add visual aids to the presentation

Using visual aids

A visual aid is described as an item of illustrative matter, such as a film, slide, or model, designed to supplement written or spoken information so that it can be understood more easily. Visual aids can be a very powerful tool to enhance the impact of your presentations. Words and images presented in different formats can appeal directly to your audience's imagination, adding power to your spoken words.

Think of using visual aids for the following reasons:
- if they will save words - *don't describe your results - show them;*
- if their impact would be greater than the spoken word - *don't describe an image - show it.*

Think about using a variety of different visual images. Try using photographs, tables, diagrams, charts, drawings, key words, or video sequences. Be creative and deliberate in your choice of images to achieve the most impact.

Think of your next presentation. How can you display your material visually? What techniques might help you present your argument or results in a stimulating way? What might add emphasis to your spoken words?

When to use visual aids

Words and images can be used throughout your presentation from the introduction to the conclusion. However, remember to restrict their use to key moments in your presentation; an over use of visual aids can be hard to follow.

Think about using visual aids at the following times:

Introduction
- display the title of your presentation;
- define particular technical terms or units;
- indicate a structure to your presentation by listing your main points;
- display an image which encapsulates your theme(s);
- highlight a question you intend answering during the course of your presentation;

Main points
- highlight new points with an appropriate image or phrase;
- support technical information with clearly displayed data;
- indicate sequence by linking points together;
- offer evidence from your research to support your argument;

Conclusion
- summarise your main points on a slide;
- present your conclusion in a succinct phrase or image;
- display your key references to allow your audience to read more on your topic.

Different types of visual aids

There are many different types of visual aids. The following advice will help you make the most of those most commonly used.

PowerPoint (or equivalent)

Microsoft PowerPoint is probably now the most commonly used form of visual aid. Used well, it can really help you in your presentation; used badly, however, it can have the opposite effect.

White or black board

White or black boards can be very useful to help explain the sequence of ideas or routines, particularly in the sciences. Use them to clarify your title or to record your key points as you introduce your presentation (this will give you a fixed list to help you recap as you go along). Rather than expecting the audience to follow your spoken description of an experiment or process, write each stage on the board, including any complex terminology or precise references to help your audience take accurate notes. However, once you have written something on the board you will either have to leave it there or rub it off - both can be distracting to your audience. Check to make sure your audience has taken down a reference before rubbing it off - there is nothing more frustrating than not being given enough time! Avoid leaving out of date material from an earlier point of your presentation on the board as this might confuse your audience. If you do need to write 'live', check that your audience can read your writing.

Paper handouts

Handouts are incredibly useful. Use a handout if your information is too detailed to fit on a slide or if you want your audience to have a full record of your findings. Consider the merits of passing round your handouts at the beginning, middle and end of a presentation. Given too early and they may prove a distraction. Given too late and your audience may have taken too many unnecessary notes. Given out in the middle and your audience will inevitably read rather than listen. One powerful way of avoiding these pitfalls is to give out incomplete handouts at key stages during your presentation. You can then highlight the missing details vocally, encouraging your audience to fill in the gaps.

Flip chart

A flip chart is a large pad of paper on a stand. It is a very useful and flexible way of recording information during your presentation — you can even use pre-prepared sheets for key points. Record information as you go along, keeping one main idea to each sheet. Flip back through the pad to help you recap your main points. Use the turning of a page to show progression from point to point. Remember to make your writing clear and readable and your diagrams as simple as possible.

Video

Video gives you a chance to show stimulating visual information. Use video to bring movement, pictures and sound into your presentation. Always make sure that the clip is directly relevant to your content. Tell your audience what to look for. Avoid showing any more film than you need.

Posters

Poster boards can be created using a variety of visual devices, such as graphs and images. They're generally quite portable and you can make them as elaborate as you want. However, they can be expensive to produce if the poster is quite complex.

Artefacts or props

Sometimes it can be very useful to use artefacts or props when making a presentation (think of the safety routine on an aeroplane when the steward shows you how to use the safety equipment). If you bring an artefact with you, make sure that the object can be seen and be prepared to pass it round a small group or move to different areas of a large room to help your audience view it in detail. Remember that this will take time and that when an audience is immersed in looking at an object, they will find it hard to listen to your talk. Conceal large props until you need them; they might distract your audience's attention.

Designing visual aids

There are many different rules for designing visual aids, some of which will apply directly to different kinds of equipment. In general, sticking to the following guidelines will produce high quality visual images:

- use one simple idea for each visual;
- make the text and diagrams clear and readable;
- avoid cluttering the image;
- keep your images consistent (use the same font, titles, lay out etc. for each image);
- make sure your images are of a high quality (check for spelling and other errors).

Always remember that an audience should be able to understand a visual image in a matter of second. Always check your equipment to make sure that it works and that you are familiar with equipment. There is nothing worse than a presenter struggling with their visual aids. Be familiar enough with your tools to ensure that you won't be thrown if something goes wrong. A confident use of visual aids will help marry them to your spoken presentation helping them become part of an impressive performance.

<table>
<tr><td>

Key ideas
- Visual aids can be a very powerful tool to enhance the impact of your presentations. Words and images presented in different formats can appeal directly to your audience's imagination, adding power to your spoken words.
- There are many different types of visual aids. These include whiteboard, video, flipchart, artefact, paper handouts and so on.
- Use visual aids to display complex information clearly and introduce variety into your delivery technique. Make sure that you are familiar with the equipment required to create and display visual aids, and deploy visual aids creatively in your presentations mixing techniques and media to create an impact.

</td></tr>
<tr><td>

Reflection
- What are some of your experiences that you had with the use of visual aids as a teacher?
- How have your experiences in this training session prepared you to be a better classroom practitioner? Which specific examples can you draw from the course to support your position?

</td></tr>
<tr><td>

Discussion
Why are visual aids worth including in your presentations? Which is your favourite visual aid to use in teaching and why?

</td></tr>
</table>

SESSION 4:   USING POWERPOINT
In this session we would revise on the definition of Microsoft PowerPoint. In this session, we will also take a look at entering other objects aside text in our presentation. Objects such as graphics, audio and video can be added to our presentation slides to make the presentation more interesting and interactive. PowerPoint has become enormously popular and you are likely to have seen it used by your lecturers and fellow students. Learning to present with PowerPoint enhances your teaching, especially with the addition of pictures, animation and videos. PowerPoint can improve the clarity of your presentations and help you to illustrate your message and engage your audience.

Learning outcome(s)
By the end of the session, the participant will be able to:
a.   Define Microsoft PowerPoint.
b.   Describe the strategies to effective PowerPoint presentations

Meaning of Microsoft PowerPoint

Remember, Microsoft PowerPoint is a computer program that allows you to create and show slides to support a presentation. You can combine text, graphics and multi-media content to create professional presentations. As a presentation tool PowerPoint can be used to:

- organise and structure your presentation;
- create a professional and consistent format;
- provide an illustrative backdrop for the content of your presentation;
- animate your slides to give them greater visual impact.

Strategies to effective PowerPoint presentations

The strategies will help you to use PowerPoint effectively in any type of presentation.

Step 1: Designing PowerPoint slides

There are a number of features to consider when designing effective PowerPoint slides. The guidelines given below will ensure you create slides that will be easy for your audience to read and understand.

General

- Make sure your presentation can run on any computer. Test it before the presentation session.
- Lay out each slide in such a way that it is easy to follow how ideas relate to each other. Titles should be on top. More important information should also be placed at the top.

Using colour

- Be consistent. Ensure that all of your slides have the same or similar background images and colour schemes. PowerPoint's design templates can be used for this.
- Avoid using red or green for text or highlighting as it can be difficult to read.
- Use a light colored background and dark colored text. Use a simple background (patterns affect readability) and one font color. When choosing your colors for font colour, you have to be very careful, otherwise your audience will not be able to see what you have typed.
- NB. It is very important to choose a good background colour before choosing the font colour.

Using text

Text on PowerPoint slides, needs to be formatted to be easily visible to all audience members.

- Include only essential information and use key phrases. Avoid using too much text. A useful guideline is the six-by-six rule (slides should have no more than six bullet points and each bullet point should be no more than six words long).
- Create bullet points which are clear summaries of key points. It is not necessary for bullet points to be complete sentences.
- Don't mix up your fonts and font sizes. Use no more than two font styles throughout the presentation. Too many variations in font size and type can be visually confusing.
- Avoid using fancy fonts as they are often difficult to read.
- Ensure that your text is at least 24pt otherwise it may be difficult to read on screen.

- Choose left align for all text to make it easier to read.
- Avoid multiple columns of text on a single slide as they can be difficult to follow on screen.
- Use bold for a clear and simple form of emphasis and headings rather than UPPER CASE, *italics* or underlining.
- Set clear hierarchies for type size to help your audience distinguish between headings, main text and other types of text.
- Limit the use of punctuation and avoid using capital letters (except for the first letter of each line).

Step 2: Making the most of graphics and animations

Using graphics

Do you remember the saying "A picture is worth a thousand words"? Of course you do! Yes, this is indeed true and is no different when using presentations. Many people find it easier to understand and remember concepts if images are used in addition to text. PowerPoint allows you to easily include graphics in your presentations, but think about the issues listed below.

- Clip Art could be used to enhance presentation. Clip Art consists of ready-made illustrations, movies or sound clips that can be used to enhance a presentation.
  These clips are available from the application itself and if there is an internet connection established, many are available for download from the Microsoft Office site.
- Choose an appropriate quality for scanned images. Scan at 150 dpi for images where accurate colour reproduction is not important and at 300 dpi for higher quality images.
- Beware of images that you take from the internet. They are generally of a very low quality and are likely to pixelate (lose their smoothness) when you project them onto a large screen.
- Make sure graphics are relevant to your text and not just decorative.
- Consider using graphics to replace text where you think an image would be easier to understand.
- Ensure that the images that you use are simple and clear enough to be easily read at a distance. A small, overly complex and poor quality image will only frustrate your audience.
- Images are used in presentations for reference, emphasis, or explanation. It is best practice to use images that are representative of the content.
- Placement is also important. Place images where they will make sense.

Remember, many images are protected by copyright. If it is not explicitly stated that an image is copyright free, or available for use in educational contexts, you should ask for permission to use the image.

Slide Transitions

We have something called transition. I believe if I were to ask you what transition means to you, you would say something like a period of change. Well, you are on track and have the right idea. A transition is a visual special effect that determines how a slide appears as it enters or leaves the screen. This makes presentations smoother and more interesting.

- Adding transitions between slides gives your presentation a smooth and consistent look. While transitions can add excitement or visual appeal to a presentation, it is recommended that they be

used sparingly to avoid making your audience "confusion"! You can experiment with the different options to see what works for you.

Animation Effects

Animation effects vary the way in which objects on a slide appear during the presentation and enable the bulleted items to appear one at a time. Each animation choice is numbered so you can clearly identify the order in which your effects will appear. An effect can be moved up or down within the sequence at any point in time to improve the presentation.

Animating elements of slides is one of the most powerful features that PowerPoint offers. However, it is very easy to overdo your use of these features and create a presentation where the animation distracts your audience from the content of your presentation.

- To increase suspense in your presentation, and to keep your audience focused on the current issue you can introduce points on a slide one at a time.
- If you have a picture or a chart that you wish to animate, simply select it and repeat the procedure above. The best choice is to make the picture simply appear, or fade in.
- Avoid excessive use of animations, as they can distract from the main message.
- Use animations to show progression. Animation is very effective at revealing a process one stage at a time.
- Be conservative. Make sure that any animation you use serves a clear purpose (e.g. to introduce a new piece of information at an appropriate point). If you cannot think of a reason to animate your slide - *don't do it!*
- Be consistent. Try to ensure that you use similar types of animation for similar functions. For example, if your text always drives in from the left it will be distracting if it suddenly appears from another direction or uses another animation technique.

Hyperlinks

- The fastest way to create a basic web hyperlink on a PowerPoint slide is to press Enter after you type the address of an existing webpage (such as http://www.ucc.edu.gh).
- You can link to a webpage, or you can link to a new document or a place in a existing document, or you can begin a message to an email address.

Video

- YouTube is the only streaming video site supported in PowerPoint (only versions 2010, 2013, 2016 and newer). In previous versions, YouTube videos were added with the use of a hyperlink, that linked to the video on YouTube. You just had to click on the link and a new window on your web browser was instantly opened. However, in newer versions, the video plays on your presentation without transitioning to a new page.

N.B. When giving the presentation, despite the version you are using, be careful to be connected to the internet, otherwise the video will not load. It may be better to embed the video.

Step 3: Using PowerPoint to help structure your presentation

Once you have designed your slides you should review your planning and think about whether you need to refine the structure of your presentation. PowerPoint offers a number of features that can help you. All views can be selected from the 'View' menu.

- Use the 'Outline' tab in Normal View to display the textual content of your presentation. This can help you to focus on and review the structure of your content rather than the visual impact of your presentation.
- Use the 'Notes' pane in Normal View to create a script or prompts which you can use when you are delivering the presentation.
- Use the Slide Sorter View to gain an overview of the visual impact of your presentation. This is also a useful view for rearranging the order of your slides or deleting multiple slides.

Use these PowerPoint tools to give you an overview of your presentation so that you can create a clear focus and a logical structure for your talk. Follow a logical order of presenting information. Begin with a roadmap of the presentation (what you will cover). Keep your introductory section short and proceed to the core of your presentation as soon as possible.

Avoid using too many slides in your presentation, as this will be distracting for your audience. In general you should use the one-minute-per-slide rule as a guide for determining how many slides to include. You can discuss a slide for longer than a minute, but you therefore have to adjust the remaining number of slides to keep within the time allotted for the presentation. When considering the final number of slides, it helps to ask yourself the question: If you had to keep to only 10 (or 5, or even 1) slides, which slides would you keep?

Step 4: Preparing to Present
Find out as much as you can about your audience and the environment in which you are going to be presenting before you present. Ask yourself the following questions:
- How large is the room that I am going to be presenting in? Will people be able to see my slides from the back?
- Do any of my audience have any special requirements (visually or hearing impaired, dyslexic, etc.)? Is there anything that I can do to ensure that they can access the presentation?
- Have I rehearsed my presentation to check that all of my slides work in the way they are supposed to?
- Does my presentation fit into the time that I have been allotted? Choosing Rehearse Timings from the Slide Show menu can help you to judge how much time you are spending on each aspect of your presentation (but choose 'No' when asked 'Do you want to keep the new slide timings to use when you view the slide show?').
- Have I checked that the necessary equipment (laptop, data projector, speakers for sound) has been booked for my presentation?
- Do I have an alternative plan in case the technology fails? This may be a second copy of the slides on acetates, a set of handouts or a second disk format (such as USB drive).

Step 5: Presenting with PowerPoint
An effective presenter uses PowerPoint to illustrate and emphasise points that are made in the presentation. An audience that is trying to copy down detailed information from slides will not be able to give you their full attention. Consider using handouts for your audience so they are free to concentrate on listening and understanding. Some points to consider when presenting with slides are given below.

- Treat each slide as a mini-presentation where you make a point to introduce the idea, give the detail and then conclude that slide with an explanation of how the point fits in with the rest of your presentation.
- Direct your audience's attention to the slides when they contain information that is key to getting your message across.
- Give your audience time to assimilate material on your slides. If, for example, a slide contains a quotation or a diagram – introduce the slide, give them time to read and understand it and then explain its relevance.
- Don't leave your screen saver on, as this will distract your audience.
- Don't move your pointer on the screen unless you are using it to demonstrate something as this will distract your audience.
- Don't just read out the text on the slides, they should be a summary or a supplement to the content of your spoken presentation.

Key ideas
- Microsoft PowerPoint is a computer program that allows you to create and show slides to support a presentation. You can combine text, graphics and multi-media content to create professional presentations.
- There are many strategies that can be used to make effective presentations.

Reflection
- What are some of the experiences you have had with using Microsoft presentations for your lessons? Have you been using the strategies discussed in this session to ensure effective presentations?
- How have my experiences in this training session prepared me to be a better classroom practitioner? Which specific examples can I draw from the course to support my position?

Discussion
Get into groups of four and create a Microsoft PowerPoint presentation on any topic in your subject area using the strategies you have learned in this session. Discuss how you can use the strategies to make your presentations more effective and also any other strategies that was not discussed in this session.