

Technology for Teaching and Learning

Understanding the Basic Concepts Related to Technology

The following terms and concepts are related to technology that you need to digest.

1. **Technology** refers to methods, processes, and devices used for practical purposes. It includes instruments from pencil and paper to modern electronic gadgets and tools for the practical task.
2. **Information and Communication Technology and Literacy or ICT Literacy** is the use of digital technology, communication tools and networks to access, manage, integrate, evaluate, create and communicate information (Guro 21, 2011).
3. **Educational Technology** refers to the utilization of technology in teaching and learning, which includes both the non-digital (flip charts, pictures, models, realia, etc.). And digital (electronic tools: hardware, software, and connections, etc.).\
4. **Digital Literacy** refers to the ability to discover, assess, utilize, share, and generate content with the use of information technologies and the internet (Cornell University).
5. **Digital Learning** is an instructional practice that utilizes technology to reinforce students' learning experience. It covers the use of a broad spectrum of processes that comprises blended or virtual learning. It can come as online or off-line, which utilizes digital technology.
6. **Online Digital Tools and Apps** use an Internet connection to access the information needed, like Skype. It is a telecommunication application software product that focuses on providing video chat and video calls between computers, tablets, mobile devices via the Internet and to regular telephones.
7. **Off-line Digital Tools and Apps** can still be used even if there is no internet access. Among these are Canary Learning, Pocket, Evertone, iBooks, KA LITE (Gupta, Prinyaka, 2017).
8. **Instructional Technology** refers to the theory and practice of design, development, utilization, management, and evaluation of the processes and resources for learning (Association for Educational Communications and Technology, Seels, B.B. &Richey, P.C. 1994).
9. **Software** refers to program control instructions and accompanying documentation stored on disks or tapes when not being used in the computer. By extension, the term refers to audiovisual materials (Smaldino, 2005).
10. **Multimedia** is a sequential or simultaneous use of a variety of media formats in a given presentation or self-study program (Smaldino, 2005).
11. **Internet** is a massive network of networks, a networking infrastructure. It connects millions of computers globally, forming a network in which any computer can communicate with any other computer as long as they are connected to the internet. It is generally defined as a global network connecting millions of computers (<http://www.webopedia.com>).
12. **World Wide Web (www)** is also called a Web, which is a graphical environment on computer networks that allows you to access, view, and maintain documentation that can include text, data, sound, and videos (Smaldino, 2005). It is a way of accessing information over the medium of the internet. It is an information-sharing model that is built on top of the Internet.
13. **Web Access** is the ability of the learner to access the Internet at any point during the lesson to take advantage of the array of available educational resources.
14. **Webquest** is an inquiry-oriented lesson format in which most or all information that learners work with comes from the web. These can be created using various programs, including simple word processing documents that include links to websites.
15. **Productivity Tools** refers to any type of software associated with computers and related technologies that can be used as tools for personal, professional, or classroom productivity.

Examples: Microsoft Office, Apple Works – word processing, grade and record-keeping, web page production, presentation) (KFIT-Unesco 2016).

16. **Technology Tool** is an instrument used for doing work. It can be anything that helps you accomplish your goal with the use of technology. These technology tools can be classified as:
 - a. **Data/Calculation Tools.** Examples: spreadsheets, Excels, Sketchpads, probability constructor
 - b. **Design Tools.** These are used to make models and design, creating, and building. Included here are Family Tree Maker, GollyGee, and Crazy Machines, among others.
 - c. **Discussion Tools.** Four different approaches utilize discussion and interaction on the Internet. These are threaded discussion forum, Blogging, Live chat, and Video Teleconferencing, Netiquette, and Safety on the Net.
 - d. **Email Tools.** Emails are great communication tools for sending messages, photographs, videos, and other files. It allows you to reach out to others around the world. Examples are google mail, Ymail, Yahoo mail, and many more.
 - e. **Handheld Devices.** Handheld devices have become popular among learners. These include Personal Digital Assistants, global positioning system, (GPS) and Geographic Information system (GIS) in the classroom, Portable electronic keyboards, Digital cameras, Mobile phones, Palm, Handheld computers.
17. **Webquest** is a teacher structured research experience for the students that are primarily based on the use of the World Wide Web and typically takes one or more instructional periods (Bender & Waller, 2011).
18. **Blog** is an online journal where posted information from both teachers and students is arranged. There are three kinds of blogs: blogs used for communication, blogs used for instruction, and blogs used for both (Ferriter & Garry, 2010).
19. **Wiki**, an editable website usually with limited access, allows students to collaboratively create and post written work or digital files, such as digital photos or videos. Wikipedia is one of the most widely recognized of all the wikis (Watters, 2011).
20. **Flipped classroom** utilizes a reverse instructional delivery, where the teacher is required to use the web resources as homework or out of class activity as initial instruction of the lesson, which will be discussed during class time.
21. **Podcast** is a video or audio multi-media clip about a single topic typically in the format of the radio talk show. The two essential functions of a podcast are to retrieve information to disseminate information (Eash, 2006).
22. **Google Apps** is a cloud-based teaching tool which is stored in the Google server and is available for students both at home and in school. It includes the Gmail, a free-mail for all; Google calendar – a tool used for organizational purposes; Google sites that provide options for developing blogs and wikis; and Google docs are used for sophisticated word processing and editing for the document.
23. **Vlog** is a video blog where each entry is posted as a video instead of the text.
24. **Facebook** is a popular social networking site used by students and adults worldwide to present information on themselves and the world.
25. **VOIP** (voice over internet protocol) is a category of hardware and software that enables people to use the Internet as a transmission medium for telephone calls by sending voice data in packets using IP rather than traditional circuit transmission.

Roles of Technology for Teaching and Learning

Roles of Technology for Teaching

According to Stosic (2015), educational technology has three domains:

1. Technology as a tutor. Technology can support the teachers, tutors and other professionals to help students learn better.
2. Technology as a teaching tool. Technology can be used as an instrument in teaching.
3. Technology as a learning tool. Technology makes learning easier and more effective. use these tools for learning for life.

A. For Teachers and Teaching

1. Provides essential support to teachers.
2. Modernizes the teaching-learning environment.
3. Enhances teaching-learning methods and strategies in teaching.
4. Opens opportunities for educational research.
5. Improves the capability of teachers and inculcates scientific attitude.
6. Serves as an avenue for teacher professional development.
7. Encourages scientific attitude.

B. For Learners and Learning

1. Supports learners on learning how to learn on their own.
2. Develops the communication skills of learners through social interactions.
3. Augments learners' higher-order-thinking skills: critical thinking, problem solving and creativity.

ICT Policies and Safety Issues in Teaching and Learning

ICT National or International Policies That are Applicable to Teaching and Learning

There are eight policy themes around the world that are commonly identified in educational technology policies; (1) vision and planning; (2) ICT infrastructure; (3) teachers; (4) skills and competencies; (5) learning resources; (6) EMIS; (7) monitoring and evaluation; and (8) equity, inclusion, and safety. The framework only considers policy intent but not the extent to which policies are realized in practice, nor the impact of such policies. The policymakers are challenged to offer useful related policy guidance for rapid developments and innovations in the technology sector (Trucano, 2016).

SABER-ICT policy framework may find useful by policymakers as a means to help their country benchmark the current state of related policy development. It can look forward to potential future policy directions and gain inspiration from other countries.

There are two official documents wherein Policy on the use of ICTs in the Philippine basic education system is articulated. The Medium-Term Development Plan of the Philippines (MTPDP) 2004-2010. The MTPDP states:

—ICT will be harnessed as a powerful enabler of capacity development. It will, therefore, be targeted directly towards specific development goals like ensuring basic education for all and lifelong learning, among others (National Economic Development Authority, 2004a, p. 2)

and the 2002 Basic Education Curriculum (BEC), that stipulates the following goal of Philippine primary education:

—We must educate our Filipino learners to filter information critically, seek credible sources of knowledge, and use data and facts creatively so that they can survive, overcome poverty, raise their personal and national esteem, and realize a gracious life in our risky new world. (p. i)

Safety issues in ICT

Mooij and Smeets (2001) suggested five successive phases of ICT implementation representing different levels of ICT transformation of the educational and learning processes. These include:

- (1) the incidental and isolated use of ICT by one or more teachers
- (2) increasing awareness of ICT relevance at all levels
- (3) emphasis on ICT co-ordination and hardware
- (4) focus on didactic innovation and ICT support
- (5) use of ICT-integrated teaching and learning that is independent of time and place

The study of Tondeur et al. (2008) entitled —ICT integration in the classroom: challenging the potential of school policy. Findings showed that there is a potential impact of policy-related factors on the actual integration of ICT in teaching-learning in daily classroom instruction. Results suggested that success in ICT integration is related to activities at the school level, like, ICT support, the development of an ICT plan, and ICT training. The results also suggest that principals have a big role in facilitating the policies put in place when defining this policy.

The Government today unveiled tough new measures to be like the UK that is the safest place in the world to be online.

These are the suggested safety policy measures:

- Independent regulator will be appointed to enforce stringent new standards
- Social media firms must abide by mandatory —duty of care to protect users and could face hefty fines if they fail to deliver
- Measures are the first of their kind in the world in the fight to make the internet a safer place

In the first online safety laws of their kind, social media companies and tech firms will be legally required to protect their users and face severe penalties if they do not comply. The eSafety Toolkit for Schools is designed to support schools to create safer online environments. The resources are backed by evidence and promote a nationally consistent approach to preventing and responding to online safety issues.

The resources are categorized into four elements: *Prepare, Engage, Educate, and Respond*. Each contributes to creating safer online environments for school communities, whether the resources from each element are used on their own or collectively, each contributes to creating safer online environments for school communities.

■ **Prepare**

Prepare resources to help schools evaluate their willingness to deal with online safety issues and deliver suggestions to improve their practices. They are useful for strengthening school policies and procedures in online safety.

■ **Engage**

All members of your school community should be active participants in creating and maintaining safe online environments. Engage resources to encourage the participation of the school community in creating a safe online environment. They help engage school community members as involved and valued participants, and they facilitate the real involvement of students.

■ **Educate**

Preventing an online incident is always better than having to respond to one. The Educate resources support schools in developing the knowledge, skills, and capabilities of students, staff, and parents to have positive and secure online experiences. They bid best practice guidance for online safety education and sit alongside eSafety's complement of curriculum-aligned teaching-learning activities.

■ **Respond**

There must be processes in place in case an incident happens so that it is controlled appropriately. The Respond resources support schools to evaluate and respond to online incidents effectively. They preserve digital evidence, offer guidance to understand reporting requirements, minimized more harm, and supporting wellbeing.

eSafety developed the Toolkit in consultation across every state and territory with government and non-government education sector representatives. It was established in response to the Royal Commission into Institutional Responses to Child Sexual Abuse and the Education Council's work program to report bullying and cyberbullying.



Uses of ICT Policies in the Teaching and Learning Environment

A. Policy Recommended Programs that have applications to education teaching-learning:

1. *ICT in Education Masterplan* for all levels, including a National Roadmap for Faculty Development in ICT in Education. A National Framework Plan for ICTs in Basic Education was developed.
2. *Content and application development through the Open Content in Education Initiative (OCEI)*, which converts DepED materials into interactive multi-media content, develops applications used in schools and conducts students' and teacher's competitions to promote the development of education-related web content.
3. *PheDNET* is a —walled garden the hosts educational learning and teaching materials and applications for use by Filipino students, their parents, and teachers. All public high schools will be part of this network with only DepEd-approved multi-media applications, materials, and mirrored internet sites accessible from school PCs.
4. *Established Community eLearning Centers called eSkwela* for out-of-school youth (OSY), providing them with ICT-enhanced alternative education opportunities.

- 5. *eQuality Program* for tertiary education through partnerships with state universities and colleges (SUCs) to improve the quality of IT education and the use of ICT in education in the country, particularly outside of Metro Manila.
- 6. *Digital Media Arts Program*, which builds digital media skills for the government using Open Source technologies. Particularly the beneficiary agencies organizations, the Cultural Center of the Philippines, National Commission and for Culture and Arts, State Universities, and local government units.
- 7. *ICT skills strategic plan*, which develops an inter-agency approach to identifying strategic and policy and program recommendations to address ICT skills demand-supply type.

B. Some Issues on ICT and Internet Policy and Regulations Issue No. 1:

Freedom of Expression and Censorship.

- The UN Universal Declaration of Human Rights provides that everyone has the right to freedom of thought, conscience, and religion, likewise the right to freedom of opinion and expression.
- Censorship restricts the transmission of information by blocking it or filtering information.

Issue No. 2: Privacy and Security

- Privacy means —personal privacy, the right of individuals not to have their home, private life, or personal life interfered with.
- Privacy of communication refers to the protection from interference with transmission over the phone or the internet.
- Information privacy must be used for purposes and will not be disclosed to others without the consent of the individuals.

Issue No. 3: Surveillance and Data Retention

- *Indirect Surveillance* – no direct contact between the agent and the surveillance subject and but evidence of activities can be traced.
- *Dataveillance* –the use of personal information to monitor a person’s activities.
- *Data Retention* – the storage and use of information from communication systems.

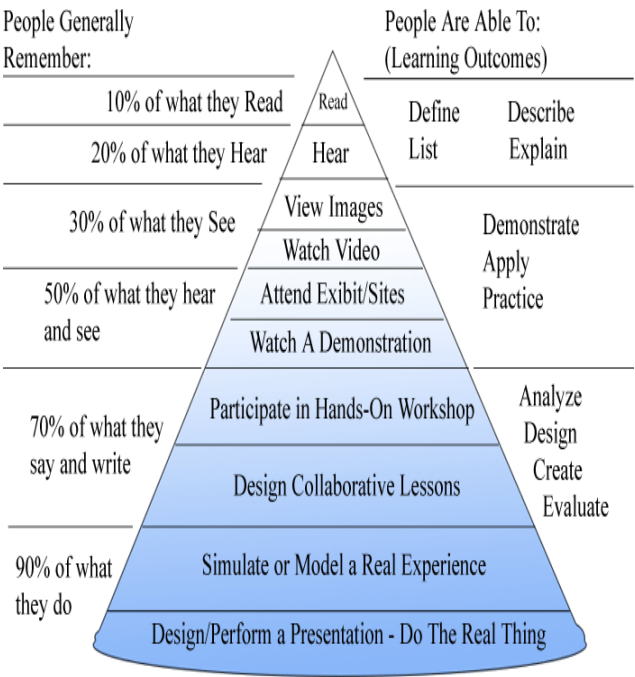
Issue No. 4: E-pollutants from E-waste

- A large amount of E-waste is generated by ICT.
- These are in particular, terminal equipment for computing, broadcasting, telephony, and peripherals.
- Material waste can be destroyed by crushing, toxic material brought by the different equipment requires top management.



Theories and Principles in the Use and Design of Technology-Driven Learning Lessons

Dale’s Cone of Experience



Edgar Dale’s Cone of Experience gives the following interpretation:

- 1. Lower levels of the Cone involve the student as a participant and encourage active learning.
- 2. Pictures are remembered better than verbal propositions.
- 3. The upper levels of the Cone need more instructional support than lower levels.
- 4. Abstractness increases as we go up the Cone, and concreteness increases as we go down the Cone.
- 5. Higher levels compress information and provide data faster for those who can process it.

What are these bands of experience in Dale's Cone of Experience?

1. **Direct Purposeful Experience** - Some experiences have the least abstractness and the maximum possible concreteness. Purposeful means interactions of one intent are meaningful. Skills we gained in real life through our first-hand, direct involvement. In a teaching-learning cycle, it is the best mode, means, or channels for the desired outcomes. Teachers will also strive to provide the students with real-life realistic experiences in the form of showing actual objects and enabling them to come into direct contact with the

realities of life themselves. Examples allow students to prepare their meals, make a PowerPoint presentation, delivering a speech, performing experiments, or making their furniture.

2. **Contrived Experiences** - These are not very rich, concrete, and direct as a real-life experience. When the real thing cannot be accurately observed, artificial stimuli can be given as a working model or as specific experiments in the laboratory. The working model is the editing of fact, which varies in size or complexity from the original. It includes models, mock-ups, experiments, and so on. We may delete the needless information in a condensed and edited version of the real thing, and make the learning simple. A mock-up of Apollo, the moon exploration spacecraft, for

Examples of Contrived Experiences:

Model- A replication in a small scale or a large scale or exact size of a real item- but made of synthetic materials. It is a substitute for a real item that may or may not be operational – Gray, et. In 1969, al.

Mockup- Is an arrangement of a real device or associated devices displayed in such a way that representation of reality is created. A unique model where the parts of a model are singled out, heightened and magnified to focus on that part or process under study. Example: Planetarium

Specimen- An individual animal, plant, piece of a mineral, etc. It is used as an example of its species or type for scientific study or display. An example is a product or piece of work, regarded as typical of its class or group—a sample for medical testing, especially of urine.

Object- May also include artifacts displayed in a museum or objective displayed in exhibits or preserved insect specimens in science.

Simulation- A representation of a real manageable event in which the learner is an active participant engage in learning behavior or in applying previously acquired skills or knowledge

3. **Dramatized Experiences** – The experience gained through active participation and role-playing in dramatic activities. Activities in which visual representation and role-playing depict the actual events of the past or present. It is useful in the teaching-learning of subjects like history, political science, language, and literature.

Plays - depict life, character, culture, or a combination of the three. They offer excellent opportunities to portray vividly essential ideas about life.

Pageants are usually community dramas that are based on local history. An example is a historical pageant that traces the growth of a school.

Pantomime is a "method of conveying a story by bodily gestures." Pantomime's impact on the audience rely on the actors' movements.

Tableau is a picture-like scene composed of people against a background. It is an arrangement of people who do not move or speak, especially on a stage, who represents a view of life, an event, etc.

Role-Playing is an unrehearsed, unprepared, and spontaneous dramatization of a situation where their roles absorb assigned participants. You pretend to be someone else or pretend to be in a particular position you are not really in at the moment.

Puppets - A puppet is an inanimate object or representational figure animated or manipulated by an entertainer, who is called a puppeteer. Puppets can present ideas with extreme simplicity.

Types of Puppets

Shadow puppets – flat, black silhouette made from lightweight cardboard shown behind a screen.



Rod puppets – flat, cut-out figures tacked to a stick with one or more movable parts, and are operated below the stage through wires or rods.

Glove-and-finger puppets – make use of gloves in which small costumed figures are attached.

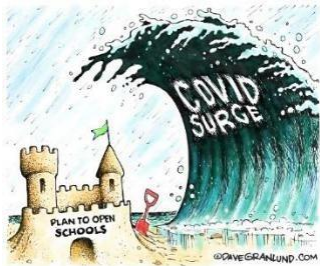


Marionettes – a flexible, jointed puppet operated by strings or wires attached to a crossbar and maneuvered from directly above the stage.

4. **Demonstrations** – It's a visual description of a significant reality, concept, or process. Students can watch how certain things are done either in the form of actual objects or models. Specific complicated procedures can be performed by the teacher for the benefit of pupils who are reduced to the position of passive listeners. For better performance, the teacher should try to involve the students in the demonstration process by asking questions and answering them or by helping them plan the demonstration and execute it. For example, a teacher in Physical Education shows the class how to dance the tango.
5. **Study Trips** – It is a planned point visit or a location outside the daily classroom. This is an organized situation in the form of tours, flights, hikes, and excursions. Provide the students with valuable opportunities to offer direct real-life experiences.
6. **Exhibits** – Bring the outside world into the classroom employing exhibits, the concrete representation of the things. The teacher can help the students by gaining useful experience through the observation and organization of educationally significant exhibitions. Exhibits are less real or direct in terms of providing direct practical experience. These may consist of meaningfully organized working models or photographs of templates, maps, and posters. Many exhibitions are —only for your eyes. However, several shows provide interactive opportunities in which visitors can touch or manipulate the displayed models.
7. **Television and motion pictures** – Television and movie clips can so expertly recreate the history of the past, that we have to feel like we're there. The special meaning of the messages that film and television deliver lies in their sense of reality, their focus on individuals and personality, their organization presentation, and their ability to select, dramatize, highlight, and clarify.
8. **Still, pictures, Recordings, Radio** - This stage includes the number of devices that might be classified roughly as one-dimensional aids because they use only one sense organ that is either eye (seeing) or ear (hearing). All these materials are less direct than audio-visual experiences.

9. **Visual symbols** - There are no longer practical reproductions of material objects, for such representations are incredibly abstract. Visible concepts that describe something intangible by association and something that reflects or stands for something else, usually by association or by way of definition of something abstract. Visual perception has a predictive framework that is interesting. This contains visual graphic resources such as charts, maps, diagrams, sketches, posters, comics, photos, drawings on blackboards, and illustrations. The visual symbols (free to use any language) form a primary contact language.

Drawings - A drawing might not be a real thing but better than nothing to have practical visual help. To prevent ambiguity, it is important that the real thing is depicted correctly by our drawing.



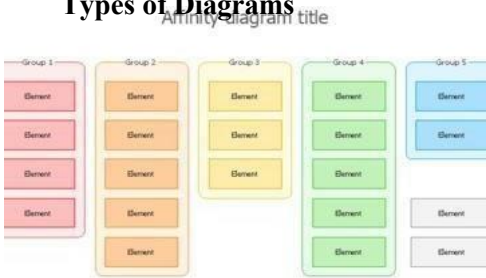
Cartoons The cartoon is another useful visual symbol which can add innovation to our teaching. Metaphorically a first-rate cartoon reveals its story.



Strip drawings - A series of sketches linked to a funny story or an adventure in a newspaper, magazine, etc .. It is a series of adjacent, typically horizontally organized images which are intended to be read as a narrative or a sequential sequence.

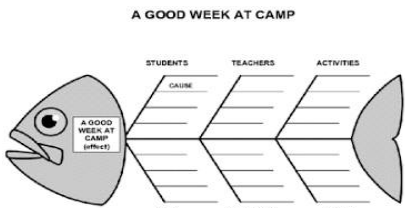
Diagrams - It is any line drawing that shows arrangement and relations as of parts to the whole, relative values, origins and development, chronological fluctuations, distributions, etc. (Dale, 1969)

Types of Diagrams



Affinity Diagram - used to cluster complex apparently unrelated data into natural and meaningful groups. An affinity diagram is to arrange ideas into a specific or natural relationship. Bananas, bananas, and oranges, for example, would be grouped as fruits while green beans, broccoli, and carrots would be grouped as vegetables.

Tree Diagram – A tree diagram is a modern method for planning management that defines the hierarchy of tasks and subtasks required to complete and be objective. The tree diagram begins with one element, then branches out to two or more, each branching into two or more, and so on. The finished diagram is like a tree, with a trunk and many branches.



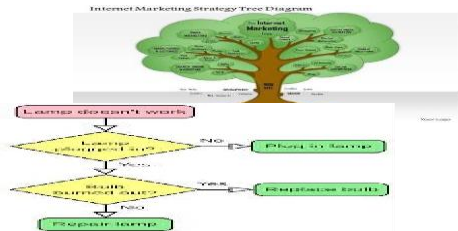
Fishbone Diagram - Often referred to as the cause and effect diagram or Ishikawa diagram is a visualization method for categorizing the possible causes of the root cause of the issue. A fishbone diagram usually used for root cause analysis incorporates the brainstorming technique with a form of mind map design.

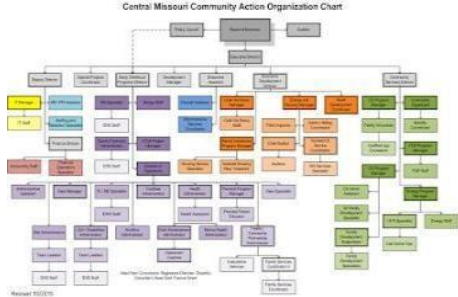
Types of Chart

Time Chart a tabular time diagram displaying data in ordinal series.

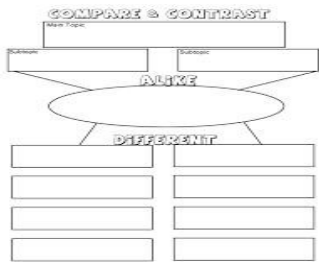
Tree or Stream Chart shows creation, growth and change starting with a simple course spreading out over several branches

Flowchart visual way of showing a process from beginning to end. A diagram of the series of individual gestures or acts or events involved in a complex structure or operation.

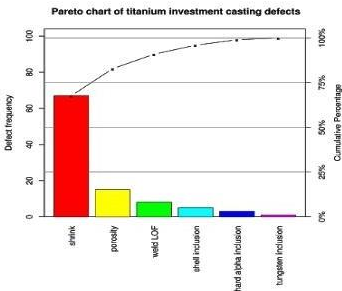




Organizational Chart Shows how one part of the company applies to other sections. It is a graphical representation of the structure which shows the relationships within the positions or jobs.

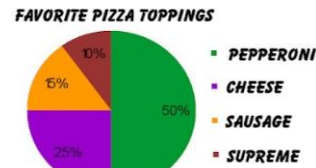
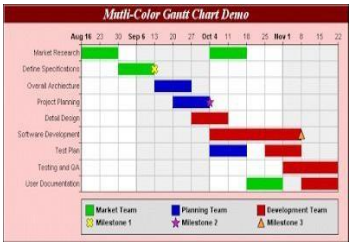


Comparison and Contrast Chart shows similarities and differences.



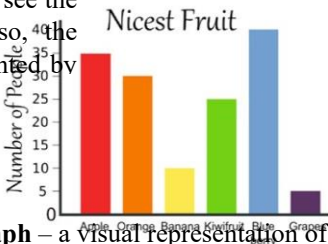
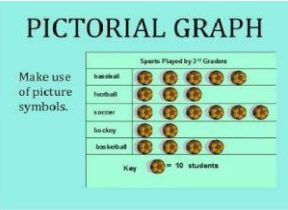
Pareto chart Is a type of bar chart, prioritized from left to right in decreasing order of magnitude or importance

Gantt chart is an activity time chart. A diagram displaying a sequence of horizontal lines representing the amount of work completed or produced during different periods to the amount expected for those periods.



Whole. Usually, the amounts in each area are expressed in percent, so that all of the amounts total of 100%.

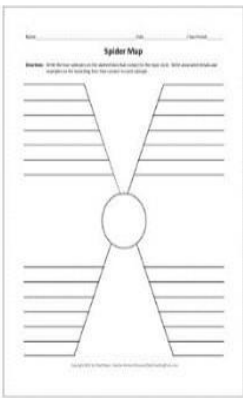
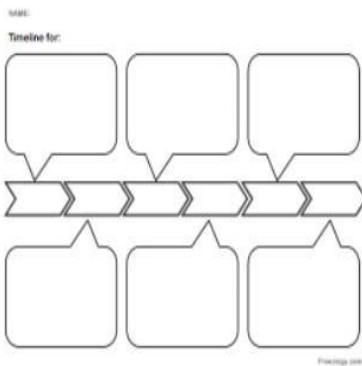
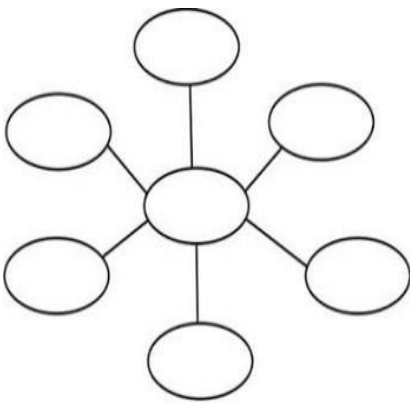
Bar Graph – Using to compare the magnitude of the same things at different relations or to see the relative sizes of the entire pieces. Also, the numerical values of variables are represented by



Pictorial Graph – a visual representation of data by using pictograms. It uses icons or pictures in relative sizes to highlight some data

Graphs - Pictures helping us to understand the details. A diagram showing the relationship between the variable quantities, usually two variables, each calculated at the right angles along with one of a pair of axes.

Graphic organizers – In your subject, you've encountered many graphic leaders, teaching values. Also known as knowledge map, idea map, story map, cognitive organizer, advance organizer, or idea diagram, this is a pedagogical method that uses visual symbols to communicate knowledge and concepts through



10. **Verbal symbols** - They are not like the artifacts or concepts they stand for. They do not generally contain visual references to their meaning. To express any meaning, verbal representations are words, phrases, sounds, or other utterances that are spoken aloud. The verbal symbol may be a phrase, an idea, a concept, a scientific theory, a formula, a philosophical aphorism, or some other representation of the experience listed in any verbal symbolization. Published terms fall into that range. It may be a word for a concrete-object (book), an idea (freedom of speech), a scientific principle (the principle of balance), a formula ($e=mc^2$)

Dale's Cone of Experience as a tool to help my students build learning experiences.

Percentage	Modality	Sample Activities
10% of what my students read	Read	Textbook (e-book) & articles
20% of what my students hear	Hear	Teacher lecture/group discussions
30% of what my students see	View images/watch videos	Content specific & research videos/concept infographics
50% of what my students hear & see	Attend exhibit/sites/watch demonstration	School site visitations/classroom observations
70% of what they say and write	Hands-on workshop/design collaborative lessons	Develop a lesson plan with a cooperating classroom teacher/design and present a group presentation
90% of what my students do	Simulate or model a real experience/design or perform a presentation	Conduct a demonstration literacy or numeracy lesson in a PreK – 3 classroom

The Cone of Experience corresponds with three significant modes of learning:

- **Enactive (direct experience)**,- Enactive or direct contact includes working with objects (the student joins a knot to practice knot tying). The enactive perception requires direct action and effective use of the senses and the body.
- **Iconic (pictorial experience)** - Iconic learning includes reading photos and sketches (the student looks at paintings, pictures, or movies to learn how to tie knots). Iconic perception is separated from the world of science and limited to two or three senses.
- **Symbolic (highly abstract experience)**- Symbolic experience involves reading or hearing symbols (the student learns or hears the word —knot and forms an image in mind). In symbolic experience, the action is removed nearly altogether, and the experience is limited to thoughts and ideas.



TPACK Framework for Effective Pedagogical Practice

What is TPACK?

TPACK is a Useful framework for researchers working to explain the convergence of learning and teaching technologies. Based on Shulman's (1986) concept of PCK, Mishra, and Koehler (2006) included technology to PCK and described the resulting TPACK as the interlocking of technology, pedagogy, and content. TPACK is a system tailored to the dynamic interactions of teacher knowledge of content (CK), pedagogy (PK), and technology (TK). Integrating technology and pedagogy into a given topic may require complex intersections such as TPK (technological pedagogical knowledge), PCK (pedagogical content knowledge), and TCK (technological content knowledge). Doering et al. (2009) emphasized the dynamic nature of TPACK, an evolving and multifaceted (rather than static) representation of teacher knowledge, as new technologies emerge for integration into particular content areas.

1. **Technology knowledge (TK):** Knowledge of various technologies. They range from low-tech technology like pencil and paper to emerging technologies like the internet, digital media, interactive whiteboards, and software programs. TK is about recognizing educational technology, evaluating its possibilities for a particular subject area or classroom, learning how to identify whether it can assist or hinder learning, and continually learning and adjusting to emerging technology offerings.
2. **Content knowledge (CK):** Awareness of the actual subject matter that teachers need to learn about teaching. This explains the appreciation teachers have of the subject matter. CK may include knowledge of principles, hypotheses, facts, and organizational structures within a given subject matter; it may also include the best practices of the field and existing methods for presenting this information to students. The CK will also differ according to the level of discipline and grade. Senior high school science and history classes, for example, require less detail and scope than undergraduate or graduate courses, so the CK of their different teachers will differ, or the CK that each teacher imparts to their students can differ.
3. **Pedagogical knowledge (PK):** Awareness of teaching strategies and processes such as classroom management, assessment, creation of the lesson plan, and learning of the students. As a general type of information, PK covers educational objectives, principles, and goals and can extend to more specific fields, including recognizing student learning styles, lesson planning, and assessments.
4. **Pedagogical content knowledge (PCK):** This defines the awareness of teachers about the essential areas of teaching and learning, including the creation of curricula, student evaluation, and reporting performance. PCK focuses on encouraging learning and exploring the ties between pedagogy and its supporting activities (curriculum, assessment, etc.), and similar to CK, may also differ depending on the grade level and subject matter. However, in all situations, PCK seeks to improve teaching practices by building more consistent linkages between the material and the pedagogy used to communicate it.
5. **Technological content knowledge (TCK):** Knowledge of how technology can create new representations for specific content. TCK requires an awareness of how the subject can be conveyed through different educational technology offerings and considering which specific educational technology tools might be best suited for particular subject matters or classrooms.
6. **Technological pedagogical knowledge (TPK):** Knowledge of various technologies that can be used in teaching and learning experiences. Another dimension of TPK relates to understanding how to apply these resources alongside pedagogy in ways relevant to the discipline and the creation of the lesson at hand.
7. **Technological pedagogical content knowledge (TPACK):** Focus on the knowledge required by teachers for integrating technology into their teaching in any content area. Teachers, who have TPACK, act with an intuitive understanding of the complex interplay between the three essential components of knowledge (CK, PK, and TK). TPACK is the culmination of these complex combinations and desires, drawing from them – and from the three wider underlying fields of content, pedagogy, and technology – to create a useful framework for teaching using educational technologies. For teachers to use the TPACK system effectively, they should be open to unique, critical ideas, including:
 - Concepts of the taught material can be expressed using technology;
 - Pedagogical techniques can use technology to communicate content in various ways;
 - Different subject definitions allow students to have specific ability levels and educational technology may help address some of these requirements;
 - Students have various experiences in the classroom – like previous educational experience and technology exposure – and lessons using educational technology should take this opportunity into account;
 - Educational technology may be used in combination with established awareness of the students, either by improving previous epistemologies or by introducing new ones.



The ASSURE Model

What is ASSURE Model?

The ASSURE model is an instructional framework or rule that instructors can use to create lesson plans which coordinate the utilization of innovation of technology and media (Smaldino, Lowther and Russell, 2008). The ASSURE Model emphasizes the student and the general result of achieving learning targets. The ASSURE model is an enhanced advancement of the ADDIE general model. Although the ASSURE model has six stages, which don't relate to ADDIE's five, ASSURE additionally presents configuration stages, and offers with it the two principle includes: the underlying spotlight on examination and the cyclic structure.

Six Steps of ASSURE Model

The ASSURE Model has six steps, each represented by a letter in the acronym title, with each step describing a set of tasks central to the informed selection and use of educational technology. The ASSURE acronym stands for these essential components:

Analyze Learners - The first step in the process is to make the instructor evaluate her learners’ attributes. Those learner characteristics that are correlated with the optimal learning outcomes should be given a priority.

State Objectives - The next step in planning is to state the objectives of the lesson or presentation accurately. Targets must be specified in terms of what the learner (not the instructor or presenter) would do as a result of the training (in behavioral conditions). Your lesson will have two or three clear targets. Usually, goals include four (4) essential parts:

- A statement that describes the intended **Audience**. For example, —The first-grade student will . . . or —The student will . . . —
- A description of the student’s anticipated **Behavior** resulting from your teaching. This conduct must be detected to be assessable.
- A description of the **Condition** to be observed for results. What tools does it require the student to use (e.g., a map, a dictionary)? Which tools or equipment does it need the student to use? Will the student be permitted to use notes or a summary when composing an article?
- A declaration of the learner’s **Degree** of accuracy or ability must be demonstrated to pass forward. The conditions should be based on the real-world and not specified on the multiple-choice test.

Select Media and Materials - In this step, you have set the starting point (the student’s current information, aptitudes, and perspectives) and the consummation point (objectives) of your instruction. Presently your activity is the fabricate an instructional scaffold that will associate the two focuses.

Utilize Media and Materials - Here you should choose how the students will utilize the materials. Next, set up the room and be sure the essential hardware and offices are accessible and prepared for your utilization before you use the exercise. It’s vital to follow the —five p’sll process to achieve this:

- Preview the Technology, Media, and Materials
- Prepare the Technology, Media, and Materials
- Prepare the Environment
- Prepare the Learners
- Provide the Learning Experience

Require Learner Performance - This step expects you to depict how you will get every student effectively and exclusively engaged with the exercise. Students understand best when they are effectively engaged with the learning experience.

Evaluate and Revise - The last advance of the ASSURE technique is to Evaluate Student Performance. Here the assessment ought to be coordinated to the target.

The ASSURE lesson plan model guides in the joining of innovation into study hall guidance. It fills in as a guide for educators and spotlights fair and square of innovative help applied. The best possible utilization of this model will enhance day by day exercises and understudy exercises and expand the capability of open innovations.



Technology Integration Matrix (TIM) Model

The Technology Integration Matrix (TIM) is a comprehensive framework that helps educators evaluate the degree to which technology is integrated into their teaching and students’ learning experiences. Developed by the Florida Center for Instructional Technology, this matrix offers a structured way to assess technology usage at various stages of adoption. It helps educators understand how different levels of technology use impact student learning and provides guidance on how to move from basic technology use to transformative teaching practices.

The Five Levels of Technology Use in TIM

1. **Entry.** This level, technology is primarily used for basic tasks. Teachers may use technology to support administrative tasks or deliver content, but there is minimal interaction between students and technology. It’s often used in a direct, teacher-centered way, with little to no impact on the way students learn.
2. **Adoption.** Teachers begin to experiment with technology to support more interactive learning experiences. This might involve using tools to facilitate communication or enhance student engagement, but technology is still used in fairly structured ways. Students might use educational software or online resources to reinforce concepts they’ve learned in class.
3. **Adaptation.** Technology is used in more flexible ways to support personalized learning. Teachers and students

are adapting technology to fit their specific needs and goals, with a stronger focus on interactive and collaborative learning. Students might use a range of digital tools to solve problems, create content, and collaborate with peers.

4. **Infusion.** This level represents a deeper integration of technology across different subject areas and learning experiences. Technology is now embedded in the learning process, and students use it seamlessly as part of their everyday learning. This level often involves students using technology for a wide range of purposes, including research, creation, collaboration, and problem-solving.
5. **Transformation.** Technology is not just a tool—it transforms the way students learn. Learning experiences become deeply collaborative, personalized, and engaging. Students use technology in innovative and creative ways that go beyond what was previously possible in a traditional classroom. This level often involves global collaboration, real-world projects, and learning experiences that are highly dynamic and flexible.

SAMR Model

A powerful conceptual tool to think about technology integration—and edtech’s best uses—is the SAMR model, developed in 2010 by education researcher Ruben Puentedura, who was the 1991 recipient of a Phi Beta Kappa teaching award. The SAMR model lays out four tiers of online learning, presented roughly in order of their sophistication and transformative power: substitution, augmentation, modification, and redefinition. When switching to an online format, teachers often focus on the first two levels, which involve replacing traditional materials with digital ones: converting lessons and worksheets into PDFs and posting them online, or recording lectures on video and making them available for asynchronous learning, for example.

1. **Substitution.** “Substitution” means replacing traditional activities and materials—like in-class lectures or paper worksheets—with digital versions. There is no substantial change to the content, just the way that it is delivered.
2. **Augmentation.** This level involves incorporating interactive digital enhancements and elements like comments, hyperlinks, or multimedia. The content remains unchanged, but students can now take advantage of digital features to enhance the lesson.
3. **Modification.** At this level, teachers can think about using a [learning management system](#) like Google Classroom, Moodle, Schoology, or Canvas to handle the logistical aspects of running a classroom, like tracking grades, messaging students, creating a calendar, and posting assignments.
4. **Redefinition.** Learning is fundamentally transformed at the “redefinition” level, enabling activities that were previously impossible in the classroom.

Social, Ethical and Legal Responsibilities in the Use of Technology Tools and Resources

Technology has become an integral part of our lives. It has created a great impact that whether we like it or not, we have become prone to safety issues. Our privacy can be intruded, our social relationships can be affected. But is just enough that we keep ourselves safe, we should also possess the skills on how we can act responsibly so as not to pose harm to others.

A **Global Citizen** is someone who is open-minded, curious, compassionate, collaborative, co-creative, inclusive, non-discriminatory, responsible, reflective, and well-informed individual. To be a global citizen it is not necessary travel to different countries or know multiple languages.

Becoming a global citizen is a lifelong learning process that requires continuous reflection of our perspectives. To become a global citizen means one is a life-long learner ready to learn, unlearn, and relearn. A global citizen is someone who is aware and acknowledges the multiple concentric identities that transcend geographical or political boundaries and takes action towards human and planetary flourishing.

Digital citizenship is the ability to safely and responsibly access digital technologies, as well as being an active and respectful member of society, both online and offline.

Who are digital citizens?

As well as knowing what digital citizenship is, it’s worth thinking about who the label might refer to. Again, we can turn to our open step for an explanation of this. A digital citizen is a person who develops the skills and knowledge to effectively use the internet and digital technologies. They’re also people who use digital technologies and the internet in appropriate and responsible ways in order to engage and participate in society and politics.

Tying the Digital and the Global Together

The Global Digital Citizen understands that we can govern technology for the benefit of both ourselves and others. It is a citizen that views the world as an interconnected community. Additionally, they realize we simultaneously share technological and human experiences regardless of culture, status, or political/religious beliefs.

We define the best assets of the Global digital Citizen using 5 tenets: Personal responsibility, Global Citizenship, Altruistic Service, Environmental Stewardship, and Digital Citizenship (Ribble, 2017).

Five Tenets of Global Digital Citizenship

1. **Personal Responsibility.** Personal responsibility includes demonstrating how we manage ourselves in matters such as: personal finance, ethical and moral boundaries, personal health and wellness, and relationships of every kind, both online or offline.
2. **Global Digital Citizen.** The Global Digital Citizen understands that technology has dissolved boundaries between all the world's people. We now communicate, collaborate, and celebrate across all levels of society. We are now all global citizens.
3. **Digital Citizenship.** Digital citizenship covers appropriate and exemplary behavior in our online environments. It's about working towards making our transparent digital world safe for ourselves and others.
4. **Altruistic Service.** Altruism is defined as "having a selfless concern for the well-being of others." The Global Digital Citizen acknowledges that they share this world with many different people. These ideals apply to the people we know, but also those we don't know. It includes embracing the opportunity to exercise charity and goodwill for the benefit of others.
5. **Environmental Stewardship.** This practice is all about common-sense values and an appreciation for the beauty and majesty that surrounds us every day. This facet of Global Digital Citizenship encourages exploring how we can practice the conscientious use of Earth's resources.

Elements of Digital Citizenship

1. **Digital Access** is about the equitable distribution of technology and online resources. Teachers and administrators need to be aware of their community and who may or may not have access, not only in school but at home as well. Educators need to provide options for lessons and data collection such as free access in the community or provide resources for the home.
2. **Digital Commerce** is the electronic buying and selling of goods and focuses on the tools and safeguards in place to assist those buying, selling, banking, or using money in any way in the digital space. Career and technical education use the tools of technology to show students the path for their future.
3. **Digital Communication and Collaboration** is the electronic exchange of information. All users need to define how they will share their thoughts so that others understand the message. For students struggling to understand their place in the world, technology can help them find their own voices and express themselves.
4. **Digital Etiquette** refers to electronic standards of conduct or procedures and has to do with the process of thinking about others when using digital devices. Teachers can include Digital Etiquette as part of the classroom rules or academic goals. Whether in the classroom or online, being aware of others is an important idea for everyone.
5. **Digital Fluency** is the process of understanding technology and its use. The better educated or "digitally fluent," students are, the more likely they are to make good decisions online, like supporting others instead of making negative comments. Digital literacy includes the discussion of media literacy and the ability to discern good information from poor, such as "fake news" from real news.
6. **Digital Health and Welfare** refers to the physical and psychological well-being in a digital world. Technology provides many opportunities and enjoyment, but knowing how to segment use with the needs of ourselves and others is key to a healthy, balanced life. Educators, especially in 1:1 schools or classrooms need to ask the question of how much screen time is appropriate for students. Common Sense media has developed a guide on this topic.
7. **Digital Law** refers to the electronic responsibility for actions and deeds and has to do with the creation of rules and policy that address issues related to the online world. Just as in the real world, the online world has had to create structure to protect those using these digital devices from harm. Support for issues such as cyberbullying and sexting are available from School Resource Officers and other school counsel. Administrators need to come up with positive approaches to these issues in their schools and districts.
8. **Digital Rights and Responsibility** are those requirements and freedoms extended to everyone in a digital world. This area of Digital Citizenship is about helping students understand that when they are provided opportunities, such as the access to the Internet and use of online products, they need to be diligent in helping others as well, such as informing adults of potential problems. Educators must help students understand that protecting others both online and in the real world are essential skills to have.
9. **Digital Security and Privacy** is the electronic precautions to guarantee safety. Viruses, worms and other bots can be passed along from one system to another just like an illness. When using devices in school or at home, understanding and being aware of attacks and how to prevent them are important skills for today and into the future.

Intellectual Property Rights on the Development and Use of Digital Materials

Intellectual Property protection is important in fostering innovation. Without protection of ideas, individuals will not be able to enjoy the full benefit of their inventions and they would not be compensated for their creations. This encourages innovation without the fear that a competitors will steal the idea and/or take the credit for it.

Intellectual property, according to World Intellectual Property Organization (WIPO), refers to creations of the mind such as inventions, literary and artistic works, designs, and symbols, names and images used in commerce. An intellectual property right is a right held by a person or by a company to have exclusive rights over these. In our country, we have the Intellectual property Office of the Philippines (IPOPHI) which administers and implements state policies in relation to intellectual property. This office was created through **Republic Act 8293**.

Copyrights are intangible rights granted through the federal Copyright Act to an author or creator of an original artistic or literary work that can be fixed in a tangible means of expression such as hard copies, electronic files, videos, or audio recordings.

Copyright law protects literary, musical, dramatic, choreographic, pictorial, sculptural, and architectural works as well as motion pictures and sound recordings. Each copyrightable work has several “copyrights”—the exclusive rights to make copies of the work, distribute the work, prepare derivative works, and perform or display the work publicly.

Copyright Infringement vs. Plagiarism

Another violation on intellectual property is plagiarism. Although plagiarism and copyright infringement are related ideas, these two are different. **Plagiarism**, according to plagiarism.org, is an act of fraud: it involves both stealing someone else’s work and lying about it forward. In other words, plagiarism refers to copying the work of another and claiming it as one’s ideas or without proper attribution. On the other hand, **copyright infringement** is copying one’s work without obtaining permission. In this sense, copyright infringement is a violation of the right of the copyright holder while plagiarism is a violation of the right of the author.