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MINISTRY OF EDUCATION

DIPLOMA IN EDUCATION LEADERSHIP AND MANAGEMENT
MODULE 5: LEADERSHIP AND MANAGEMENT OF ICT INTEGRATION IN EDUCATION

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ICT INTEGRATION IN LEARNING

UNIT 4



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- The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements in the 21st century (J. Augustus Richard, 2015).
- Using ICT in teaching and learning is critical in this digitally connected world.
- In this unit you will learn about digital literacy as a core competence, ICT integration models, characteristics of an ICT integrated lesson, instructional resources, learner centred approaches in ICT integration, professional development and support; and change management for effective ICT integration.

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Learning Outcomes

Upon completion of this unit you will be able to:

a) Demonstrate understanding of digital literacy as a core competency
b) Apply ICT integration models in the learning process
c) Plan for an ICT integration lesson
d) Demonstrate understanding of digital resources that can be used for ICT integration in teaching and learning
e) Explore various learner-centered approaches for use in ICT integration;
f) Appreciate the importance of teacher professional development and support for effective and efficient curriculum implementation;
g) Develop a change management plan for ICT integration in education

Digital Literacy as a Core Competency

- The Basic Education Curriculum Framework (BECF) which was developed to actualize the curriculum reforms in Kenya outlines the seven core competencies to be achieved in basic education.
- In the context of the Kenyan Competency Based Curriculum (KCBC), competency is understood as “the ability to apply appropriate knowledge and skills to successfully perform a function”.
- Within this context, the curriculum is designed to emphasize the importance of not only developing skills and knowledge but also applying these to real life situations.

The seven core competencies include in CBC are:

i. Communication and Collaboration,
ii. Critical Thinking and Problem Solving,
iii. Creativity and Imagination,
iv. Citizenship,
v. Self-efficacy,
vi. Learning to Learn and
vii. Digital Literacy

- Digital literacy requires learners to possess the knowledge, skills and behaviour which is necessary to effectively and safely use a wide range of digital content and devices.
- Such devices include mobile phones, smart phones, tablets, laptops and desktops among others.
- According to the BECF (2019), individuals are presumed to be digitally literate if they possess a broad range of digital skills and knowledge, and have a basic understanding of the potential uses of computing devices.
- Digital literacy skills also include being able to use computer communication networks, being able to engage in online communication and social networks, being aware of and adhering to ethical behaviour protocols, being aware of societal issues raised through digital media, and being able to search, evaluate and use information channeled through digital platforms.

- Furthermore, the digital literate individual should also have the ability to safely and securely use technology while being able to assess the nature of the information acquired in order to support and enhance the environment (British Council, 2015).
- Digital literacy as a competence therefore encompasses *knowledge and skills concerning the appropriate application of a variety of hardware platforms such as computers, tablets and mobile devices, and their software including but not limited to web search or internet application software*.
- We need to note that digital literacy is a dynamic competence due to the fast-changing world of information communication technology and the ongoing development of technological devices as well as their related software.
- This is an area in which there is constant innovation and development as the industry attempts to keep up with a globally increasing demand for efficient and effective communication technologies.

Types of digital literacy skills

The digital literacy skills to be acquired can summarised as follows:

- **Interacting with technology skills**: This refers to the interaction with hardware, software, accessing, handling, managing and presenting information.
- **Creating with technology skills**: This refers to the use of technology in coding, simulation, modeling and designing.
- **Connecting using technology skills:** This refers to the use of technology to communicate and collaborate either synchronously or asynchronously.
- **Digital Citizenship skills: This refers to the ethical, safe and responsible use of technology.**

In order to acquire these skills, learners will need to be exposed to a wide range of content and devices to equip them with knowledge, skills and behaviours which are effective and safe for digital literacy.

Activity

i. Give reasons why digital literacy is considered as a core competency

ii. Identify areas in our lives where digital literacy is required.

ICT Integration Models

- Various models have been adopted for ICT integration. These include the TPACK Model, SAMR Model, among others. In this section, we will look at these two models

TPACK Model

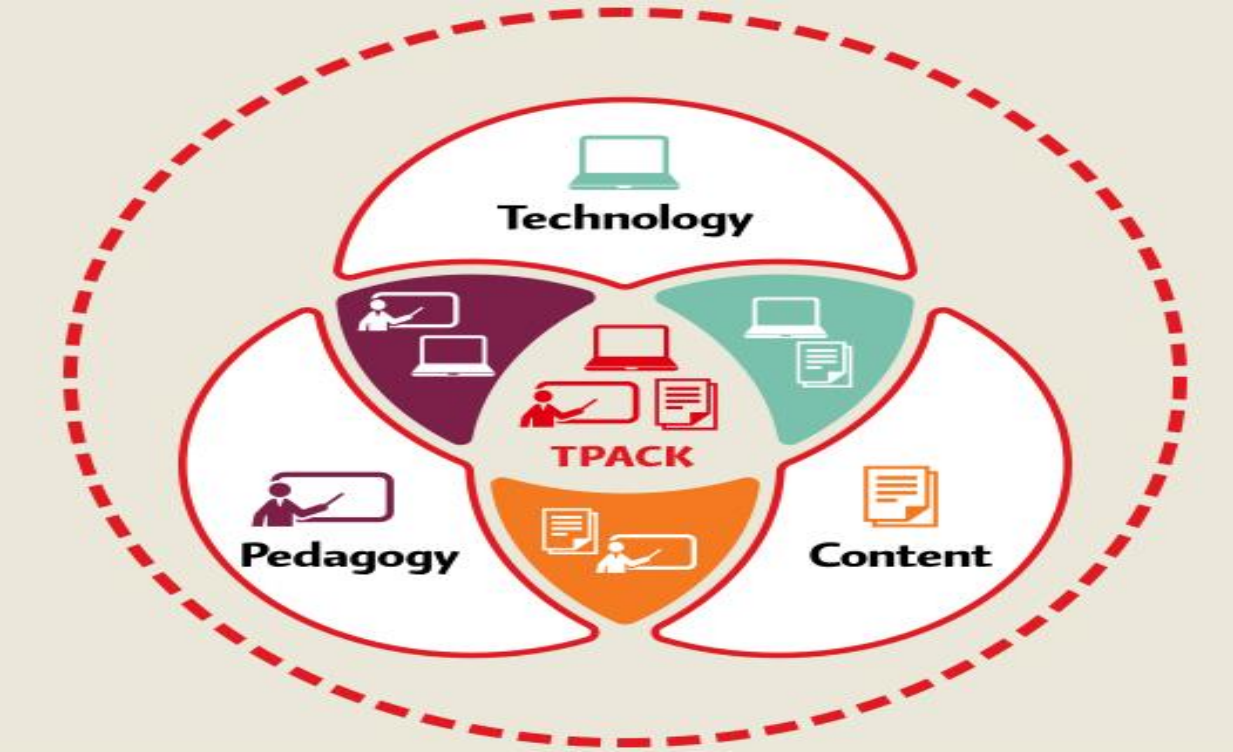
- TPACK is a technology integration framework was introduced by Punya Mishra and Matthew J. Koehler in 2006. The model identifies three primary forms of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK).
- Let us now discuss the three types of knowledge in details:

i. **Content Knowledge (CK)**: This knowledge emanates from the curriculum documents and the deep learning of concepts, as well as the higher order thinking and high level communication and other processes in the curriculum.

ii. **Pedagogical knowledge (P**K): This knowledge is related to the strategies, and techniques used in classrooms and other learning situations and environments to ensure curriculum goals are met.

iii. **Technology knowledge (TK)**: This is knowledge is concerned with the digital and non-digital technologies and tools that we use in our classrooms.

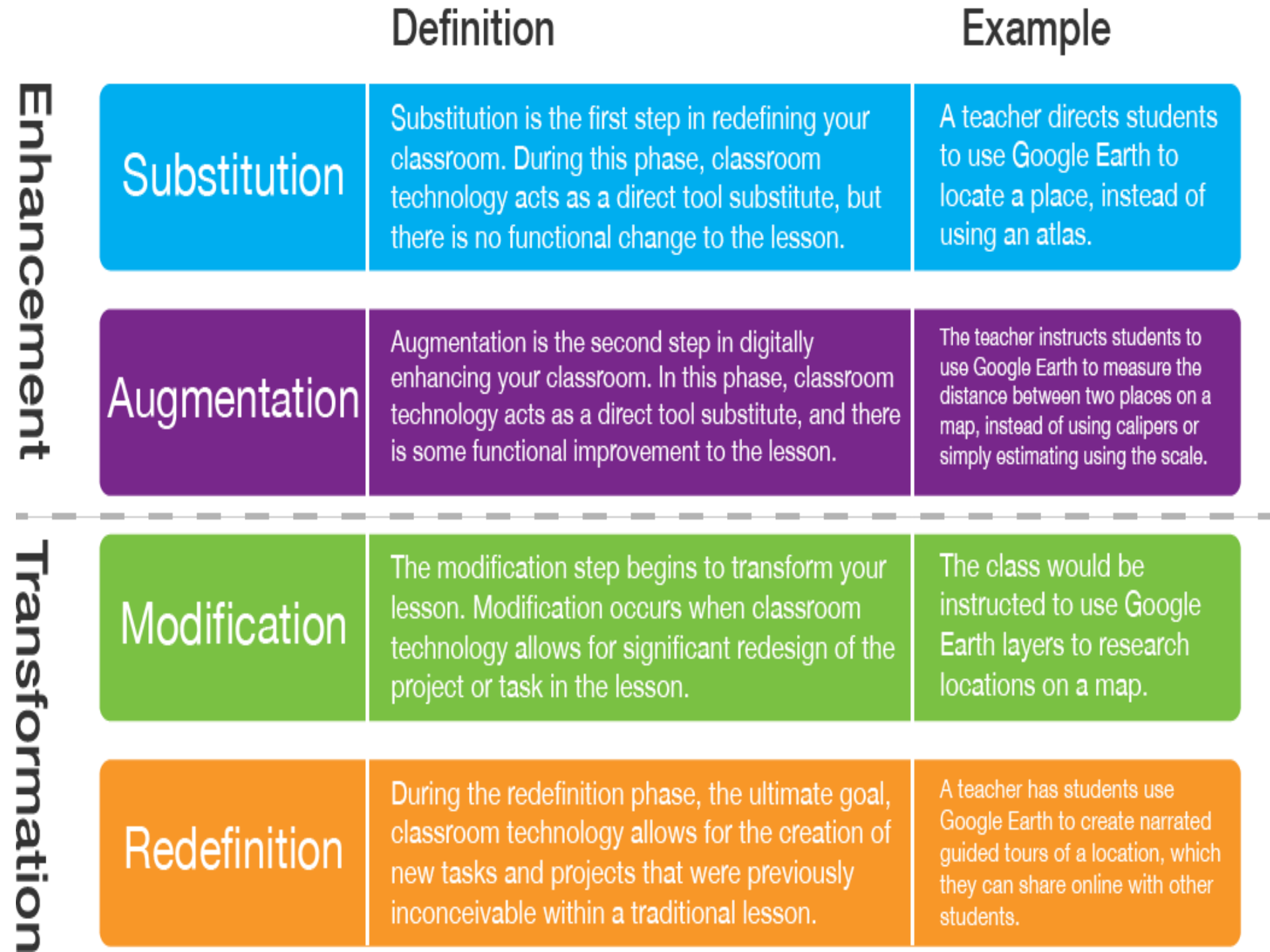
These three elements must actively interact at all times for the full benefits of ICT integration to be realized in the teaching and learning process. The interaction of the three elements is illustrated in the following figure:



- There are a lot of ways to use technology in the classroom.
- The TPACK model provides a new framework for the integration of technology in education and how the classrooms can be structured to provide the best educational experience for students while incorporating technology

SAMR Model

- The SAMR Model is a framework that categorizes four different degrees of classroom technology integration.
- The letters “SAMR” stand for **Substitution, Augmentation**, **Modification, and Redefinition**.
- The SAMR model was created to share a common language across disciplines as teachers strive to personalize learning and help learners visualize complex concepts.
- The SAMR Model can be especially powerful during remote and blended learning when integrated classroom technology makes teaching and learning a more seamless experience for educators and learners.
- The following figure illustrates the four elements:


Definition
Example
Enhancement
Substitution
Substitution is the first step in redefining your classroom. During this phase, classroom technology acts as a direct tool substitute, but there is no functional change to the lesson.
A teacher directs students to use Google Earth to locate a place, instead of using an atlas.
Augmentation
Augmentation is the second step in digitally enhancing your classroom. In this phase, classroom technology acts as a direct tool substitute, and there is some functional improvement to the lesson.
The teacher instructs students to use Google Earth to measure the distance between two places on a map, instead of using calipers or simply estimating using the scale.
Transformation
Modification
The modification step begins to transform your lesson. Modification occurs when classroom technology allows for significant redesign of the project or task in the lesson.
The class would be instructed to use Google Earth layers to research locations on a map.
Redefinition
During the redefinition phase, the ultimate goal, classroom technology allows for the creation of new tasks and projects that were previously inconceivable within a traditional lesson.
A teacher has students use Google Earth to create narrated guided tours of a location, which they can share online with other students.

- The SAMR model technology is used as a one-to-one replacement for traditional tools, and on the other end, technology enables experiences that were previously impossible without it.
- However, regardless of how you visualize it, the SAMR model can be a simple and effective way to assess how one incorporates technology in their instruction.

Planning for an ICT Integrated Lesson

- When thinking of a lesson to be taught, the first question that comes to the mind of an effective teacher is "What do I need to do to make the lesson very successful in achieving the objectives?"
- You need to consider the following as you plan an integrated lesson:

i. The concept to be taught
ii. The learning outcomes to be achieved
iii. The learning experiences: ensure the activities are student centered
iv. Identify the strategy to teach the concept,
v. Identify the ICT tools to be used and how the identified tool will be used to teach the concept.

Characteristics of an ICT Integrated Lesson

- An ICT integrated lesson is derived from an ICT integrated lesson plan.
- An ICT integrated lesson plan is developed by identifying sections within the lesson plan where ICT can be used to enhance the lesson, for instance by use of videos, photographs, audio, illustrations, animations, among other multimedia elements.
- The teacher uses these multimedia elements during the lesson where applicable.
- The teacher should give learners an opportunity to interact as well as create some content using the digital devices, for instance, through drawing images, coloring/painting, taking photos, recording audio and videos, among others.
- This is how learners acquire the digital literacy core competency.

Instructional Digital Resources

- These are the materials used in the teaching and learning process. In ICT integration, different types of digital resources are required so as to give the learners an enriched learning experience. Digital resources include, but not limited to:
  - Radio lessons;
  - Video programmes;
  - Interactive digital content;
  - e-books.
- These resources can be accessed on Kenya Education Cloud (www.kec.ac.ke). Radio programmes can be accessed through KBC English service and Radio Taifa while video programmes can be accessed through EDU Channel TV. The radio and TV timetables can be accessed from the KICD website (www.kicd.ac.ke).
- Other digital resources are also available in the KICD Multimedia Bookshop. Contacts of the Bookshop can be obtained from the KICD website.

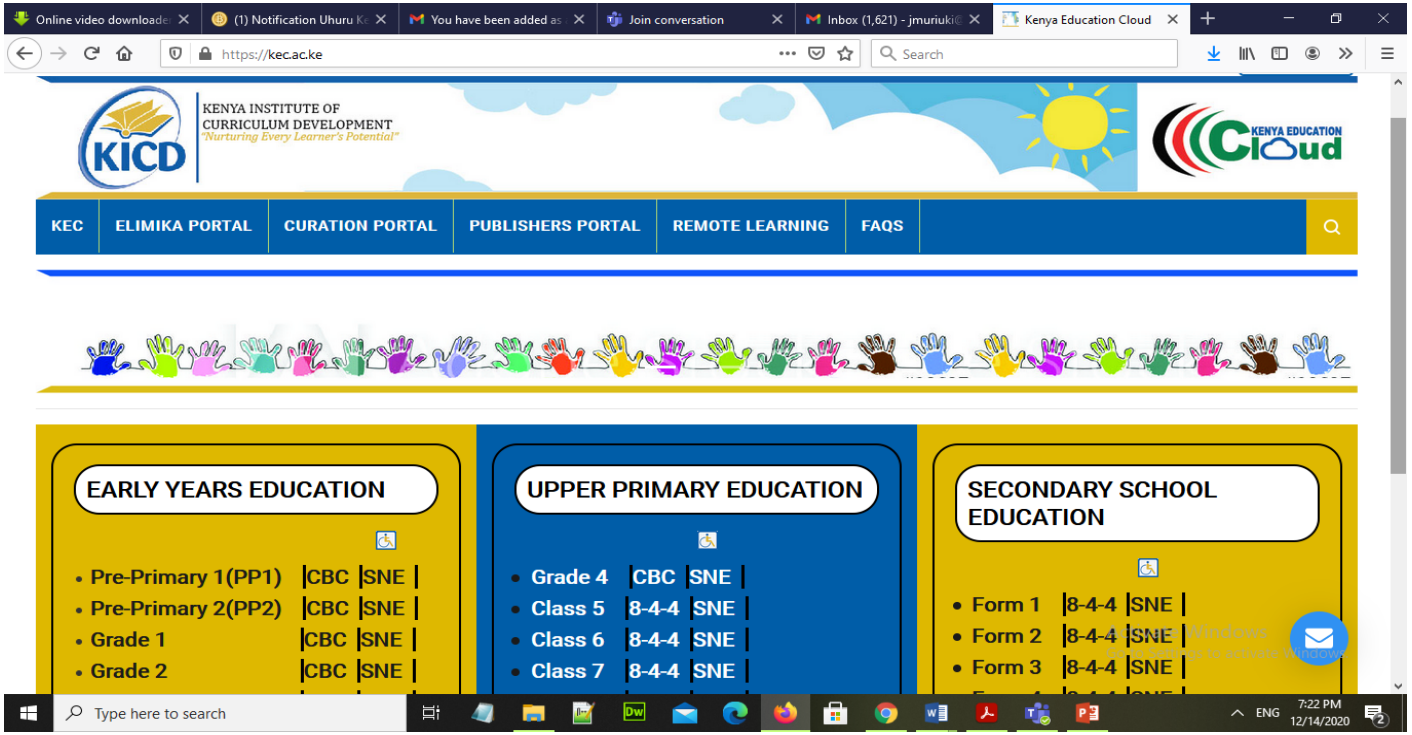
Activity

- **Step 1:** Log into KEC using www.kec.ac.ke. Select content from a Learning Area/Subject of your choice and explain how you would use it in a lesson.
- **Step 2:** Present your write up to your fellow teachers for peer review, critique and improvement.
- **Step 3:** Save the peer reviewed write up in a folder named ***"Peerfeedback"*** created in Unit 2

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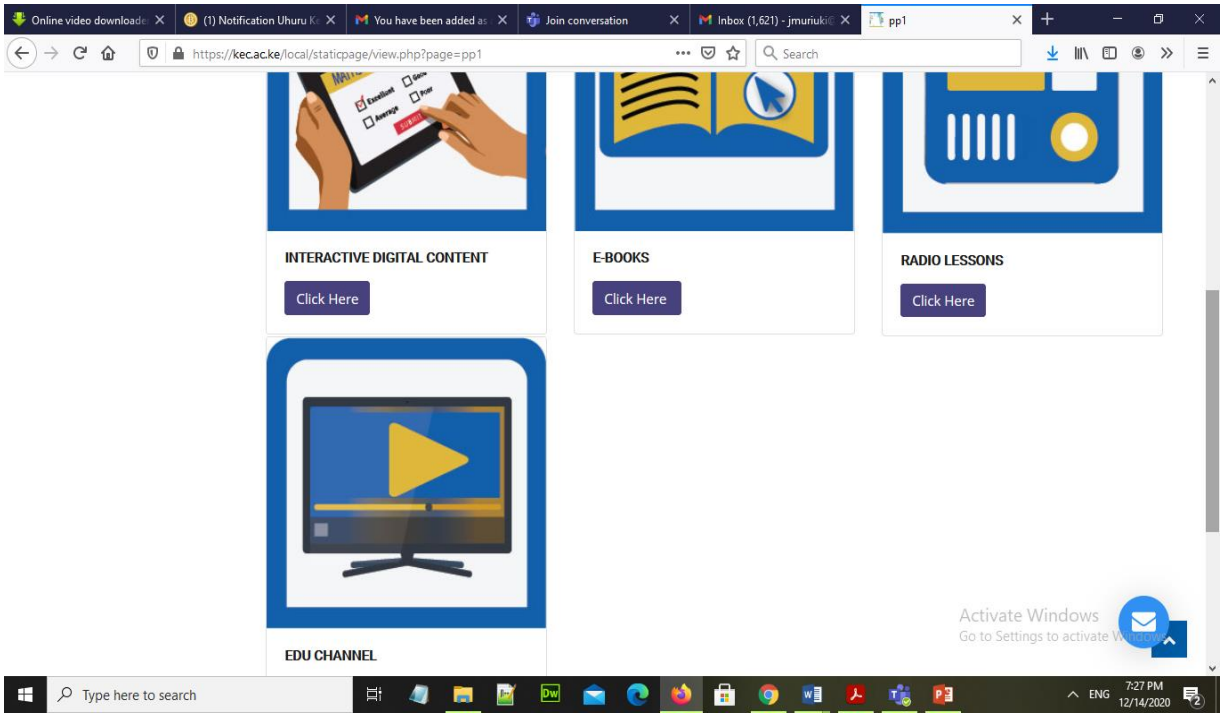
- **Steps on how to Access Content on Kenya Education Cloud (KEC)**
- **Step 1:** Log into www.kec.ac.ke and click on a Grade or Class to access content.



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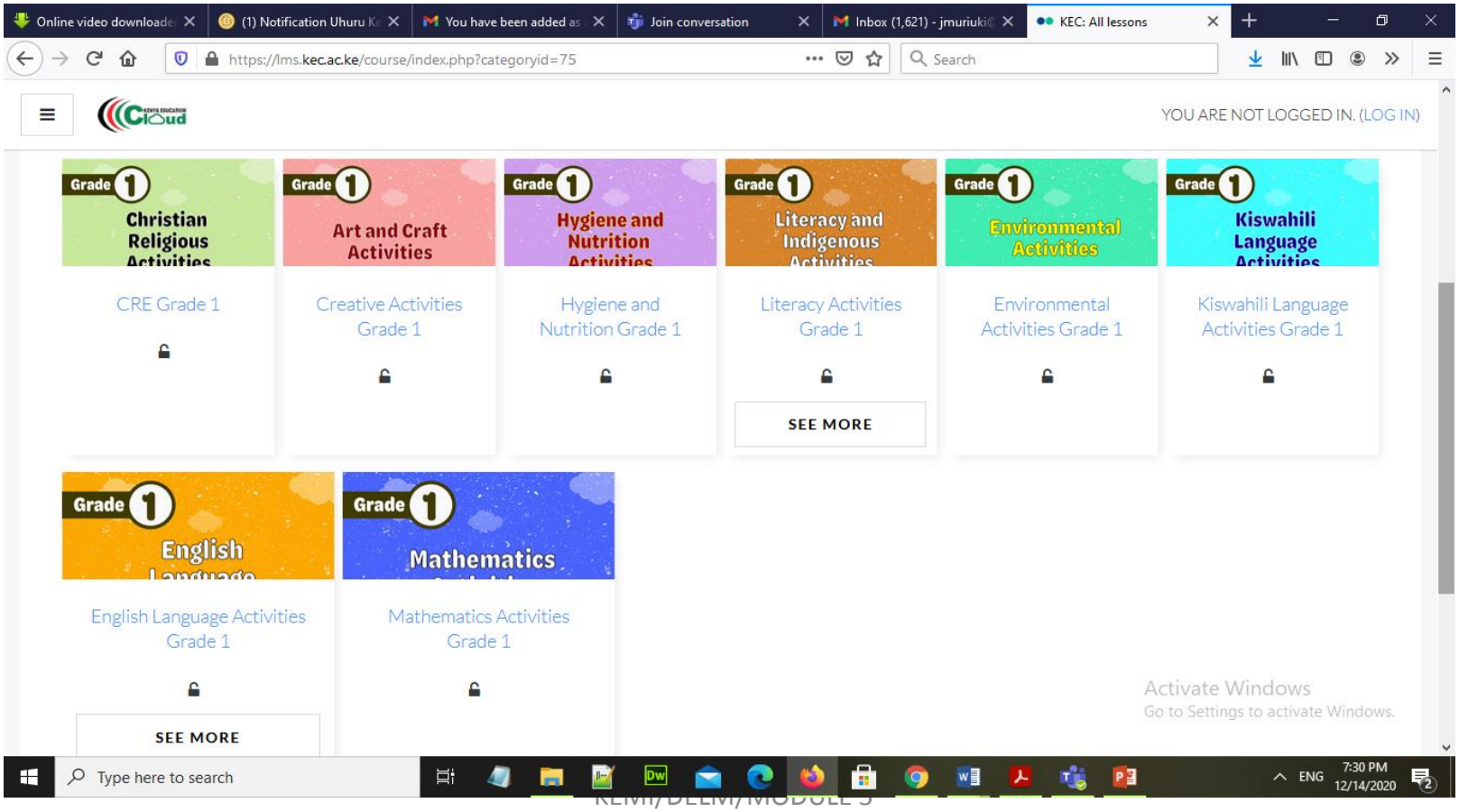
Step 2: Click on content of your choice



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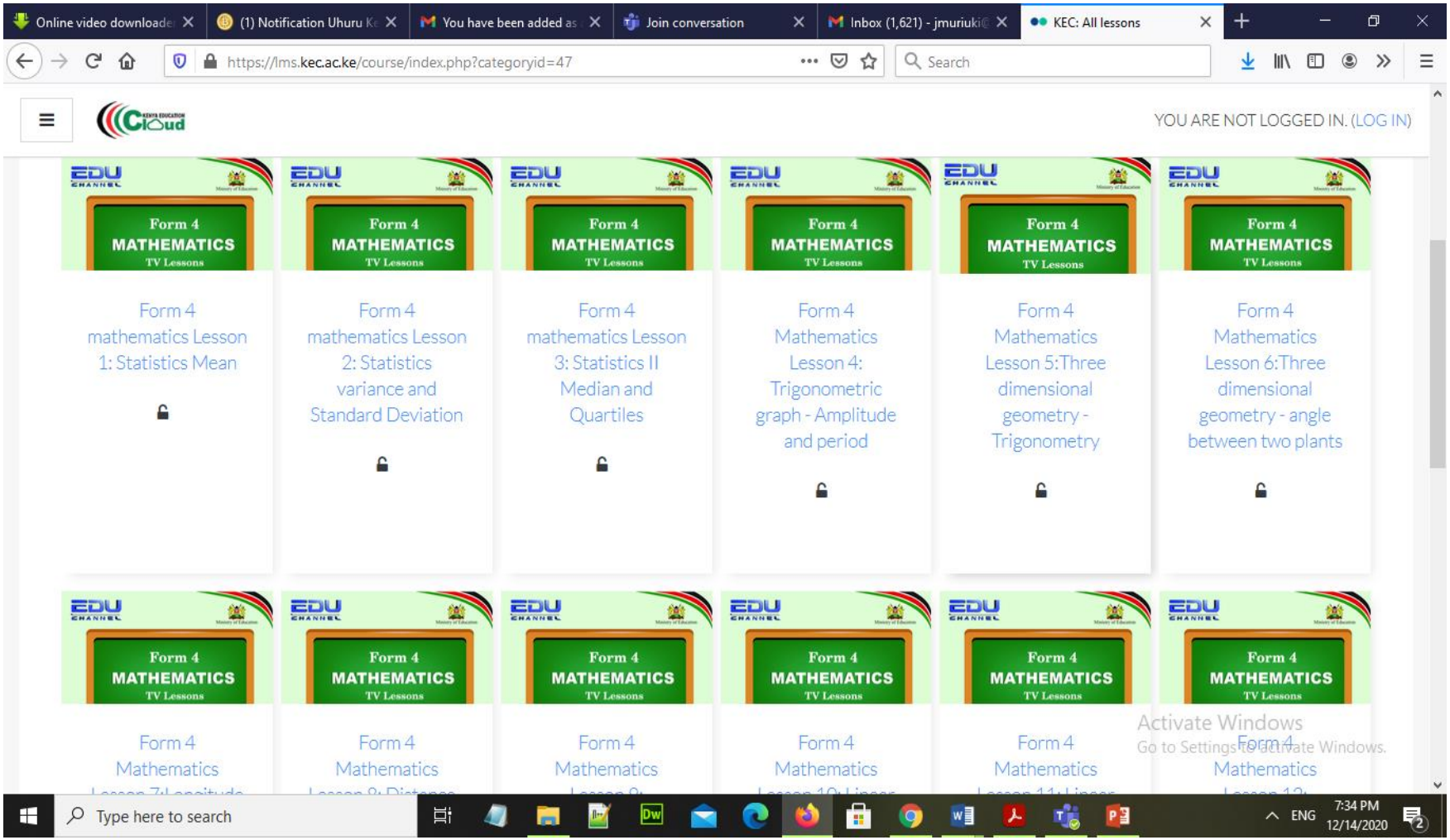
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Sample Interactive Digital Content



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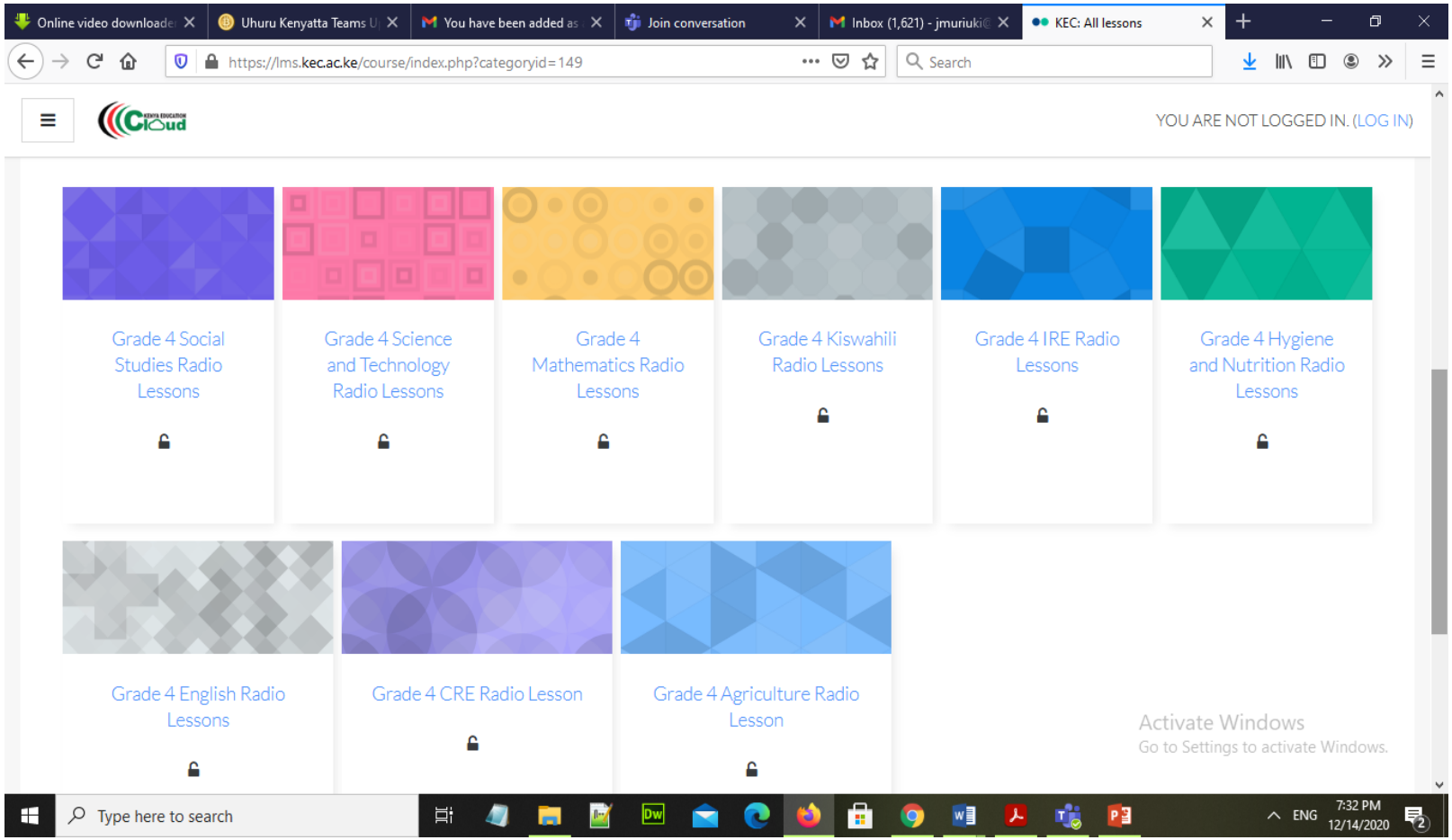
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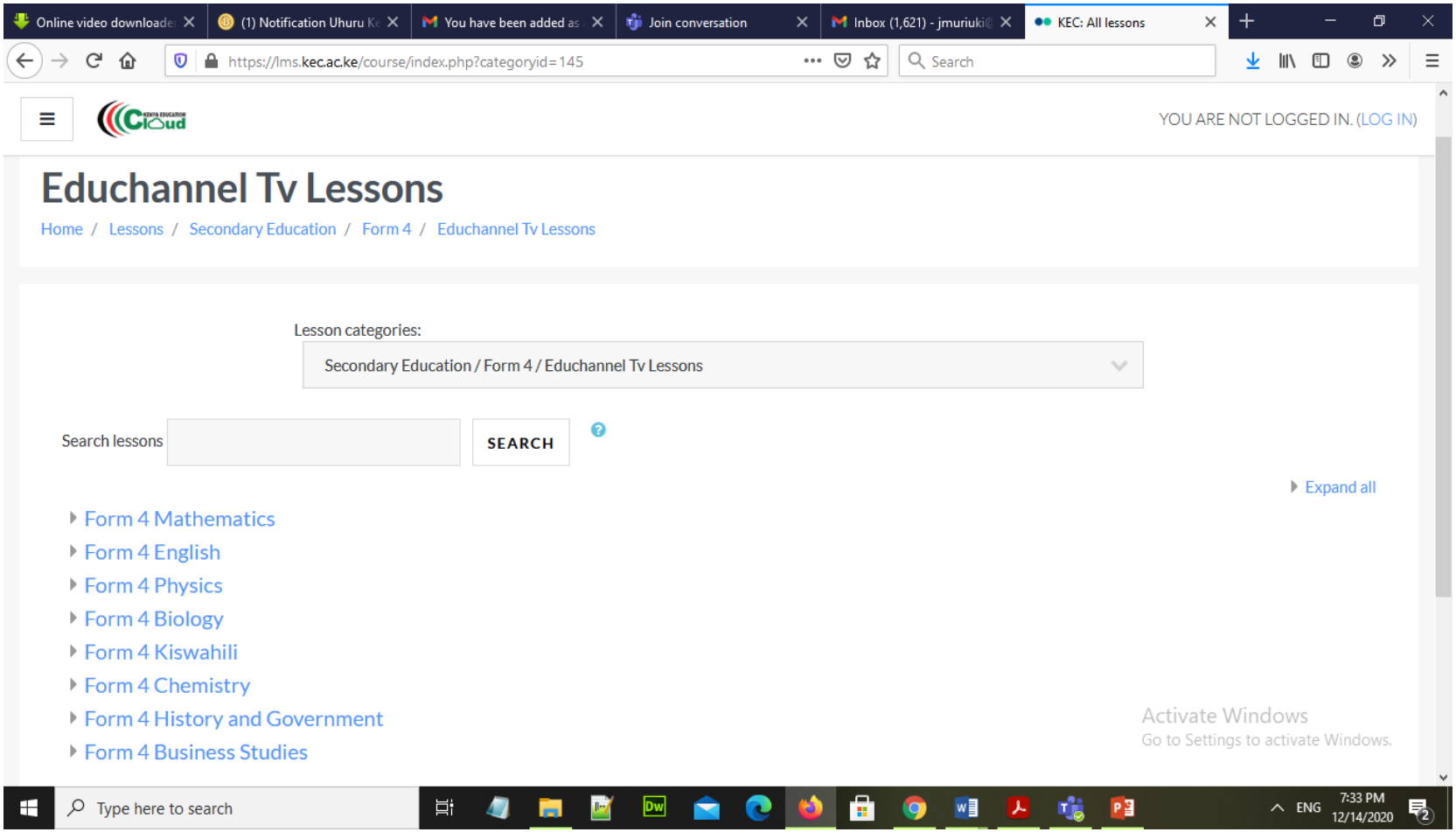
Sample Radio Lessons



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Sample EDU Channel Lessons



Open Educational Resources (OERs)

- Resources (OER) are teaching and learning materials licensed in such a way that they are free and may be used, reused, remixed, and otherwise customized to meet specific needs.
- In other words, OER are teaching, learning resource materials, tools, and media that are in the public domain or are available under an open license so that they may be used and repurposed freely by educators, students, and self-learners.
- They include e- textbooks, videos, animations, audio, graphics, assessments, and any other tools that support teaching and learning.
- OER provide a unique and cost-effective pathway for equipping all students with high-quality, up-to-date, and customizable content and tools.

Examples include:

- Khan Academy (2021) (see https://www.khanacademy.org/) has lessons on math, science, history, grammar, coding, music and so much more.
- Discovery Education (2020) (see http://www.discoveryeducation.com/teachers/) has content in English, Mathematics, Science, Social Studies. Provides Lesson plans, interactive games, puzzles, programs and contest
- Geogebra (2021) (see www.geogebra.org) A mathematics software used in graphing, equations and Algebra
- Jumpstart (2021) (see http://www.jumpstart.com/parents/resources/teacher-resources) Teacher resources; worksheets, lesson plans, social networking sites, learning games, audiovisual teaching aids, interactive educational software

Advantages of Digital Content over Print Materials

i. Digital materials may be modified and refined much more easily, enabling adjustments to address local needs and to ensure relevance and accuracy over time.

ii. Digital materials create opportunities for meaningful evaluation of the content's performance in the classroom, followed by timely improvement, adjustment, and review before students encounter the new materials.

iii. Digital OER's unique intellectual property permits content modification and refinement to be undertaken by multiple users, such as teachers and students before adoption decision is reached.

Activity

ICT integration in education is on-going and you have been allocated a school in a rural area where there is no trace of electricity to initiate the same.

- Discuss how you will integrate ICT in this school.

In the activity above, you may have given the following responses:

- u may have come up with the following suggestions:
- Use of solar in place of the electricity
- Use of radio batteries
- Improvisation of a white board for projection

Teacher Developed Digital Resources

- These include lessons, assessment objects and units of work developed by teachers to inspire and challenge their learners.
- Teachers are utilizing digital resources in order to make learning interesting and appealing in the 21st century.
- Smartphones, tablets, eReaders, educational apps, ebooks and computers are increasingly used today in education to get the latest information.
- Teachers are also sharing digital resources globally in a video portal known as Teacher tube which can be accessed from the following link http://www.teachertube.com
- Teachers can also create lessons and upload on YouTube.
- They can do this individually or they can collaborate with others on the same.

Selection of Relevant Digital Resources for Teaching and Learning

- The learning outcomes of your lesson will determine what resource to use, when to use them, and how to use them.
- For instance, if the learning outcome is related to information literacy skills, an open web search may be appropriate.
- If, however, the search is related to curriculum specific information then it would require the teacher to pre-select sites for the learners or use approved digital content.
- When selecting relevant digital resources for teaching and learning a number of factors are taken into consideration.

Activity

- **Step 1:** Log into KEC using www.kec.ac.ke. Select content from a Learning Area/Subject of your choice and explain how you would use it in a lesson.
- **Step 2**: Present your write up to your fellow teachers for peer review, critique and improvement.
- **Step 3:** Save the peer reviewed write up in a folder named ***"Peerfeedback"*** created in Unit 2.

Factors to consider when selecting digital learning resources

i. approved by the Kenya Institute of Curriculum Development and should be in the list of approved content;
ii. easy to use;
iii. relevant to the content learning outcomes;
iv. fit within your existing curriculum and teaching plans;
v. provide appropriate assessment items;
vi. cater for learner diversity in gender, values and culture;
vii. cater for different learning styles, different abilities;

viii. be appropriate for the learners' ages;
ix. have language that is suitable for the level of the learners;
x. allow for adaptations where need be to make them suitable for learners with special needs;
xi. promote learner-centred education;
xii. encourage problem-solving skills and/or cooperative learning;
xiii. be easily available and accessible;
xiv. consider the requirements for ICT equipment, other resources, space, that might limit how and where the lesson is taught.

Factors to consider when selecting resources for learners with special needs

- Content with large print (Large font);
- Content with magnifiers;
- Signed content;
- Narrated content;
- Brailed content;
- Complexity of the content;
- Compatibility with other tools or technologies;
- Availability of assistive technologies;
- Nature of special need of the learner;
- Ability to manipulate the device.

Learner Centred Approaches in ICT Integration

- Learner centred approaches view learners as active agents.
- The learners bring their knowledge, past experiences, education and ideas.
- This impacts how they take on board new information and learn.
- The learner centred approaches place the learner at the centre of the learning. Some examples include:

a) **Project Based Learning (PBL):** Project-Based Learning (PBL) is a research-backed pedagogical approach where learners solve real-life problems through planning and executing a project, for instance in partnership with the community under the supervision of the teacher. Here ICT can be used in searching for information while working on the project, organizing as well as presenting the findings or results.

b) **Inquiry Based Learning (IBL):** Inquiry Based Learning involves experiences that enable learners to develop a deeper understanding of aspects of the world around them through the development and use of investigative skills. The learners can use ICT to explore and discover new ways of doing things.

b) **Collaborative Learning:** Collaborative learning involves grouping learners to work together in order to solve problems, complete tasks, or learn new concepts. The learners can use collaborative tools to communicate, collaborate with others and share information as well as experiences.

Activity

Select one of the learner centered approaches and describe how you would use it in a learning situation. Explain how ICT will be used in in the situation you have described. Le

Teacher Professional development and Support

Successful on-going professional development models can be divided into three phases:

i. Pre-service, focusing on initial preparation on pedagogy, subject mastery, management skills and use of various teaching tools (including ICTs);

ii. In-service, including structured face-to-face and distance learning opportunities building upon pre-service training and directly relevant to teacher needs; and

iii. Ongoing formal and informal pedagogical and technical support, enabled by ICTs, for teachers, targeting daily needs and challenges.

Teachers' expertise in using ICTs in their teaching:

- Schools that report the highest levels of student ICT-related skills and experience are often not those with heavy computer course requirements, but rather ones that made use of ICTs on a routine basis throughout the teacher professional development and the teaching and learning process.
- Teacher inexperience and skill deficiencies may often be an important factor inhibiting the effectiveness of ICT use in education by students.

Teacher usage of ICTs:

- Teachers most often use ICTs for 'routine tasks' (record keeping, lesson plan development, information presentation, basic information searches on the Internet).
- Teachers more knowledgeable in ICTs use utilize computer assisted instruction less than other teachers who use ICTs, but utilize ICTs more overall.
- Types of usage of ICTs correlate with teacher pedagogical philosophies:

i. Teachers who use ICTs the most -- and the most effectively -- are less likely to use traditional 'transmission-method' pedagogies.

ii. Teachers who use different types of software tend to practice more "constructivist" pedagogies.

Teacher participation in continuing professional development:

The following issues are critical to teacher participation in continuing professional development:-

- ***Motivation:*** Teachers require additional motivation and incentives to participate actively in professional development activities.
- ***Access to ICTs:*** The most significant factor for continuing the development of teachers' ICT-related skills is for them to have regular access to functioning and relevant ICT equipment.
- ***Teachers' subject knowledge:*** The way ICT is used in lessons is influenced by teacher knowledge about their subjects, and how ICT resources can be utilized and related to it.
- ***Teacher self-learning:*** ICTs can aid teacher self-learning in subject matter; by providing access to updated and additional learning resources, ICTs can enable teacher self-learning in his/her subject area.
- ***On-going in-service training:*** Traditional one-time teacher training workshops have not been seen as effective in helping teachers to feel comfortable using ICTs, let alone in integrating it successfully into their teaching. On-going professional development is more effective.

Activity

Few teachers are confident in using a wide range of ICT resources, and limited confidence affects the way the lesson is conducted. Many teachers still fear using ICTs, and thus are reluctant to use them in their teaching.

- Do you agree with this statement?
- What strategies can an education manager use to deal with the situation mentioned above?

- Education managers need to ensure that there are continuous professional development programs to enable teachers to s continuously update their professional knowledge and their personal competence.
- This ensures that all teachers can at each stage of their career develop their knowledge, improve their skills and enhance their confidence and motivation with a view of improving learning outcomes.
- A number of organizations, including KICD, KEMI, CEMASTEA, among others offer short courses for teachers.
- Examples include; CBC Online Course and Online ICT Integration Course in Teaching and Learning which are free self-paced courses.
- Below are programs that have been designed to support and motivate teachers in ICT integration.

ICT champions program

- The Ministry of Education identified and trained one teacher per constituency, whose role is to train and support their peers in the constituency on ICT integration.
- It is hoped that from the championship program, teachers can develop communities of practice in their regions.

ICT Teacher of Year Award (ITOYA)

- The Teacher Service Commission (TSC) in conjunction with the Kenya Secondary School Heads Association (KESSHA) have an annual innovative/ICT teacher of the year (iTOYA) award.
- This includes teachers in any subject as long as they can present their innovation and creativity in curriculum delivery.
- The main objective is to: encourage compliance with teaching standards; facilitate career progression; promote professional development; promote best practices in curriculum implementation.

Communities of Practice

- A community of Practice (CoP) refers to a group of people who share a common concern, a set of problems, or an interest in a topic and who come together to fulfill both individual and group goals.
- Communities of practice often focus on sharing best practices and creating new knowledge to advance a domain of professional practice.
- Interaction on an ongoing basis is an important part of this.
- Many communities of practice rely on face-to-face meetings as well as web-based collaborative environments to communicate, connect and conduct community activities.

Communities of practice offer the following benefits:

i. They help teachers to learn new ideas faster;
ii. Ensures rapid flow of communication and shared awareness;
iii. They reduce reworking and prevent "reinvention of the wheel";
iv. They help teachers to respond more rapidly to emerging trends in education;
v. They create an enabling environment for coming up with new ideas in teaching and learning;

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- In this unit we have learnt about digital literacy as a core competency.
- We have also learnt about the models that can be used for ICT integration and how to plan for ICT integrated lessons.

- We have learnt about different digital resources that can be used for instructional purposes.
- We have concluded the unit by looking at the importance of teacher professional development for effective ICT integration.
- It is our hope that you can utilize what you have learnt to ensure effective integration of ICT in teaching and learning,