Use of ICT for Learning

Are students passive consumers of ICT, active users, or designers of an ICT product for an authentic audience?

Overview

We live in a connected world with unprecedented access to a vast array of digital information and experiences. The use of technology continues to transform how we live and work. On-going adoption of new advances in ICT has become more essential to both life-long learning and life-long earning. In today's globalized, knowledge-based economies, individuals increasingly need skills not only to intelligently consume information and ideas, but also to design and create *new* information and ideas using ICT.

While ICT is becoming increasingly common in classrooms and learning environments, it is often used to present or consume information rather than to fundamentally transform learning experiences. This ITL rubric examines *how* students use ICT— and whether it is used in more powerful ways to construct knowledge or to design knowledge-based products.

In this rubric, the term "ICT" encompasses the full range of available digital tools, both hardware (computers and related electronic devices such as tablets and notebooks, e-readers, smart phones, personal digital assistants, camcorders, graphing calculators, and electronic whiteboards) and software (including everything from an Internet browser and multimedia development tools to engineering applications, social media, and collaborative editing platforms).

ICT is a powerful tool to promote and support a wide range of 21st century skills, including all other Learning Design rubrics. For example, ICT can help students to collaborate in ways that were not possible before, or to communicate through new mediums of expression. In this rubric we focus on the interaction of ICT use with two rubrics in particular: knowledge construction and real-world problem-solving and innovation. These are not the only important ways that ICT can support innovative teaching and learning, but they represent particularly powerful uses.

Big Ideas

Student use of ICT happens when students use ICT directly to complete all or part of the learning activity. The educator's use of ICT to present materials to students does not count as student use: it is important that students have control over the ICT use themselves. Some educators' use of ICT can enhance their teaching significantly: for example, educators can show simulations that make difficult content easier for students to visualize. However, this rubric focuses only on how the learning activity requires *students* to use ICT in their learning.

This rubric looks at the **opportunities** students have to use ICT. It is considered ICT use if the students **are required to** use ICT or **can use ICT** to complete an activity.

IS THIS STUDENT USE?	
YES:	**NO:**
Students complete a math learning activity by using Excel spreadsheet software.	Students complete a math learning activity by using worksheets that the educator has printed out from the computer.
Students learn about cell replication by using a software simulation to explore the process.	Students learn about cell replication by watching the educator demonstrate a software simulation of the process.
Students use Microsoft OneNote to edit their writing, tracking their changes as they go.	The educator uses Microsoft OneNote to make and track suggested changes to the student's writing.

Knowledge construction occurs when students generate ideas and understandings that are *new to them*, through **interpretation, analysis, synthesis,** or **evaluation**. This rubric examines whether the learning activity requires that students use ICT in ways that **support knowledge construction,** either directly or indirectly.

ICT **supports knowledge construction** when:
- Students use ICT directly for the knowledge-construction part of a learning activity. For example, students use a computer to analyze scientific information.
- Students use ICT to indirectly support knowledge construction, by using ICT to complete one step of an activity, and then using information from that step in the knowledge-construction part of the activity. For example, students might search for terms related to current events on Twitter and then analyse people's responses offline. The information they found on Twitter supported their analysis, so we say that ICT use supported knowledge construction.

The knowledge construction supported by ICT must be about the learning goals of the activity: learning to use the ICT does not qualify. For example, students might learn about PowerPoint as they create a presentation for history class. But to be considered knowledge construction using ICT, it is essential that the use of PowerPoint helped them to deepen their interpretation, analysis, synthesis, or evaluation of historical ideas, not just to deepen their knowledge on how to use the tool.

Evaluation of Internet resources related to the learning goals is also considered knowledge construction. Some learning activities are designed to help students become intelligent, ethical users of Internet resources rather than passive consumers of the information. For example, students might be required to find several sources on a topic and evaluate their credibility before they select which information to rely on.

DOES THIS STUDENT USE SUPPORT KNOWLEDGE CONSTRUCTION?	
YES:	**NO:**
Students use Excel spreadsheet software to analyse results of an experiment.	Students use Excel spreadsheet software to add numbers together.
Students use a computer-based simulation to investigate how stars are formed.	Students watch a video about how stars are formed.
Students use StickySorter to create interconnected plot and character diagrams for the novel they are reading in literature class.	Students use StickySorter to make a list of the characters in the novel they are reading in literature class.
Students use Kinect (Xbox) Driving Games to research and publish the effects of texting while driving.	Students play with Kinect (Xbox) Driving Games.
Students write an essay on a computer, using the Microsoft OneNote to help organize and synthesize their ideas in writing.	Students use Microsoft OneNote to type an essay they have written.
Students use AutoCollage to create a composite image that reflects the style and influences of an artist of their choice.	Students use AutoCollage to create a composite image of art works by an artist of their choice.
Students who have not learned about triangles experiment with Microsoft Mathematics graphing calculator tool by entering angle degrees and hypothesizing about the total number of degrees in a triangle.	Students who have already learned about triangles use the Microsoft Mathematics graphing calculator tool to create triangles by entering angle numbers that add up to 180 degrees.

ICT is required for the knowledge construction when it allows students to do knowledge construction activities that would be impossible or impractical without the use of the ICT. For example, students might be asked to communicate with students in another country over a period of two weeks to research the impact of a recent drought on their community. In this case, email enables students to construct knowledge that they could not construct without ICT because mailing physical letters would be impractical in this short a time. The use of email is required for constructing this knowledge.

Many activities that require knowledge construction can also be done without ICT. For example, students may be asked to find information about the beaks of a variety of bird species with different diets and develop categories of different types of beaks. If students use the Internet for this activity, they are constructing knowledge, but ICT is not required: they would be able to achieve the same learning goals without ICT by using printed books in a library.

IS ICT REQUIRED FOR THIS KNOWLEDGECONSTRUCTION?	
YES:	**NO:**
Students use the Internet to find newspaper articles about a current event from three different countries, and analyse how the perspectives are similar or different. In this school, current newspapers from other countries are not available in hardcopy.	**Students read the local newspaper online to research a current event and analyse three stories they find.** The local newspaper is probably available to students in hardcopy.
Students use a computer-based simulation to investigate how stars are formed. The simulation helps deepen students' knowledge about events that cannot be directly observed.	**Students use a spreadsheet to compute totals that they will use to analyse their data.** The calculations can also be done by hand.

Students are **designers** of ICT products when they **create ICT products that others can use.** For example, if students record a podcast and make it available on the Internet, they are creating an ICT product others could use. The product lasts beyond the learning activity and can be used or enjoyed by an outside audience.

When students act as designers, ICT is supporting their real-world problem-solving and innovation. Students must have an authentic audience in mind, such as a community that needs the information their podcast will provide, or younger students who will learn about disease prevention from the simulation students are building. In their design, students must attend to the needs and preferences of that audience. Ideally, but not necessarily, the product might actually be used by the intended audience. Students who create a product with no particular audience in mind do not qualify as designers under this definition.

ARE STUDENTS DESIGNERS OF AN ICT PRODUCT?

YES:	NO:
In computer programming class, students use TouchDevelop to design and program a mobile smarthphone app that could help senior citizens in their daily lives. The students build knowledge of computer programming AND must consider the needs of senior citizens in order to create an app that would be useful for that population.	**In computer programming class, students use TouchDevelop to program a mobile smartphone app that causes the phone to vibrate any time the user takes a photo.** The students build knowledge of computer programming, but they do not consider any end users.
Students use SongSmith to create songs to educate visitors to the children's natural history museum about dinosaurs. Students must think about the interests and ability level of museum visitors to create a song with appropriate content and music.	**Students use SongSmith to create songs about dinosaurs that they will post on the Internet for general access.** Students do not need to consider any specific end-users.
Students create videos of their own interviews with local community members that will air on a local television channel program about "our community". Students must consider the television audience and adhere to television programming parameters (e.g., time limits).	**Students create videos of their own interviews with local community members to submit to the educator for the end-of-year assignment.** Students do not need to design for any particular audience.
Students use the Internet to research and communicate with local food producers and then develop an app to help families in their community make more local choices when they buy their food. Students must design the app to be accessible and usable to local families.	**Students use the Internet to research local food producers and write a report of their findings to submit to the educator.** Students do not create an ICT product or need to consider the needs of any particular audience.

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Use of ICT for Learning: Rubric

1
- Students **do not have the opportunity to use ICT** for this learning activity.

2
- Students **use ICT to learn or practice basic skills or reproduce information.** They are not constructing knowledge.

3
- ☐ Students **use ICT to support knowledge construction**
- ☐ BUT they could construct the same knowledge without using ICT.

4
- Students **use ICT to support knowledge construction**
- AND the ICT is **required for constructing this knowledge**
- BUT students do NOT create an ICT product for authentic users.

5
- Students **use ICT to support knowledge construction**
- AND the ICT is **required for constructing this knowledge**
- AND students do **create an ICT product for authentic users**.

Use of ICT for Learning: Decision Steps

Students have the opportunity to use ICT?

NO → **1**

YES

ICT supports students' **knowledge construction?**

NO → **2**

YES

ICT is required for constructing this knowledge?

NO → **3**

YES

Students are **designers** of an **ICT product?**

NO → **4**

YES → **5**

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