Unit 1 Individual Assignment

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Introduction:

It is 2013 at staff meeting in a Canadian elementary school. During the meeting, the principal proposes that the school purchase of a set of 20 iPads. He suggests that purchasing the iPads would help keep the school and its students on the cutting edge of new technology trends. A teacher raises her hand and asks how the school plans on using the devices. Her query is met with silence. The teacher then points out that iPads aren't useful for teaching typing as the keyboard layout and size are non-traditional. Furthermore, iPads can't run Flash content, preventing teachers and students from accessing a number of online Flash-based games and simulations. Finally, apps are rarely free, so there needs to be an assessment process for choosing apps as well as a budget to pay for them. The principal eventually decides against purchasing the iPads.

The preceding vignette illustrates the challenges educators face when attempting to integrate information and computer technologies (ICT) into their classrooms. Schools appear eager to embrace ICT with the goal of improving academic outcomes while simultaneously preparing students for a technologically evolving world (Hargis, 2014; Delgado et al., 2015). Without careful planning however, educators may be unsure what technologies are best suited to improving educational outcomes while still meeting their schools' objectives. Worse still, without investment in planning, assessment and training, precious dollars might be spent purchasing technologies that end up neglected or under-utilized (Inan & Lowther, 2010; Kling, 1996).

Background:

Educational technology planning emerged in the 1980s in response to the increasing presence of computers in classrooms. While corporations and non-governmental organisations such as the North Central Regional Educational Laboratory (Center, 1997) were implicated early on in the development of planning guidelines, the United States

Department of Education has since emerged as a leader in the field (Wyzard, 2011). In 1994, the Office of Educational Technology was established as part of a wider American educational legislative package (Civic, 2018). The first National Education Technology Plan (NETP) was released by the Office two years later and several new editions and updates have been released since. This document and others like it (Roblyer, 2006), along with research on the benefits and implications of technology planning (Vanderlinde & Braak, 2013), are helping to guide educators worldwide in their quest to intelligently implement technology interventions in a way that enhances student learning while meeting curricular objectives.

Although guidebooks like the NETP may appear at first to be proscriptive, their main goal is not to dictate ICT integration from the top down. Such guides are meant to impart "the knowledge and skills to take full advantage of technology-rich learning environments" at a local level (Thomas, 2016, p. 5). Taking the task of educational planning out of the hands of external or governmental actors and placing it into the hands of local educators empowers them to define a vision and to implement a plan that is sensitive and responsive to student needs, their community's context, and the school's vision (Vanderlinde & Braak, 2009). Although governmental organisations are wise to provide educators with guidance, plans that are developed by teachers at the local level are more likely to be implemented than those that are externally imposed (Nieveen & Kuiper, 2012).

Educational technology planning toolkits and guides differ slightly in their terminology and in their sequencing of the stages of the planning process. Nonetheless, they are in general agreement over the stages of the planning process (Alberta, 2012; Michigan, 2017; Thomas, 2016). The stages are: 1) Creating a leadership structure for developing a vision for the institution and overseeing the plan's implementation; 2) Identifying the resources and the human capital required to successfully implement the plan; 3) Creating actionable, measurable objectives for the implementation process; 4) Following through with the plan by meeting objectives wherever possible, and; 5) Assessing the success of the technology plan and identifying areas for improvement. The toolkits and guides cited

stress that the planning process is cyclical in nature. Technology plans must regularly undergo assessment and renewal in order to ensure that they remain relevant to a school's (or a classroom's, or a division's) vision and that educational outcomes are being met.

Educational Context:

This plan has been developed for implementation within a grade 4, publicly-funded, French Immersion classroom in Manitoba. The 20 students come from a mix of ethnic backgrounds. Roughly a quarter of the students are recent immigrants themselves or the children of recent immigrants. Many speak a language other than English at home. The catchment zone for the school is large and students come from a wide range of socio-economic backgrounds. Informal surveys suggests that all have access to an Internet-enabled device, such as a computer, a tablet, or a smart phone.

The school's technology infrastructure includes school-wide high speed WiFi, an instructor computer in every class as well as an attached digital overhead projector. Most classrooms, including the one for which this plan is being developed, are equipped with an electronic whiteboard. Three laptop carts are spread throughout the school. The laptops are of varying quality. Carts are booked online through the school's Web portal and teachers who book early usually get their desired time slots. Educators in the school have access to a responsive, qualified, and dedicated divisional IT department. A part-time teacher-librarian is on staff to assist educators with technology integration. All computers run on Windows 10 with access to the Office 365 suite of products.

Student-centred use of ICT in the classroom is currently limited to 1.5 hour sessions once per 6-day school cycle. Students are typically tasked with either practicing typing skills, visiting specific web pages for research, or experimenting with word processing tools. Other technologies used on a regular basis include a digital overhead projector and an interactive whiteboard. The whiteboard is generally used by the instructor for demonstration purposes or for showing online content.

The Manitoba French Immersion program is a content-based curriculum. Students are expected to tackle all subjects aside from English Language Arts in French, and they are also expected to interact with instructors and their peers in that language within the classroom. Very few students are exposed to the French language outside of the school environment. The classroom-level technology plan in this paper examines technology interventions for use during Science classe, in particular the animal Habitats and Communities module of the curriculum (Éducation, 2000). The original is in French, but a highly similar document exists in English as well (Manitoba, 1999). The education technology plan has been adapted to reflect the complicating factor of second language instruction through the addition of an assessment framework.

ARCC Framework:

Research suggests that active-use technology interventions are excellent options for teachers looking to give their students a meaningful experience and much-needed practice in a target language (Allen, 2007; Franciosi, 2017; Purushotma et al., 2009; Stepp-Greany, 2003; Ziegler, & Feucht, 2012). Existing taxonomies have been created or adapted to guide ICT selection in the classroom (Ziegler, & Feucht, 2012; Toronto, 2010). These models do not deal explicitly with the needs of second language learners.

Following is a framework that can be adapted to help guide the selection of educators teaching any second or foreign-language students. It is inspired by, and builds upon, constructivist approaches to encourage higher-level thinking and learning wherever possible, while accepting that these higher levels are built upon the acquisition of lower-level skills. The framework has been refined to reflect accepted models of second language acquisition (Krashen & Terrell, 1983). The framework has not yet been validated through outside testing.

(Fig. 1) ARCC: ABSORB, RECALL, COMPREHEND, CREATE

A	**Absorb** – Students absorb new vocabulary through listening and viewing.	Examples: Videos, songs and audiobooks, non-educational video games featuring plenty of dialogue.
R	**Recall** – Students repeat new vocabulary and phrases, without necessarily fully understanding their structure or appropriate uses.	Examples: Matching drills, electronic flashcards, word searches, many language learning applications and programs.
C	**Comprehend** – Students understand input from the target language and can answer questions in that language independently.	Examples: Content-based tests, target language quizzes, puzzles with specific outcomes, simulations, language applications requiring phrase translation and sentence assembly.
C	**Create** – Students share ideas and explore concepts using the target language.	Examples: Writing emails, blogging, video and audio creation and editing, social media posts in the target language.

The goals of the ARCC framework are threefold: 1) Assist educators in recognizing which technologies are best for developing basic vocabulary and comprehension skills; 2) Make educators conscious of the sequencing of technology interventions in order to prepare students for more creative tasks and; 3) Help educators recognize and prioritize technologies that are most likely to involve active use of a target language.

Technology Planning Table:

In an ideal scenario, the instructor and students would have access to a customizable Learning Management System (LMS) such as Moodle as well as the PoodLL plug-in for embedded audio and video recording. The table has been assembled under the presumption that such a system is unavailable due to budgetary, infrastructure, or human resources constraints. Alternatives to a dedicated LMS have been used throughout. All activities use existing infrastructure, although a dedicated laptop for each student would be ideal. Some of the skills required (such as opening a session on a networked computer) seem obvious, yet Grade 4 students may nonetheless require explicit instruction to gain these competencies before engaging with online content.

SUBJECT: *Science – Cluster 1: Habitats and Communities)*	
Curricular Objective: *4-1-01 Use appropriate vocabulary related to their investigations of habitats and communities …*	
Technology Intervention or Activity: *Students create an online visual dictionary that combines imagery (original or found), French vocabulary terms, and audio and/or video files demonstrating the proper pronunciation of vocabulary terms.*	
Justification for technology intervention: *An online repository eliminates the need for storage and transportation of a physical document. Students may also access, edit and add to their dictionaries from a variety of locations.*	

Hardware requirements:	**Software requirements:**
- *Computer / Web-compatible device.* - *Functioning microphone.* - *High-speed Internet connection.* - *Digital camera.*	- *Wiki or free LMS (Edmodo) with audio and video recording functionality.* - *Edmodo app (optional).*

Skills or training required:	- *Digital photography.*
- *Session login.*	- *Effective search engine use.*
- *Web navigation.*	- *Digital file storage and retrieval.*
- *Wiki or LMS navigation.*	- *Early keyboarding skills.*

ARCC categories: *Absorb, Recall, Comprehend.*

Technology Intervention or Activity: *Students access online videos created by instructor for reviewing basic concepts and vocabulary.*

Justification for technology intervention: *Allows students who missed lessons or who did not grasp the material the first time to review material at their own pace.*

Hardware requirements:	**Software requirements:**

- *Computer / Web-compatible device.*	- *Class Web page or LMS (Edmodo).*
- *Functioning webcam and microphone (Instructor).*	
- *High-speed Internet connection.*	

Skills or training required:
- *Session login.*   - *Wiki or LMS navigation.*

ARCC categories: *Absorb, Comprehend.*

Technology Intervention or Activity: *Students complete online vocabulary and concept quizzes created by instructor.*

Justification for technology intervention: *Students receive immediate feedback for their selections. Students to learn from past mistakes through multiple attempts. Assessment is simplified for instructors.*

Hardware requirements:	**Software requirements:**
- *Computer / Web-enabled device.*	- *Free LMS (Edmodo) with quiz function.*
- *High-speed Internet connection.*	

Skills or training required:
- *Session login.*   - *LMS navigation.*

ARCC categories: *Comprehend.*

Curricular Objectives: *4-1-02 Recognize that each plant and animal depends on a specific habitat to meet its needs. 4-1-03 Identify the components of an animal habitat. Include: food, water, living space, cover/shelter.*

Technology Intervention or Activity: *Students create a virtual biome or an animal habitat online at https://switchzoo.com/. Instructor demonstrates the activities with the classroom and posts links to the activities for individual exploration.*

Justification for technology intervention: *The concepts of habitat and biome can be hard to explain effectively within a limited time period. This Website encourages students to explore a variety of biomes and habitats through simple but effective games that offer timely feedback.*

Hardware requirements:	**Software requirements:**
- *Overhead digital projector.*	- *Flash Player plug-in.*
- *Computer or laptop.*	- *Class Web page or LMS (Edmodo).*
- *High-speed Internet connection.*	

Skills or training required:
- *Session login.*
- *Web navigation.*

ARCC categories: *None. Website only available in English. No francophone equivalent found.*

Curricular Objectives: *4-1-04 Identify physical and behavioural adaptations of animals and plants, and infer how these adaptations help them to survive in a specific habitat. 4-1-06 Investigate how technological developments often mirror physical adaptations.*

Technology Intervention or Activity: *Students contribute to an online class discussion by posting two labelled images: 1) a physical or behavioural adaptation found in an animal and; 2) a human technology that fulfils the same (or a similar) function.*

Justification for technology intervention: *Nearly all telephones now include a digital camera. This makes recording a scientific observation easy. Students wishing to research more exotic animals can easily access images through a Web search.*

Hardware requirements:	Software requirements:
- *Digital camera.*	- *Free LMS (Edmodo).*
- *Computer / Web-enabled device.*	
- *High-speed Internet connection.*	

Skills or training required:	- *Digital photography.*
- *Session login.*	- *Effective search engine use.*
- *Web navigation.*	- *Digital file storage and retrieval.*
- *Wiki or LMS navigation.*	- *Early keyboarding skills.*

ARCC category: *Recall, Comprehend.*

Curricular Objective: *4-1-05 Investigate alternate explanations of plant or animal adaptations based on traditional knowledge from a variety of cultures. 4-1-17 Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal populations and interactions.*

Technology Intervention or Activity: *Students view short films or listen to stories describing Indigenous and First Peoples' interpretations of animal adaptations. Professional short films: blogue.onf.ca/. YouTube playlist: youtube.com/ Online legends: lesautochtones.wikispaces.com/, museedubronze.com/, amerindien.e-monsite.com/*

Justification for technology intervention: *Watching a video can assist in better comprehension for second language learners. Students may be inspired to animate a legend themselves.*

Hardware requirements:	Software requirements:
- *Overhead projector.*	- *None.*
- *Computer (connected to projector).*	
- *High-speed Internet connection.*	

Skills or training required:
- *No prerequisite skills.*

ARCC category: *Absorb.*

Curricular Objective: *4-1-07 Investigate and describe a variety of local and regional habitats and their associated populations of plants and animals. 4-1-08 Predict and test to determine an appropriate method for measuring a plant population within a given habitat.*

Technology Intervention or Activity: *Students observe wildlife through online Webcams. They then use that knowledge to create a form for recording observations. They then fill out forms while observing Webcam feeds from a chosen biome/habitat. Website examples:* sandiegozoo.org/*,* houstonzoo.org/*, and* earthcam.com/

Justification for technology intervention: *Options for directly observing a variety of habitats can be limited without a trip to the local zoo. Webcams allow students to observe animals in a variety of habitats.*

Hardware requirements:	Software requirements:
- *Overhead projector.*	- *Word processing software (for*
- *Computer / Web-enabled device.*	*students choosing to create digital*
- *High-speed Internet.*	*forms).*
- *Printer or photocopier.*	

Skills or training required:	- *Familiarity with word processing software.*
- *Session login.*	- *Digital file storage and retrieval.*
- *Web navigation.*	- *Early keyboarding skills.*
- *Wiki or LMS navigation.*	

ARCC category: *Recall, Comprehend, Create.*

Curricular Objective: *4-1-09 Recognize that plant and animal populations interact within a community. 4-1-13 Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community.*

Technology Intervention or Activity: *Students explore the mechanisms driving natural selection through the PhET Natural Selection Simulation at* https://phet.colorado.edu/fr/

Justification for technology intervention: *Natural selection can be difficult to observe in real life without access to a laboratory. Through this simulator, students can trigger mutations in a population of virtual rabbits and manipulate aspects of the simulation's biome in order to observe and track resultant population changes.*

Hardware requirements:	Software requirements:
- *Computer / Web-enabled device.*	- *Java (computers, laptops).*
- *High-speed Internet.*	- *PhET Android / iOS app.*

Skills or training required:
- *Session login.*
- *Web navigation.*

ARCC Category: *Absorb, Comprehend.*

Curricular Objective: *4-1-11 Construct food chains and food webs, and classify organisms according to their roles. Include: producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger. 4-1-10 Recognize that the food chain is a system in which some of the energy from the Sun is transferred eventually to animals.*

Technology Intervention or Activity: *Students create and share a food chain that includes the major classifications of organisms using the* Popplet.com *website or app. Following*

feedback from peers, students add organisms to build a food web.

Justification for technology intervention: *The Popplet interface is intuitive and easy to use for young learners. Concept maps created in Popplet can be embedded within outside Web pages, allowing for easy sharing.*

Hardware requirements:	**Software requirements:**
- *Computer / Web-enabled device.*	- *Free LMS (Edmodo).*
- *High-speed Internet connection.*	- *Popplet account (free).*
- *Digital camera (optional).*	- *Flash Player plug-in (computers).*
	- *Popplet Android / iOS app.*

Skills or training required:	- *Digital photography.*
- *Session login.*	- *Effective search engine use.*
- *Web navigation.*	- *Digital file storage and retrieval.*
- *Wiki or LMS navigation.*	- *Early keyboarding skills.*

ARCC Category: *Recall, Comprehend, Create.*

Curricular Objective: *4-1-12 Use the design process to construct a model of a local or regional habitat and its associated populations of plants and animals.*

Technology Intervention or Activity: *Students access Web page detailing instructions, assessment rubrics and examples of model habitats.*

Justification for technology intervention: *In the absence of physical examples, viewing images of others' projects can be inspiring and provide direction to students unsure of project objectives. Posting instructions and providing a rubric ensures that students are aware of desired outcomes.*

Hardware requirements:	**Software requirements:**
- *Computer / Web-enabled device.*	- *None.*
- *High-speed Internet connection.*	

Skills or training required:
- *Session login.*
- *Web navigation.*

ARCC category: *Absorb, Comprehend.*

Curricular Objective: *4-1-14 Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations.*
Include: endangerment, extinction.

Technology Intervention or Activity: *Students use Google Earth to identify examples of human impacts on the environment. Students contribute to a group Wiki or online discussion by sharing an image of an environment in their community that has been altered as well as an image depicting that environment's natural state. Students write a post or record a video of themselves describing the changes that occurred in their example.*

Justification for technology intervention: *Students will rarely see environments that*

haven't been altered by human activity. The scope of the change can best be observed through satellite imagery. Digital cameras allow students to quickly record their observations.

Infrastructure required:	**Software requirements:**
- *Overhead projector*.	- *Wiki or free LMS (Edmodo) with audio and video recording functionality.*
- *Computer / Web-enabled device.*	- *Edmodo app (optional).*
- *Webcam and microphone.*	- *Google Earth program or app.*
- *Digital camera.*	
- *High-speed Internet connection.*	

Skills or training required:	- *Digital photography.*
- *Session login.*	- *Effective search engine use.*
- *Web navigation.*	- *Digital file storage and retrieval.*
- *Wiki or LMS navigation.*	- *Early keyboarding skills.*

ARCC category: *Create.*

Curricular Objective: *4-1-15 Describe how their actions can help conserve plant and animal populations and their habitats.*

Technology Intervention or Activity: *Students contribute to a group Wiki by writing a post or recording a video of themselves describing an example of environmental activism, and/or posting links to relevant online resources.*

Justification for technology intervention: *Wikis provide opportunities for classmates to share ideas and to learn from others' contributions. Participating in a group project encourages classroom discussion on a common topic and positive peer pressure motivates students to contribute.*

Hardware requirements:	**Software requirements:**
- *Overhead projector*.	- *Wiki or free LMS (Edmodo) with audio and video recording functionality.*
- *Computer / Web-enabled device.*	- *Edmodo app (optional).*
- *Webcam and microphone.*	- *Google Earth program or app.*
- *Digital camera.*	
- *High-speed Internet connection.*	

Skills or training required:	- *Digital photography.*
- *Session login.*	- *Effective search engine use.*
- *Web navigation.*	- *Digital file storage and retrieval.*
- *Wiki or LMS navigation.*	- *Early keyboarding skills.*

ARCC category: *Create.*

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