

3D Media Architecture Communication with SketchUp to Support Design for Learning

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INTRODUCTION

Japanese have an international image as communications (i.e. technologies) rich but communication poor. This article seeks to redress this communications - communication dissonance by exemplifying a course which empowers students skilled in information communications technologies to actively engage in media supported communication. Contextualized by the debate surrounding the Fukushima nuclear disaster of March 2011, undergraduate students studying Information Systems at Future University Hakodate, Japan considered alternative energies for Japan's future. The students conducted a SWOT analysis (Strengths -Weaknesses - Opportunities - Threats), located facts, sought opinions, brainstormed ideas, compared with existing energies, obtained feedback, and designed a 3D representation of unique alternative energies for Japan's future using SketchUp software. The final designs were demonstrated on a unique iPad application. The article outlines the Media Architecture Communication course which facilitates an inter-disciplinary approach supported by a 'Design for Learning' pedagogy. The process synthesizes design, computer science, cognitive science, social science, and communication for an erudite Information Science course. The practice may be replicated in developing Higher Education Institutes where an inter-disciplinary education, combined with informed technology integration, is beginning to be recognized as critical for supporting students in a daunting digital age of global economic, industrial and social upheaval.

BACKGROUND

This section explains the communications - communication dissonance in Japan. The myth of Japan as a digitally literate nation is first dispelled. A case is then made for supporting Japanese undergraduate students to develop digital literacy competencies required of 21st century learners. To accomplish this effectively it is argued that an inter-disciplinary approach in university curricula implementation is both required and a necessity. The article continues with an example of a course named Media Architecture Communication, which blends digital design, computer programming, and communication to develop core skills, digital competencies, and high-order cognition. The article concludes with recommendations for practitioners in Japan and the wider international community.

In 2007, UNESCO recorded that the uptake of technology in education in Japan, "remains comparatively low, and ICT does not appear as a priority in national education policy" (UNESCO, 2007). The UNESCO data reveals:

- For the average weekly computer usage, Japan ranks the lowest for students who use computers when studying the subjects Language (Japanese), Mathematics and Science;
- For creating multimedia works, the percentage of Japanese students who answered: "I can do this very well by myself," or "I can do this with help from someone" ranks lowest amongst all participating countries and regions;

- For creating graphs using table-computing software, Japan ranks lower than average of countries in the Organization for Economic Co-operation and Development (OECD).

Although computers have been installed in all Japanese schools, the 2009 results of the Programme for International Student Assessment (PISA), administered by the Organization for Economic Co-operation and Development (OECD), is also revealing. Of the 3,400 respondents from 109 Junior High (ages 12 to 15) and Senior High (ages 15 to 18) schools in Japan, fewer than 5% of students use computers at school and less than 10% use computers at home for study or homework. In contrast, the PISA results indicate that in Australia and Norway, students' use of computers at school and home for educational purposes is over 70%. Of the OECD countries, Japanese students ranked lowest in ability to use a computer to create a presentation or use a spreadsheet to plot a graph (OECD, 2009). Japanese high school (secondary) education tends to be weak in providing higher analytical skills, consequently leaving pupils ill-prepared to deploy the kinds of analytical skills required at university level (Vallance & Wright, 2010).

In Higher Education, of the top 50 countries in the National Science Foundation (NSF) rankings of research output in 2006-7, Universitas 21 ranked Japan as 20 (Williams et al., 2012). According to a Global Competitiveness Report the overall quality of the Japanese university system is ranked 31st, while its Math and Science education has fallen to 25th. The 2010 Times Higher Education World University Rankings listed Tokyo University at 26 and Kyoto University at 57. China and Singapore universities now rank higher than Japan's national flag bearers (cf. Field, 2012).

Referring to Japanese society, Fitzpatrick coined the term 'digital homeless' to describe citizens who cannot access personal finances or government resources which are increasingly becoming available only in digital formats (Fitzpatrick, 2010). The sooner the process of educating citizens (children and adults) for this new Digital Age begins, the more flexible a nation will be to economic, industrial, and social adjustments occurring throughout all of Asia. However, Japan lacks a clear vision for technology integration from schooling to higher education (Vallance, 2008; Suzuki et al., 2010). In her critique of Japan's attempts,

Bachnik (2003) states that, "the technology revolution appears to be caught in a series of organizational 'short circuits' that sap the forward momentum of those trying to implement IT so that real forward movement is blocked" (p.309). One major consequence of this lack of educational leadership is that universities in Japan are not considered to be having much of an impact on developing the nation's human capital. Citing research as a key indicator of university impact on a nation's science and technology knowledge base, Whittaker (2001) reported that patent applications in Japan from its universities were a "minuscule 0.3%" in 1997. Vallance (2008) compares the clearly constructed educational policies for the 21st century of Singapore to the vague directives from the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan. It was argued that if Japanese educators were released from the stranglehold of national policies bereft of specific guidance, opportunities for stakeholders (teachers, students, parents, education managers) to embrace change in understandable, meaningful and relevant ways in classrooms throughout Japan will occur. A framework with strategic actions built upon the firm constructs of thinking, learning, creativity and communication in order to develop literacy in a knowledge-based economy is provided.

Literacy can be defined as the development of academic skills required to source, analyze, evaluate, manage, understand and make sense of information in a variety of modes, and communicate outcomes in multiple formats (Vallance & Wright, 2010). Henry Jenkins, Director of the Comparative Media Studies Program at the Massachusetts Institute of Technology, is more specific. He posits that the focus of literacy is changing from one of individual expression to community involvement (Jenkins, 2009), and that such literacies develop through collaboration and networking. Jenkins' literacy skills are listed as:

- **Play:** The capacity to experiment with one's surroundings as a form of problem-solving;
- **Performance:** The ability to adopt alternative identities for the purpose of improvisation and discovery;
- **Simulation:** The ability to interpret and construct dynamic models of real-world processes;
- **Appropriation:** The ability to meaningfully sample and remix media content;

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