

# **Effective E-Learning for Geoscientists in the Global, Multi-Generational Workplace\***

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## **Abstract**

This article discusses e-learning for geoscientists in a rapidly changing world and describes the types of web-based distance learning that can be most effective and affordable for individuals in diverse, distributed workplaces. In addition to formal learning settings, the paper discusses the aspects of informal learning that can be employed by geoscientists and instructional design that aligns with multiple learning styles, generational characteristics, and learning goals and objectives.

## **Introduction**

E-learning can be a highly effective and affordable way to provide high-quality geoscience education and professional development. However, there are a number of considerations to keep in mind while developing e-learning programs for geoscientists in a multi-generational workplace.

## **Generational Beliefs and Misconceptions**

While it can be said that cohorts, who share the same formative experiences, such as historical events and engagement with emerging technologies, share a certain worldview, it is reductive to say that all have the same toward information technologies and communication strategies.

For example, it is common in today's workplace to act on the belief that older workers are technology-resistant, and that all younger workers are "digital natives" with a natural desire to work with technology. What stereotyping does is miss the point that many older workers have adapted to wave after wave of technological innovation, and are comfortable with using an integrative synthetic approach that incorporates many different and kinds of computer technology. It also misses the point that younger workers may be comfortable with kinds of writing and research required in their education and may be adept at text-messaging using cell-phones and capturing and sending

images and videos via their smartphones, but they may have little or no experience in kinds of information architecture/networks, security and access protocols, software programs, and information/content management that one finds in today's distributed workplace.

The sweeping statement that older and younger generations are different in their approach to information technology and training also misses the point that all who work with Internet-based information exchange have, to some degree, become comfortable with informal learning. Informal learning is often perceived as more and relevant than formal learning. As a result, some of the negative attitudes and resistance to formal learning, particularly with respect to software, may be a natural response from those who have found that they learned very well on their own. Informal learning is generationally independent.

Operating under faulty assumptions will effectively divide a group and result in poor team performance. For that reason and many others, it is important to avoid stereotypes when developing a training or professional development plan, or when proposing changes in workflows.

Instead, a series of assessments and survey instruments should be administered in order to gain a clearer idea of the true picture of capabilities, attitudes, and experience with information technology and professional development.

### **E-Learning in the Multi-Generational Workplace: Informal and Formal Learning for Professional Development**

Informal learning tends to be effective because it incorporates prior knowledge, and it is flexible enough to accommodate a variety of learning styles. For example, a geologist who wishes to learn more about 3D seismic processing may be a kinaesthetic (rather than dominantly visual or auditory) learner with substantial experience in workplace settings that require an integration of geological, geophysical, and engineering analysis. In this case, an informal learning process that builds on prior knowledge and which allows the learner to take a hands-on approach will be much more effective than a traditional lecture-based classroom learning setting.

E-learning used in workplace training and professional development is often designed to encourage the learner to build on prior knowledge and to try a number of different pathways to get to the same result.

For example, a geologist wishing to learn more about 3D seismic may be best served by an approach that brings together the following learning elements:

- Synchronous, group learning via web conference, or webinar;
- Asynchronous self-study: reading articles, examining presentations, watching videos;
- Asynchronous self-assessment: taking online quizzes, engaging with interactive programs/graphics;
- Asynchronous team/instructor-guided assessment: creating work, then reviewing in teams or one-on-one with the instructor for focused feedback.

Avoiding a “one size fits all” approach to training is important. Although it may seem most efficient and cost effective for a company to simply purchase seats in a number of face-to-face short courses or workshops, the reality is that unless a blend of activities is used, and the individual learners are given the opportunity to work alone, with groups, and one-on-one with a mentor or instructor, the results will tend to be very poor.

The ideal educational program (training, professional development, education) combines informal and formal learning, and relies heavily on experiential learning which taps into prior knowledge. It is also highly situated, which is to say that the activities and the learning concepts tie closely to real-world activities and tasks.

### **Situated Learning: Leveraging Experiential Learning and Prior Knowledge**

Situated learning will help individuals apply the knowledge that they are gaining, and build skills and problem-solving abilities. Situated learning, which brings in a case study or a specific, tangible problem, will allow teams to form that understand the learning goals and desired outcome.

The following elements can be blended in order to achieve situated learning with both formal and informal learning approaches:

- Synchronous webinars / web conferences.
- Asynchronous problem-based e-learning: use as short courses for individual and group training.
- Building-block instructional components/learning objects: select and use to build a module or a problem-based module. Instructional components/learning objects can consist of videos, articles, audio files, software demonstrations, maps, graphics, recorded lectures, presentations.
- Synchronous project-based e-learning: use as short courses, but define the outcome clearly (a report on something, a presentation, a collection of resources and research, a portfolio).

### **Cost-Effectiveness and Convenience Trump Conventional Learning Approaches**

It may be customary for a company to require all its employees to attend face-to-face courses together in groups. Some companies even go to the expense of selecting a group to engage in training off-site in a one-week retreat, with the stated goal of avoiding distractions.

However, such training approaches are often disappointing, not just in the fact that they are expensive and may not produce uniform results; they are disappointing because actual performance does not live up to expectations.

A more cost-effective and convenient approach involves highly applied situational learning, which requires the learners to pull from all their past experiences in order to achieve a very well defined goal. The approach used can also be adapted to cultural and corporate

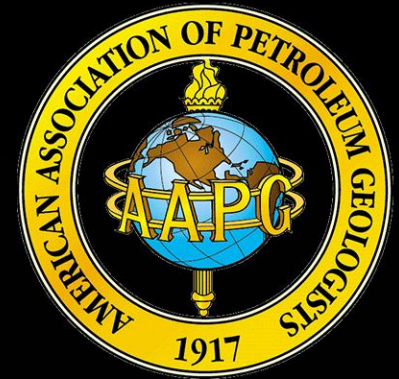
exigencies. They may use informal learning methods to gain the knowledge and skills to achieve their desired result, and they may take more formal online training. The precise path is something that can be developed as a team effort, between the organization and the learners.

### **Acknowledgments**

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### **Reference**

International Labour Office, 2008, World of Work Report 2008: Income inequalities in the age of financial globalization: International Institute for Labour Studies, International Labour Office, Geneva. ISBN 978-92-9014-868-5.



Susan Smith Nash, Ph.D.

# Effective E-Learning for Geoscientists in the Global, Multi-Generational Workplace

# What is E-Learning? A Brief Review

- Delivered via the Internet
- Used with a variety of devices
- Synchronous or asynchronous
- *Chief benefits: Any time, any where, affordable*



# Ways E-Learning Is Presented

- **Objects**
  - Videos, Audio Presentations, Readings, Presentations, Graphics, Digital Flashcards, Simple Quizzes
- **Packages**
  - Courseware and complex learning solution packages
- **Events**
  - Webinars, Guided interactive sessions (web conference)
- **Activities**
  - Simulations, Virtual World Interaction

# What does e-learning look like?

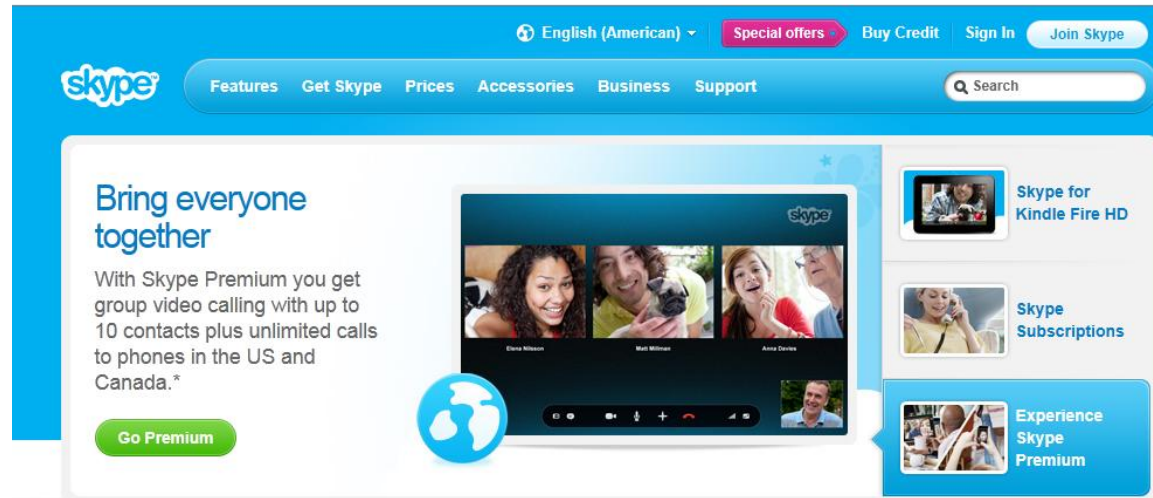
- Stand-alone learning objects
- *Powerpoints, maps, graphics, texts*





# Synchronous Events

- Example: Webinars
- Interactive, synchronous events
- *Can be archived for future replay*



# E-Learning Full Solutions

## Learning Management Systems

- Contain lessons / modules / assessment / interaction

### *Popular Learning Management System Platforms*

- Blackboard
- Moodle
- Sakai
- Desire2Learn

# Who Are the Learners?

## Boomers, Gen X, Gen Y, Millennials

- **The WWII Generation:** Events, economic climate, social policies shaped them
- **Boomers:** Are E&P Boomers different from the general herd of Boomers? (Yes, definitely)
- **Gen X:** Independent, self-actualizing, want to work on own
- **Gen Y // Millennials:** Information technology shaped them (trust text more than talk)

# Generational Characteristics

TOP RANKED TERMS USED TO DESCRIBE CO-WORKERS IN THE SAME GENERATIONAL COHORT			
<b>Gen Y</b> Chief Friendship Officers	<b>Gen X</b> The Doer	<b>Baby Boomers</b> Moral Authority	<b>Matures</b> Moral Authority
<ul style="list-style-type: none"><li>*Makes personal friends at the workplace</li><li>*Sociable</li><li>*Thinks out of the box</li><li>*Open to new ideas</li><li>*Friendly</li></ul>	<ul style="list-style-type: none"><li>*Confident</li><li>*Competent</li><li>*Willing to take responsibility</li><li>*Willing to put in the extra time to get the job done</li><li>*Ethical</li></ul>	<ul style="list-style-type: none"><li>*Strong work ethic</li><li>*Competent</li><li>*Ethical</li><li>*Ability to handle a crisis</li><li>*Willing to take on responsibility</li><li>*Good communication skills</li></ul>	<ul style="list-style-type: none"><li>*Strong work ethic</li><li>*Ethical</li><li>*Committed to the company</li><li>*Competent</li><li>*Confident</li></ul>

# Generational Differences?

- **Socialization Process is Key**
- What did the dominant culture do?
- Meetings culture
- Phone conference culture
- Lone wolf “get it done” culture
- Collaborative culture
  - @@@@
- What do you trust? The words? The text? The behavior? The follow-up actions?

# Cultural Differences?

- **Distributed, Global Workplace**
- Organizational culture aspects
- Context culture (background / locations)
- Historical culture (the traditional approaches to training and professional development)
- Training culture
  - @@@@
- Work toward a collaborative culture.



# Geoscientist Training Needs

- *Rapid Adaptation Needed*
- New plays, new trends every day
- *Integrated, Interdisciplinary Knowledge*
- Engineering / geophysics / petrophysics / geology solutions
- Application-focus, with theoretical underpinnings & conceptual grounding
- *Example: fractures in the Marcellus Shale*

# Getting Started

- Tie training to organizational goals and mission
- Identify needs (skills, knowledge, competencies)
- Get to know your learners
- Describe the real conditions under which your learners will be working
- *Need to be able to download to mobile device? Snippets rather than hours of video? Time / access issues?*



# Knowledge Transfer Considerations

- Outcome first: what do you want them to do?
- Who is your audience?
- Why are they listening to you? What do they want?
- What are their beliefs, values, needs?
- Know the “deal-killers”

# Developing Your Own Content

- Webinars
- Video Snippets of Presentations (“video executive summary” of new process / procedure)
- Powerpoints with audio (caution – boring)
- Repositories of Resources: Bundled articles, presentations, audio – accessible through website
- Key to success: Redundancy / multiple formats

# Prepackaged Solutions

- Pro's

- Convenient
- Can be cost-effective
- Great for basic competencies

- Con's

- Can be expensive
- Not precisely what you need
- Not instructor-led, can be passive

*Best approach? Use as  
complementary / supplementary*

# Simulations and Virtual Worlds

- Pro's
  - Replicates real-life scenarios
  - Can be cost-effective, esp for safety training
  - Interactive, immersive
- Con's
  - Can be extremely expensive
  - Steep learning curve
  - Need very good, fast connection

*Best approach? Grab it if you have affordable access*

# Leveraging Social Networking



Max, what  
happened?!

# Social Networking

## ■ Benefits

- Form virtual teams for case studies
- Guided questions – sharing
- Build cross-disciplinary relationships




## ■ Potential Costs


- Can veer off-track
- Potential time-waster
- Task-dedicated account

The Facebook logo, consisting of the word "facebook" in white lowercase letters on a blue rectangular background.The LinkedIn logo, featuring the word "Linked" in black and "in" in white inside a blue square, with a registered trademark symbol.The MySpace logo, with the word "myspace" in white lowercase letters on a black rectangular background.



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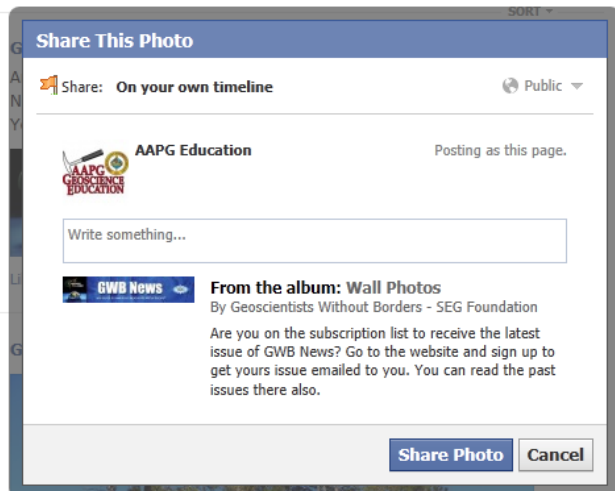
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APPS


- Messages
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- Notes
- Links


 Update Status  Add Photo / Video  Ask Question

What's on your mind?






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# Optimal E-Learning: Mobile

- *Make training mobile-friendly*
- Create stand-alone downloadable objects
  - Diagrams and maps
  - Videos
  - Audio
  - Presentations
  - Text (pdf reader-friendly)



# Success is a function of flexibility

- $f(x)$  = listening to generational / cultural differences + urgency of training needs + technological realities + economical considerations + realities of access + preferred modalities of content delivery

**Remember:**

*The future is handheld.*