



**Simulation Interoperability
Standards Organization**

"Simulation Interoperability & Reuse through Standards"

Workshop theme for Fall 2018: "Leveraging the Power of Simulation"

Advanced Technologies to Enhance Education to Optimize Information Flow Utilization

2018F-SIW-0036

Mark C. Davis, Wood Duck Research, Inc.

Dan M. Davis, University of Southern California



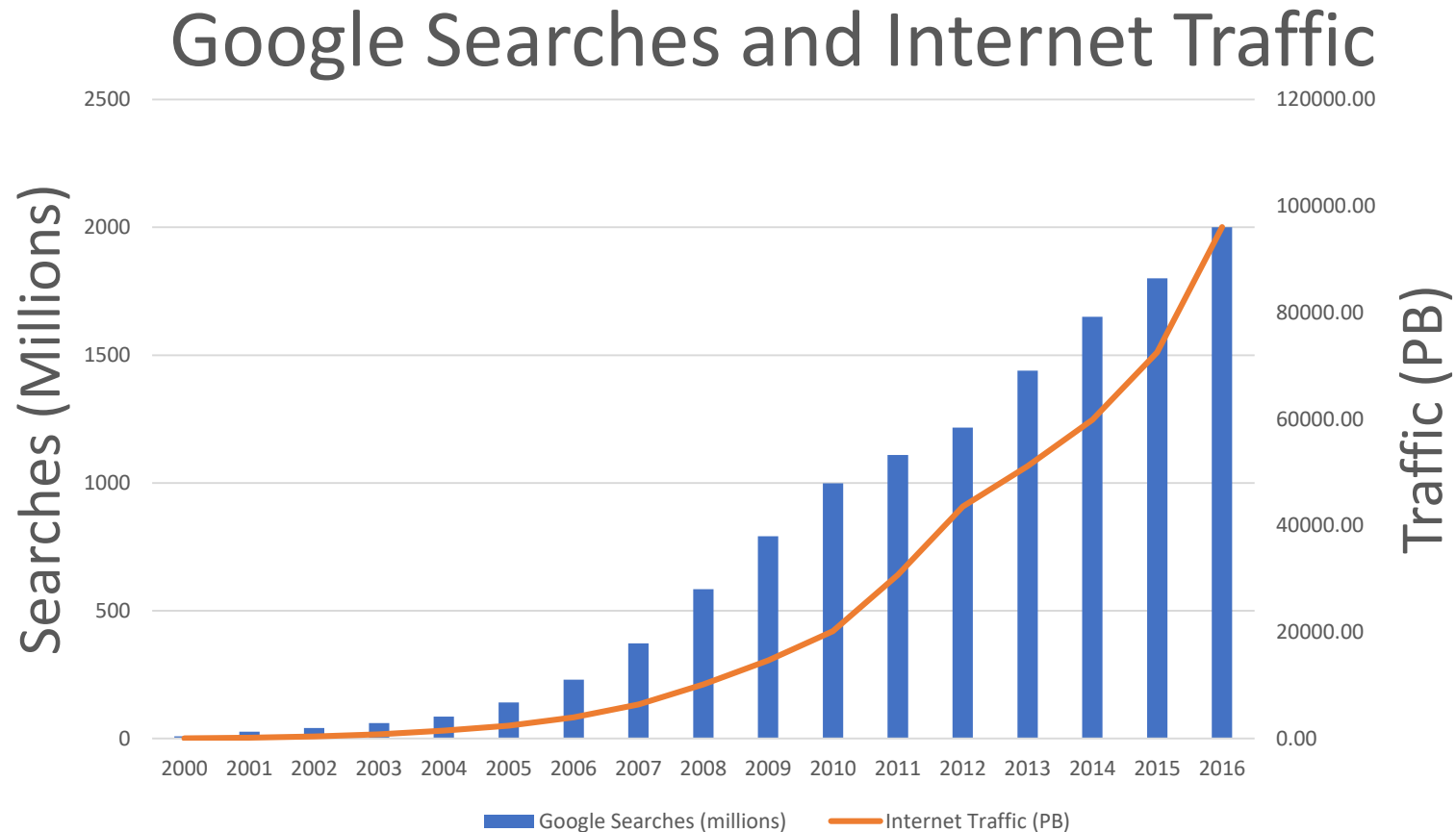
Introduction

- **Processing information has changed over the last few years**
 - Wireless communications, processing power, portability, and software
- **Information flow has dramatically increased**
 - Virtually unlimited accumulation of data and enhanced search tools
 - More than ever, information is selected by the end user
 - Smart phones and social networks put greater information in hand
- **Different problems and inhibitors now limit comprehension**
- **New technology and education is required**
 - Teach end user to assess, filter and comprehend
 - Improved information systems that enhance comprehension



Background

- **Exponential growth in data and availability**
 - “90% data in last 2 years ... by 2025 ... grow by 10 times” Shenoy 8/8/18



PB = Petabyte = 10^{15} bytes



Changes from Technology

- Consider changes in typical questions in normal conversation
 - 30, 50, etc. years ago answers were hard – Questions didn't get asked
 - Today the answers are easy and just seconds away

How much does that house cost



How long is the Nile River?



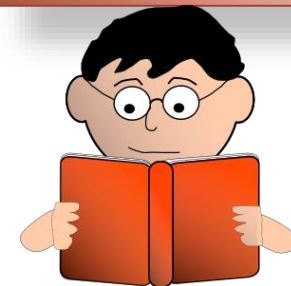
1980's
Call Agent
1-2 hour



Today
Check App
20-30 sec



1960's
Encyclopedia
1-2 hour



Today
Check App
20-30 sec





eLearning is a Critical Defense Asset

- **Defense personnel need to be adequately educated**
- **Training is only one of the pillars of performance**
- **Education is disrupted by:**
 - Operations Schedules
 - Geographical dispersion of personnel
- **Operations tempos continue to rise**
- **Simulation offers an economical way to counter this**
- **All of this requires more and more information**



Ease of Information Flow Emphasizes Different Problems

- **Easier information flow doesn't mean end users comprehend better**
 - For optimal comprehension, all the good questions must be asked
- **Asking the right questions is now more important than ever**
- **Easier information flow has aggravated some old problems**
 - Incomplete information – “friendly apps” that show what the user “wants to see”
 - Hidden information – classified or secret information
 - False information – deliberately incorrect data



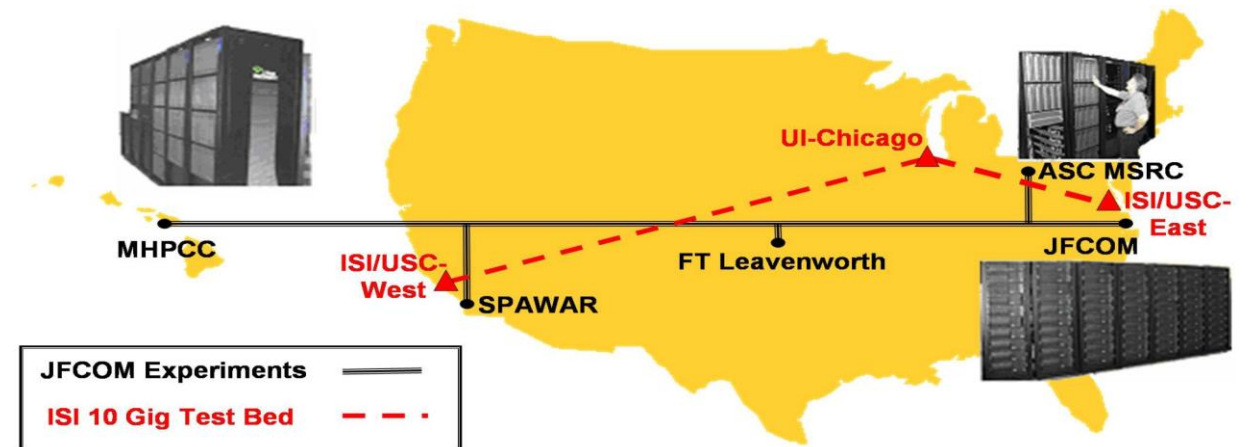
New Information Flow Requires New Skills

- **Skills must be targeted to the low-friction information environment**
 1. Ask better questions
 - *What needs to be known?*
 2. Get all the information
 - *Is “helpful” software not showing info*
 - *What sources should be consulted (multiple tools)*
 3. Recognize censorship and secrecy
 - *Data classified or hidden*
 - *Know or guess what is not known*
 4. Critically analyze reliability of data
 - *Is this source reliable*
 - *Does the source have an agenda*
 - *Can source be corroborated?*
- **Education and training in this area is nontrivial**
 - These types of skills take years to master



Several Technologies are available to help

- High Performance Computing
- Better filtering of data using Artificial Intelligence
- Carefully designed intercontinental systems to ensure the data arrives in timely function



- ... But our emphasis today is on education
- The needed skills can be taught and trained using several technologies
 1. AI enhanced avatars
 2. Constructivism
 3. Modified existing games



Teaching Critical Thinking using Avatars

- **Avatars with AI (Artificial Intelligence) backing**
 - Already adapted to Holocaust victim and career advice applications
- **Subject Matter Expert on info flow and train and educate**



Videotaped holocaust victim in
3D Holographic display



Animated SimCoach with
alternative characters



Constructivism

- **Constructivism is useful tool in education**
 - Accepted education foundation
 - Particularly suited to individual study
 - Tolerates interruption
 - Implementations can be transmitted to any computer for remote learning
- **This method has been shown to be more effective**
- **Can enhance Critical Thinking by its very nature**



Zombie Apocalypse board for problem solving training



Augment Video Games to Teach the Lessons

- **Improve “America’s Army” to teach critical thinking**
 - Include scenarios and interactions to take advantage of information flow
- **The traditional way of teach Infantry doctrine is via classroom instruction and field practice**
- **Constrained by costs, time, training areas, ...**
- **Program designed to recruit soldiers was found useful**
- **Those playing the computer game were doing better during exercises**
- **Not just rote memory then practice**
- **Engaging realistic repeated simulated participation**
- **Undergirded with constructivist pedagogy**
- **Feasible to address required info skills**





Conclusions

- **Information flow now has less friction**
 - Action is required for best comprehension
- **Factors inhibit end user comprehension**
- **Critical thinking training can alleviate this friction**
- **Constructivism and other approaches hold promise.**
- **Simulations are training tools for information flow**
- **Improved information systems is future work**



Simulation Interoperability Standards Organization

"Simulation Interoperability & Reuse through Standards"

QUESTIONS