



Sae Schatz
February 2016 HS Conference



OUSD(P&R)

Deputy Asst. Secretary of Defense (Force Education & Training)



Sae Schatz, Director
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Established via Executive Order in 1999



To conduct R&D on learning science and technology



To improve learning effectiveness and efficiency across government



Help craft the future vision of learning science and tech



Provide customer support to facilitate implementation



Show the "art of the possible" via applied R&D



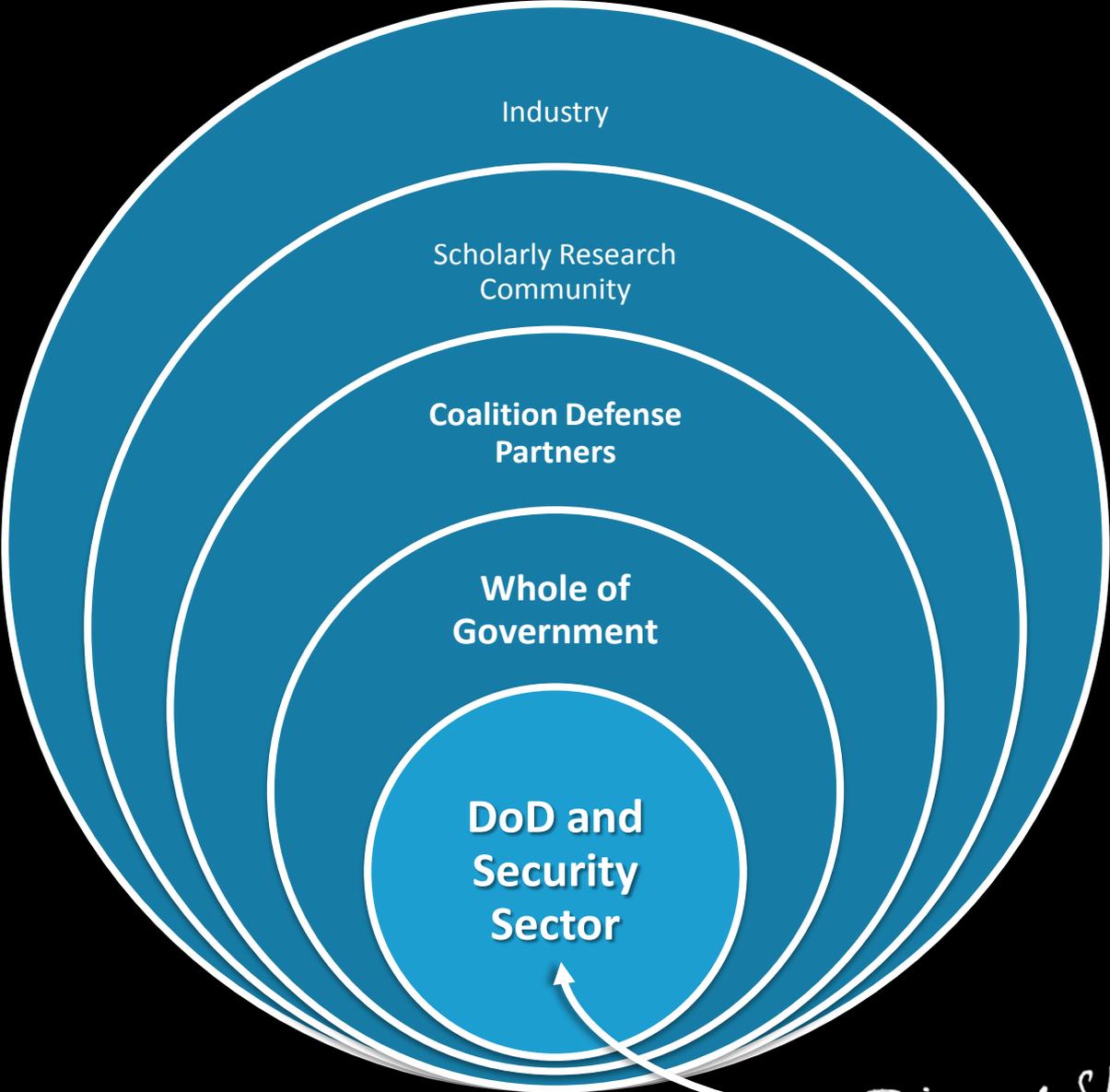
Alexandria

Orlando



GLOBAL PARTNERSHIP NETWORK





Industry

Scholarly Research
Community

Coalition Defense
Partners

Whole of
Government

DoD and
Security
Sector

Primary Stakeholders



Activities

Thought Leadership:
Help craft the vision for future learning science and technology

Transition: Help bridge the research-practice gap

Innovation: Mature learning ideas and technologies

Emerging Concepts Exploration

Requirements Engineering

Visioning and Dissemination

Engage the Community

Design-Based Research

Internal R&D

BAA Research Portfolio

Including

SCORM

e-Learning

Learning Theory

m-Learning

VWs / Simulations

TLA infrastructure

Performance Data

Learner Modeling
Competencies and Credentialing
Persistent and Open Models
Visualizations

ADL Partnership Network

Coalition: NATO, TTCP, PfPC

ADL Communities of Practice

Defense ADL Advisory Committee

Active Outreach to DoD/Gov

Collaborative Research

Emphasis on Open-Source

Policy and Specifications

DODI 1322.26
STANAG 2591

e.g.

xAPI

e.g.

Via

Budget Activity 6.3: Advanced Technology Development



TRL 4

Component and/or breadboard validation in a laboratory

Basic technological components are integrated to establish that they will work together; “low fidelity”



TRL 5

Component and/or breadboard validation in a relevant setting

Basic technological components and their supporting elements are tested in a realistic simulated environment; “high fidelity”



TRL 6

Prototype demonstration in a relevant environment

Prototype *system*, beyond that of TRL 5, is tested in a relevant environment to show the technology’s readiness



EXAMPLES

ADL
BAA

The screenshot shows the FedBizOpps.gov website. At the top, there is a navigation bar with links for Home, Getting Started, General Info, Opportunities, Agencies, and Privacy. Below this is a secondary navigation bar with links for Buyers (Login | Register) and Vendors (Login | Register), along with an Accessibility link. The main content area features a U.S. Army logo and a notice titled "A-The ADL Initiative is to develop a Personal Assistant for Learning (PAL) for effective, personalized learning content and/or job performance aids that can be accessed from multiple devices/platforms." The notice includes the Solicitation Number (ADLBAA12003), Agency (Department of the Army), Office (Army Contracting Command), and Location (ACC - APG - Natick (SPS)). There are tabs for Notice Details, Packages, and Interested Vendors List. A note indicates that there have been modifications to this notice and provides a link to view the most recent modification/amendment. The main content is divided into two columns. The left column shows a list of changes to the synopsis, with the most recent change on Nov 06, 2014. The right column contains general information about the notice, including the Notice Type (Special Notice), Posted Date (September 3, 2014), Response Date (-), Archiving Policy (Automatic, on specified date), Archive Date (November 6, 2016), Original Set Aside (N/A), Set Aside (N/A), Classification Code (A - Research & Development), and NAICS Code (541 - Professional, Scientific and Technical).

Federal Business Opportunities

★ FedBizOpps.gov

Home Getting Started General Info Opportunities Agencies Privacy

Buyers: [Login](#) | [Register](#) Vendors: [Login](#) | [Register](#) [Accessibility](#)

A-The ADL Initiative is to develop a Personal Assistant for Learning (PAL) for effective, personalized learning content and/or job performance aids that can be accessed from multiple devices/platforms.
Solicitation Number: ADLBAA12003
Agency: Department of the Army
Office: Army Contracting Command
Location: ACC - APG - Natick (SPS)

Notice Details Packages Interested Vendors List [Print](#) [Link](#)

Note: There have been modifications to this notice. You are currently viewing the original synopsis. To view the most recent modification/amendment, [click here](#)

[Complete View](#) [Return To Opportunities List](#)

Original Synopsis
Sep 03, 2014 11:23 am

Changed
Oct 09, 2014 10:03 am

Changed
Nov 06, 2014 9:00 am

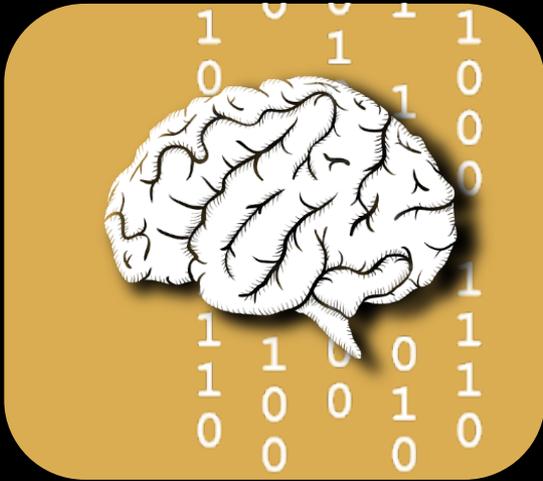
Changed
Nov 06, 2014 9:41 am

Solicitation Number: ADLBAA12003
Notice Type: Special Notice

Synopsis:
Added: Sep 03, 2014 11:23 am
The ADL Initiative has the mission to develop and advance the state of the art in education and training through the use of technology and innovative learning methodologies which highly leverage artificial intelligence, networking, data warehousing and recall technologies for the Department of Defense and across the Federal Government. Projects funded under this BAA will include research related to the ADL mission resulting in prototypes or prototype modules with potential for transition to the Department of Defense community, including the Department of Defense Education Activity. Projects of most interest will be in those areas that explore and develop novel applications of new and emerging educational and training technologies, explore new methods of integrating sound instructional principles with the emerging learning technologies, and maintain a learner-centric orientation. Work should avoid use of proprietary software whenever possible and should

GENERAL INFORMATION
Notice Type: Special Notice
Posted Date: September 3, 2014
Response Date: -
Archiving Policy: Automatic, on specified date
Archive Date: November 6, 2016
Original Set Aside: N/A
Set Aside: N/A
Classification Code: A - Research & Development
NAICS Code: 541 - Professional, Scientific and Technical

WIIFM?



Learning Ecosystem
of the Future
(Vision)

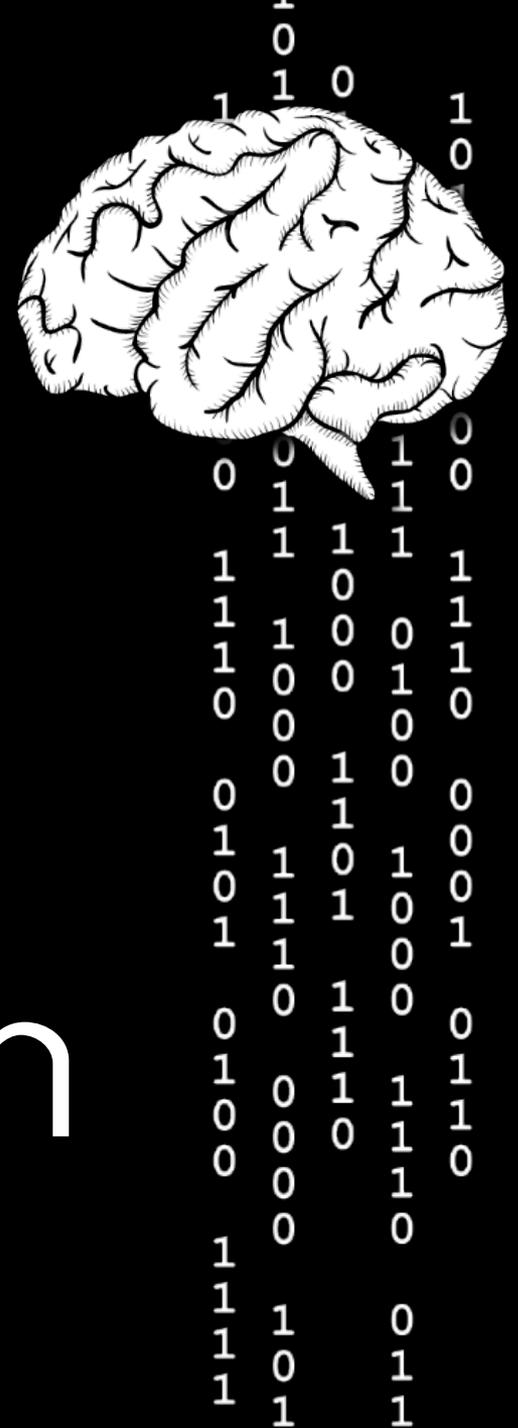


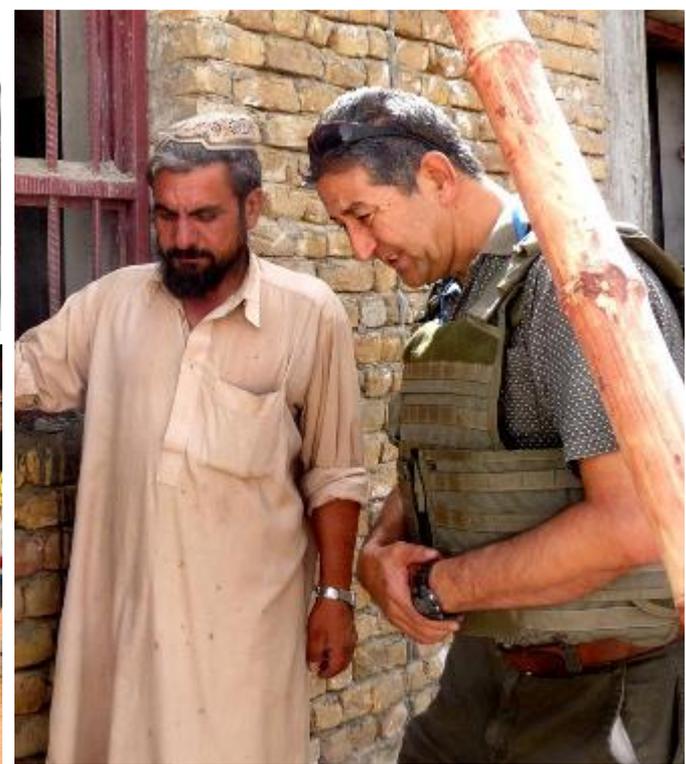
Return on
Investment (ROI)
data for HSI



Free learning
science and
technology stuff

PART 2:
Future
Learning
Ecosystem





Simplify

Develop technology and systems

Prepare personnel to ~~cope with~~ VUCA !!

^
thrive in



NBSD Hosts Resilient Workforce Summit

Story Number: NNS151005 06 Release Date: 10/5
By Mass Communication Specialist Dan P...



CHAIRMAN OF THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20318-3999



Search Dgov

HOME > NEWS ARTICLE VIEW

Carter Details Force of the Future Initiatives

By Jim Garamone
DoD News, Defense Media Activity

PRINT | E-MAIL | CONTACT AUTHOR

- News ▲
- Secretary of Defense ▲
- Deputy Secretary of Defense ▲

WASHINGTON, November 11, 2015 — Secretary of Defense Ashton Carter said today that it is necessary to ensure the Department of Defense is prepared for the future.

The secretary told students at the United States Naval Academy that one of his core commitments is to ensure the Department of Defense is prepared in many ways as possible.

Carter emphasized his start in the military. "George Washington, launched the United States military," he said. "I fought for freedom on 9/11."

But it was more than a fighting force that he talked about. He talked about positioning system.

Mastering Change With Excellence

"Throughout all this, the one thing that we need to focus on is excellence -- continuing to do it better."

"But that excellence is not a one-time thing. It's a continuous process in the 21st century."

America's advantage is tied to our ability to adapt.

"In the face of generational change, we need to think outside our five-sided box and try to do things that only Americans can do," he said.

Spreading the word that DoD is open to ideas from corporations to academia.

Learning From Corporations

Carter announced the idea of the Force of the Future in one of his first speeches after taking office in February. The secretary visited many corporations and learned from leaders in academia and elsewhere.

"Throughout this process, we've always been mindful that the military is a profession of arms," he said. "It's not just about technology."

Veterans

11/05/2015



DEPARTMENT OF DEFENSE TALENT MANAGEMENT

"What we've always known is that the way we win is critical to our success. To fight, we need a pool of talent that is healthy, fit, and motivated. We must evolve our personnel management, we must evolve our people. Today we shift from 'what we have' to 'what we need'." **Secret**

UNITED STATES NAVAL ACADEMY INITIATIVES

- **Optimized Service-Assignment for USNA (2016) -** USNA will continue to evolve our service assignment process by moving further away from a class-rank selection model to a more market-based system that identifies natural talents and interest of USNA graduates with focused skills needed in our warfare communities.

CULTURE OF FITNESS

Navy fitness initiatives (2016-2017) - The Navy and Marine Corps' fitness culture should focus on producing warfighters capable of accomplishing any mission any time and supporting healthy lifestyles to reduce overall medical costs. To do so, we will make the following changes:

- When measuring body fat, we will evaluate health, not shape.

UNIFORMS

- **One Uniform -** Navy and Marine Corps and Marines. The Department of the Navy will develop a uniform for both males and females.

166-13
e 2013

Simplify

Develop technology and systems

Prepare personnel to ~~cope with~~ VUCA !!

^
thrive in

~~☐~~ Simplify

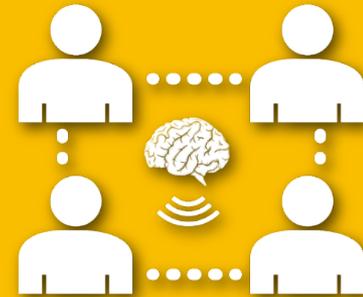
~~☐~~ Develop technology and systems



More Skills



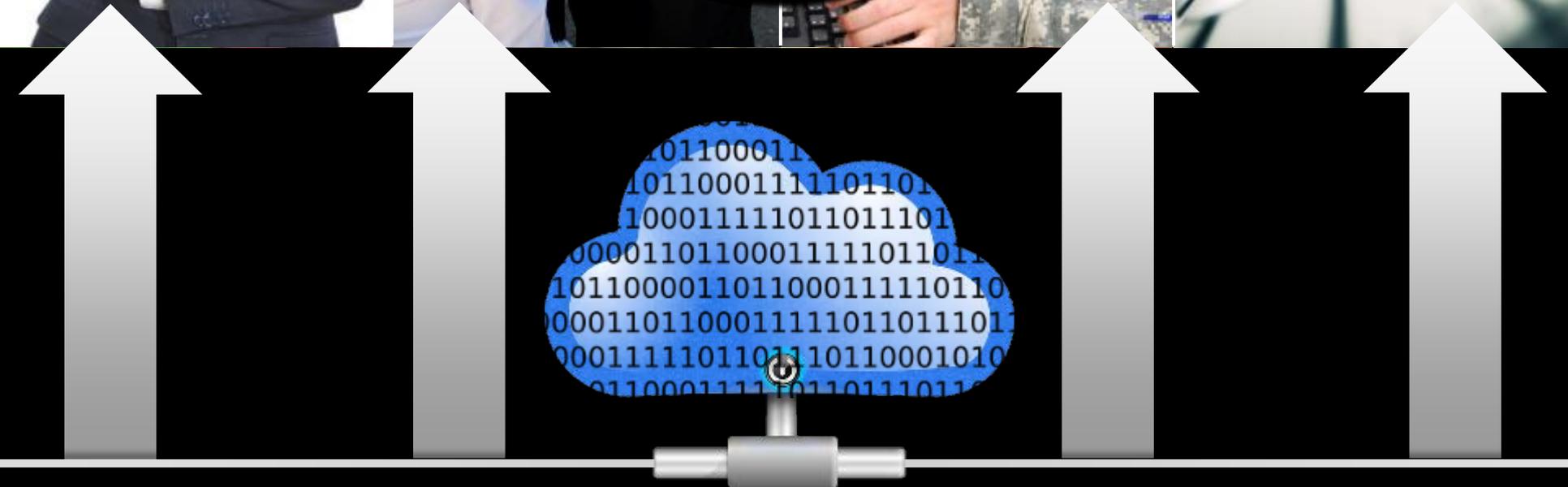
Higher Order



More Agile



Learner-centric, technology-enabled: Flexibly, efficiently, and seamlessly (truly blended)



Data-driven learning tailored is to what, where, when, and how learners need it

Learning Science



Learning system is guided by evidence-based best practices and continuously improved



Technology enables action from self, commanders/instructors, and peers (social learning)



Organizations learn lessons and disseminate them effectively



Learner-Centric
Technology-
Enabled



Data-Driven
Learning



Learning
Science



Social Learning



Learning
Organizations

+ *Training and Learning Architecture*

PART 2:

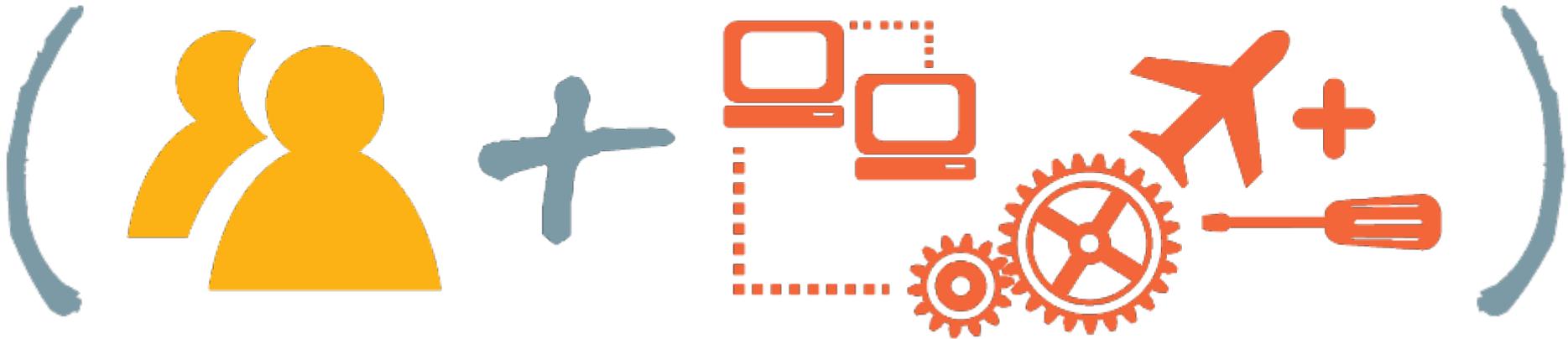
ROI of HSI



Human-Systems Integration

PEOPLE

TECH + INFRASTRUCTURE



HSI is a philosophy and set of processes that focus on systems-level human performance concerns throughout a system's life-cycle. Its purpose is to mitigate the risk of downstream system failure.

Human-Systems Integration

PEOPLE

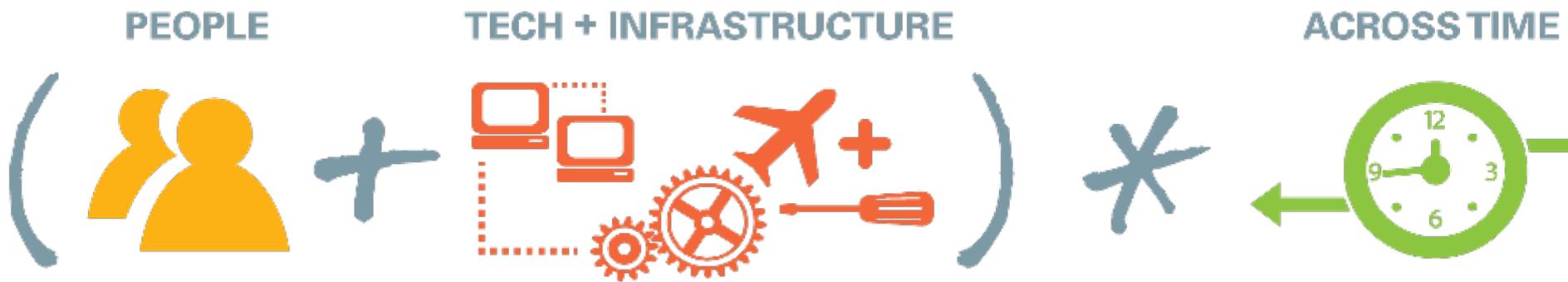


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HSL Core Tenets



Emphasize Humans

Emphasize human performance early and often in the system design process; give humans equal treatment to hardware and software



Optimize Total System

Optimize overall system performance at the comprehensive (big picture) level and not simply at the individual component levels



Consider Full Life-Cycle

Take a long view; maximize a system's benefits—while controlling its costs and mitigating risks—across the entire system life-cycle



Facilitate Design

Facilitate multidisciplinary design; help “translate” among specialists in different disciplines as well as between designers and other stakeholders

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HSL domains



MANPOWER

PERSONNEL

TRAINING



HUMAN FACTORS

SAFETY/HEALTH

HABITABILITY

SURVIVABILITY

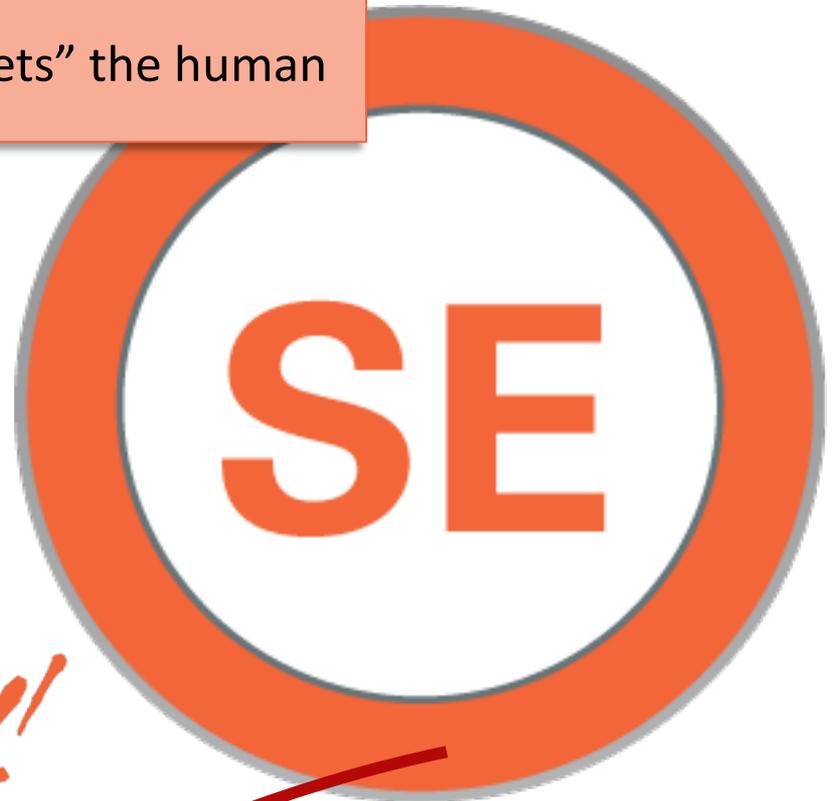


- × Optimizing across components
- × Maximizing total life-cycle ROI
- × Facilitating multidisciplinary design

Hey!

~~That's Human Factors~~

✘ In practice, SE usually “forgets” the human



Hey!

~~It's Systems Engineering~~



Essentially, HSI is an alloy of HF/E (broadly defined) and SE



FORMALLY MANDATED

Agencies, such as the DoD, have developed guidelines mandating or instructing the use of HSI; e.g., the DoD “5000 Series” formally directs the use of HSI in all DoD system acquisitions processes



RETURN ON INVESTMENT

HSI has high ROI; e.g., Booher reports a USAF program that had a 50:1 ROI (savings of \$50 or every \$1 spent on HSI) and two Army helicopter programs with 44:1 and 22:1 ratios, respectively



REDUCE RISK OF FAILURE

HSI mitigates the risk of system failure, including three of the most common causes: (1) Underuse due to poor design, (2) Human error, (3) High operations and maintenance costs



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RETURN ON INVESTMENT

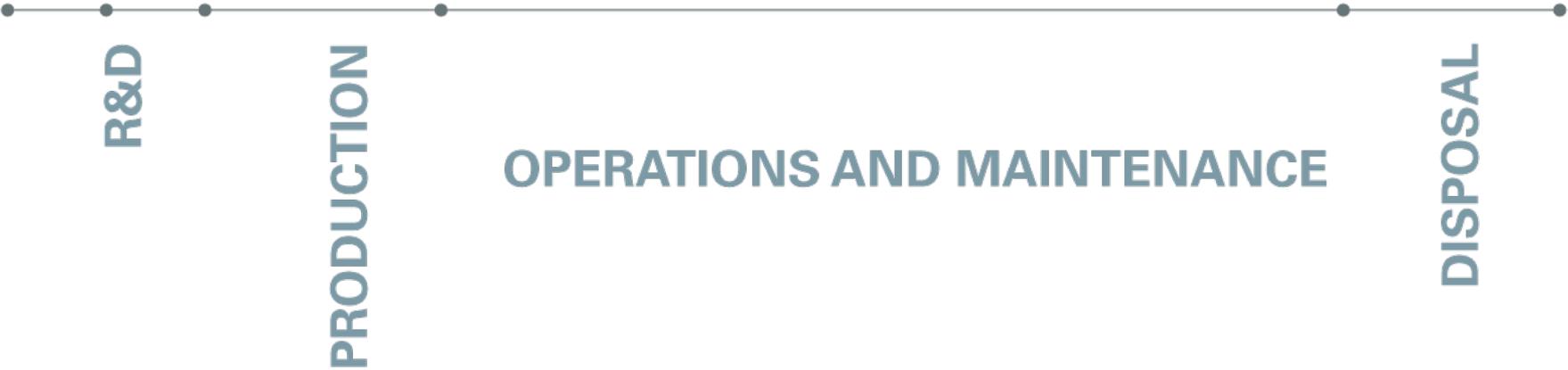
HSI has had a positive ROI (saving every \$1 and two programs with 44:1 and 22:1 ratios, respectively



Only 34% of technology development projects in the US are successful. Projects most frequently fail because (1) inadequate understanding of the intended users/context and (2) vague usability requirements

(3) High operations and maintenance costs

SYSTEM LIFE-CYCLE



Defence



egration is worth the money
 e implementation of Human
 es in Defence capability acc

ATIONAL
 FETY
 ple

ence.gov.au/
 fence.gov.au/dpe/ohsc

NAVY

WILEY

Handbook of Human Systems Integration



HAROLD R. BOOHER

Wiley Series in Systems Engineering and Management

284 | A Publication of the Defense Acquisition University www.dau.edu

THE F119 ENGINE: A SUCCESS STORY OF HUMAN SYSTEMS INTEGRATION IN ACQUISITION

2ndLt Kevin K. Liu, USMC, Ricardo Valerdi,
 Donna H. Rhodes, Col Larry Kimm, USAF, and
 Lt Col Alvis Headen, USAF

The Department of Defense recently mandated the incorporation of Human Systems Integration (HSI) early in the acquisition cycle to improve system performance and reduce ownership cost. However, little documentation of successful examples of HSI within the context of systems engineering exists, making it difficult for the acquisition community to disseminate and apply best practices. This article presents a case study of a large Air Force project that represents a successful application of HSI. The authors explore the influence of both the Air Force and the project contractor. Additionally, they identify top-level leadership support for integrating HSI into systems engineering processes as key to HSI success, reinforcing the importance of treating HSI as an integral part of pre-Milestone A activities.

Keywords: Human Systems Integration, Systems Engineering, Acquisition Process, Human Factors Engineering, Integrated Product Development

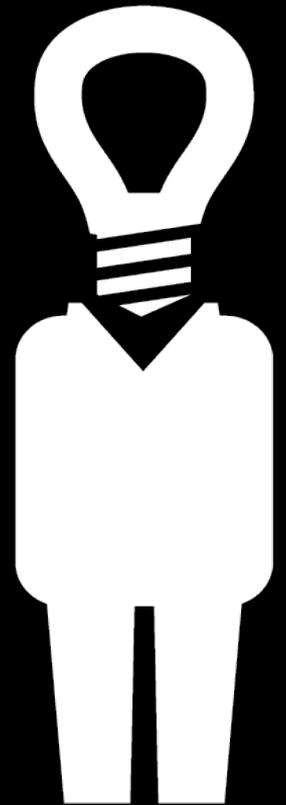
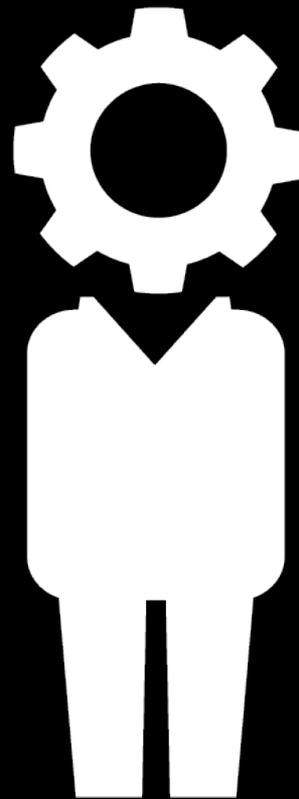
Image designed by Harvinder Grewal

HSI ROI Resources

PART 3:

LS&T

Goodies



The screenshot displays a web browser window titled "First Playable Demo" at the URL `localhost:3000/adl/sandbox/3KCuD3a10-HZm2MRK/`. The interface includes a top menu bar with options like File, Edit, Camera, Hierarchy, Create, Assets, Tools, Windows, Rendering, and Help. Below the menu is a toolbar with various icons for navigation and editing.

On the left side, there is a "Content Libraries" panel with a "Library" tab, showing a grid of asset thumbnails such as "Default Tree", "Island", "Hill Hill", "Barrel", "Road Tile", "Basic Tile 10", "Basic Brick 10", "Sonic Tile", "Fire", "Rock", and "Grass".

The central 3D viewport shows a boat with a propeller and a cabin, floating on a blue ocean under a sunset sky. The boat is highlighted with a blue wireframe. To the right of the viewport is a "Hierarchy" panel with a search filter and a tree view showing the scene structure: Scene > asset-wf-Nf1bop40d > DDC51 > **FAC_MASTER** > LookatCamera > Ocean.

Below the viewport is a "ScriptEditor" window titled "ScriptEditor - sas-assets-1ad6adad-N560f3127". It has tabs for "Methods", "Events", "Properties", and "Options". The "Methods" tab is active, showing a list of methods on the left, with "tick" selected. The main area contains the following code:

```

1 function tick()
2
3 // The tick function is called 20 times every second.
4 // Write code here to animate over time
5
6 if (this._keysDown.indexOf("W") !== -1)
7 {
8     var force = this.transformAPI.localToGlobal(-10 * mass, 0, 0);
9     this.physicsAPI.addForceAtCenter(
10         force);
11 }
12 if (this._keysDown.in

```

A dropdown menu is open over the `this.physicsAPI.addForceAtCenter` call, listing methods: `addForceAtCenter`, `addForceOffset`, `addTorque`, `addTorqueInput`, `getAngularVelocity`, and `getLinearVelocity`. Buttons for "Call Method", "Delete Method", "New Method", and "Check Code" are visible at the bottom of the dropdown.

At the bottom of the interface, there is a status bar with "Save Method" and "Discard Changes" buttons, and a footer showing "First Playable Demo" and "Logged in as: ADTeam".

VR, AR, Simulation and Games

Virtual World Sandbox, Open-source simulations via web browser

EXPERIENCE xAPI™

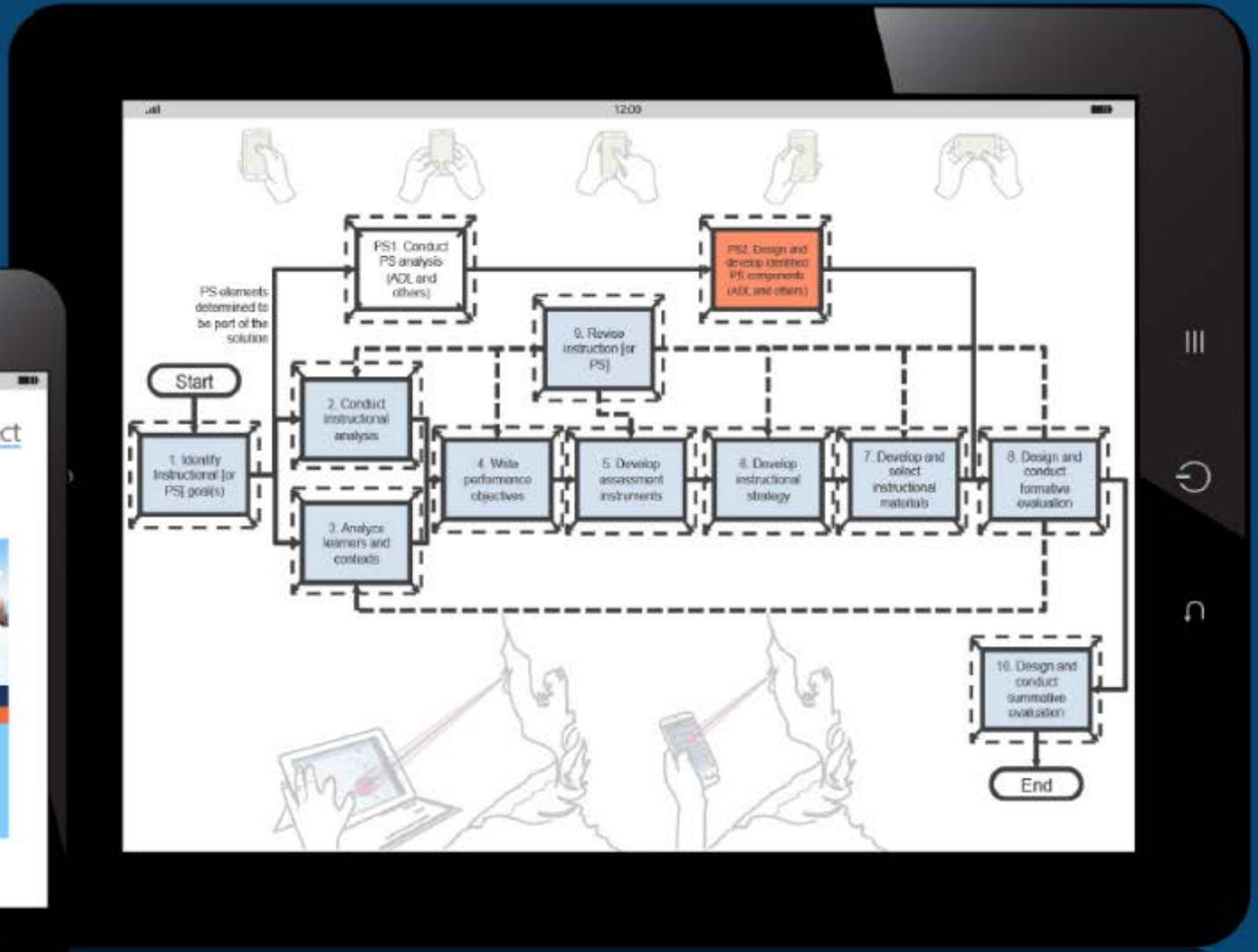
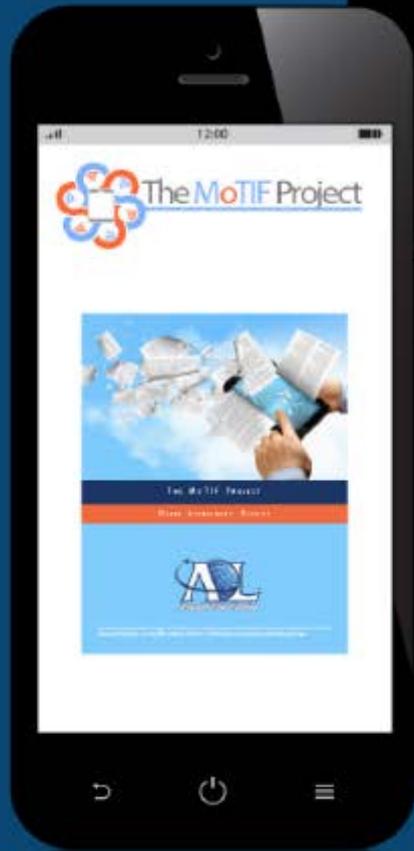


- Big Data
- Human Performance
- System Agnostic
- Open Source



Performance Tracking/Analysis

xAPI, Open-source specification for big human-performance data



mLearning Reference Model, interactive flowchart to guide mlearning and support design

Choosing Authoring Tools

Choosing a Learning Record Store (LRS)

Choosing a Learning Management System



Advanced Distributed Learning (ADL) Co-Laboratories

2 November 2015
Version 5.4



<http://creativecommons.org/licenses/by-nc-sa/4.0/>



Advanced Distributed Learning (ADL) Co-Lab

Peter Berking

18 November 2015

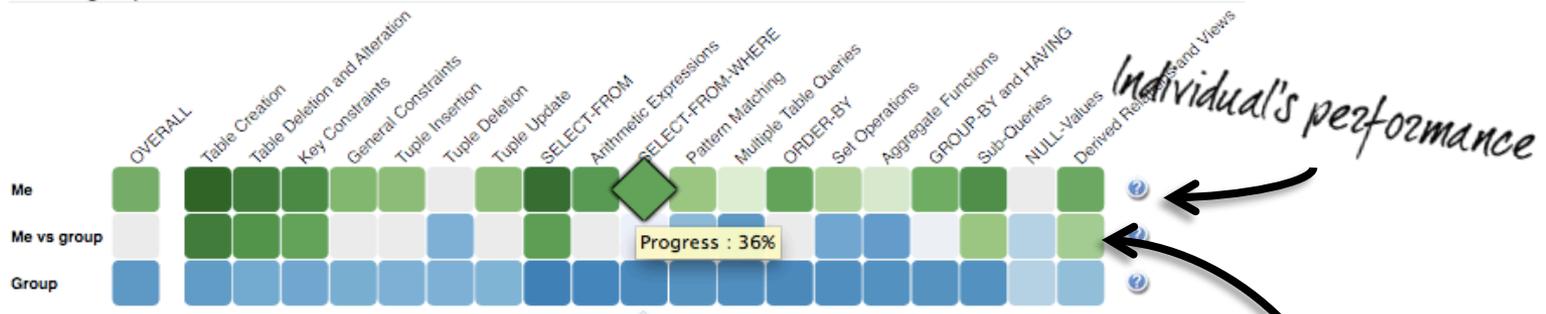
Version 1.3



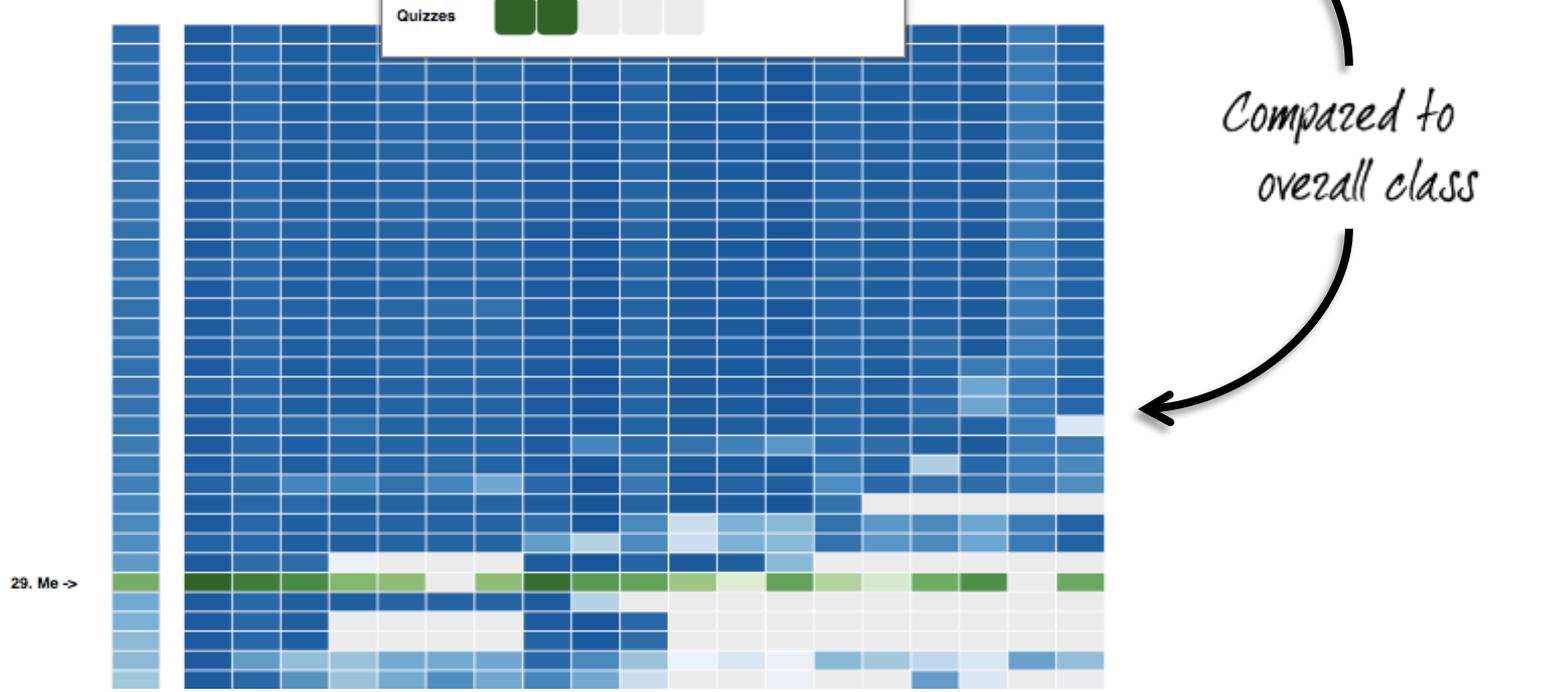
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Tools Guides, support review and selection of learning technologies

Me and group (Students in the class)



Students in the class (you are 29th out of 30)





www.ADLnet.gov

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