PeBL

Personalized eBooks for Learning

open source

A Next-Generation Mobile Platform for Adaptive Immersive Training

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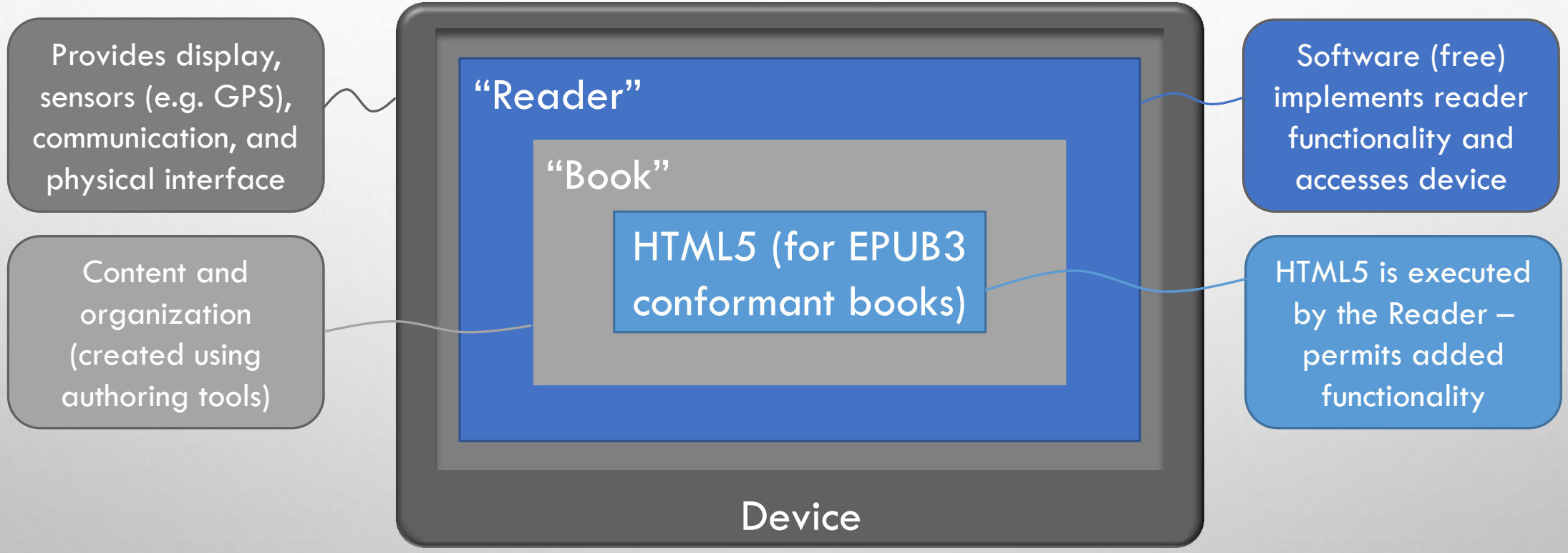
How eBooks Work



eBooks Today

- Used to provide electronic (DRM-controlled) access to publisher content.
- Adopted and supported by the digital publishing industry.

eBooks Tomorrow

- Based on a standard (EPUB) now being updated in the W3C.
- Supported by an ecosystem of readers and authoring tools

EPUB 3 CAN PROVIDE A LOT OF AFFORDANCES!

- ✓ **Readability and organization of eBooks**
- ✓ **Mobility and sensor capabilities of tablets**
- ✓ **Learning analytics and social interaction**

Advantages of eBooks as a platform for adaptive immersive training

- Mobile
  - ✓ Meets the needs of modern learners and is ideal for field use
- Networked
  - ✓ Learners and instructors to communicate with each other and with experts (text & voice)
  - ✓ eBooks can share data and support multi-player exercises
- Adaptative
  - ✓ Can adapt based on location, light conditions, learner goals and learner profiles
- Integrated
  - ✓ Integrates with other training systems and reports granular data for a range of analytics
- Interactive
  - ✓ Can include standard quizzes and can embed games, simulations, virtual labs, etc.

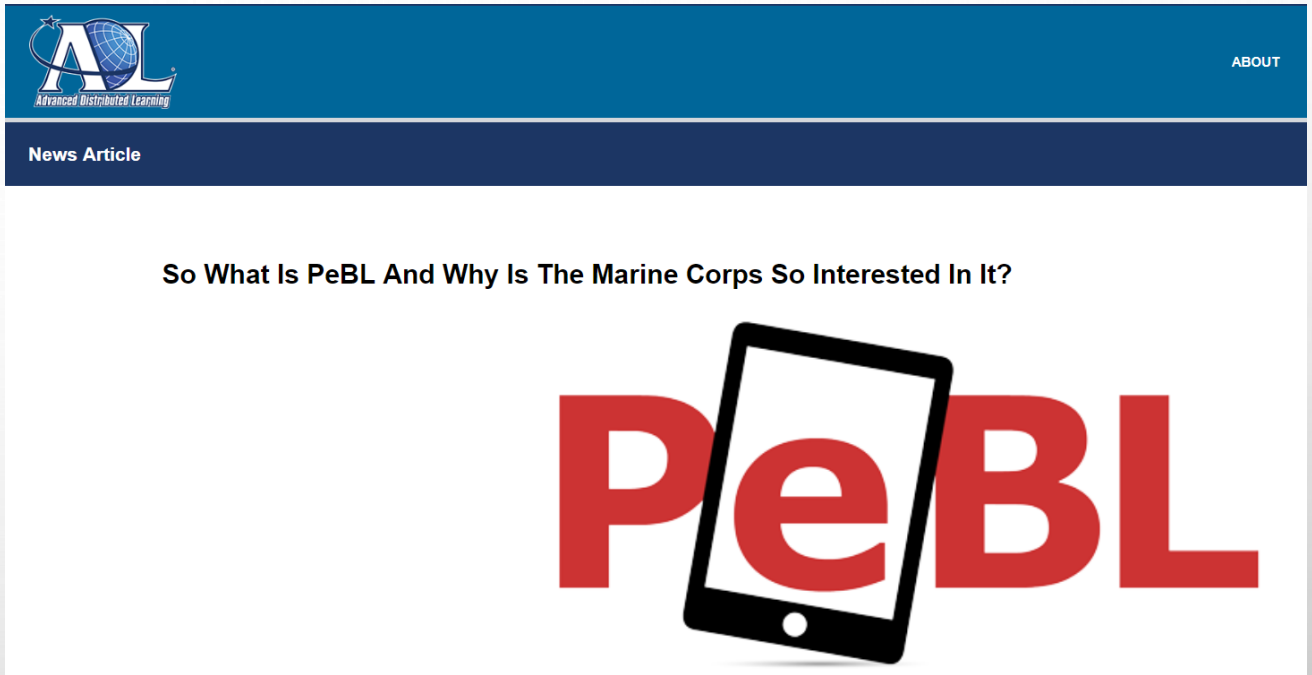
Challenges for eBooks as a platform for adaptive immersive training

- Complexity
  - ! Multiple OS (iOS, Android, Windows)
  - ! Multiple devices (Desktop, Apple, Android etc.)
  - ! Many readers, most with limited functionality
- Authoring
  - ! Tools are designed for creating traditional eBooks - requires coding to implement features on left
- Standards
  - ! No standards in EPUB3 for integration, results reporting, adaptation, etc.

Similar to the early days of web-based learning!

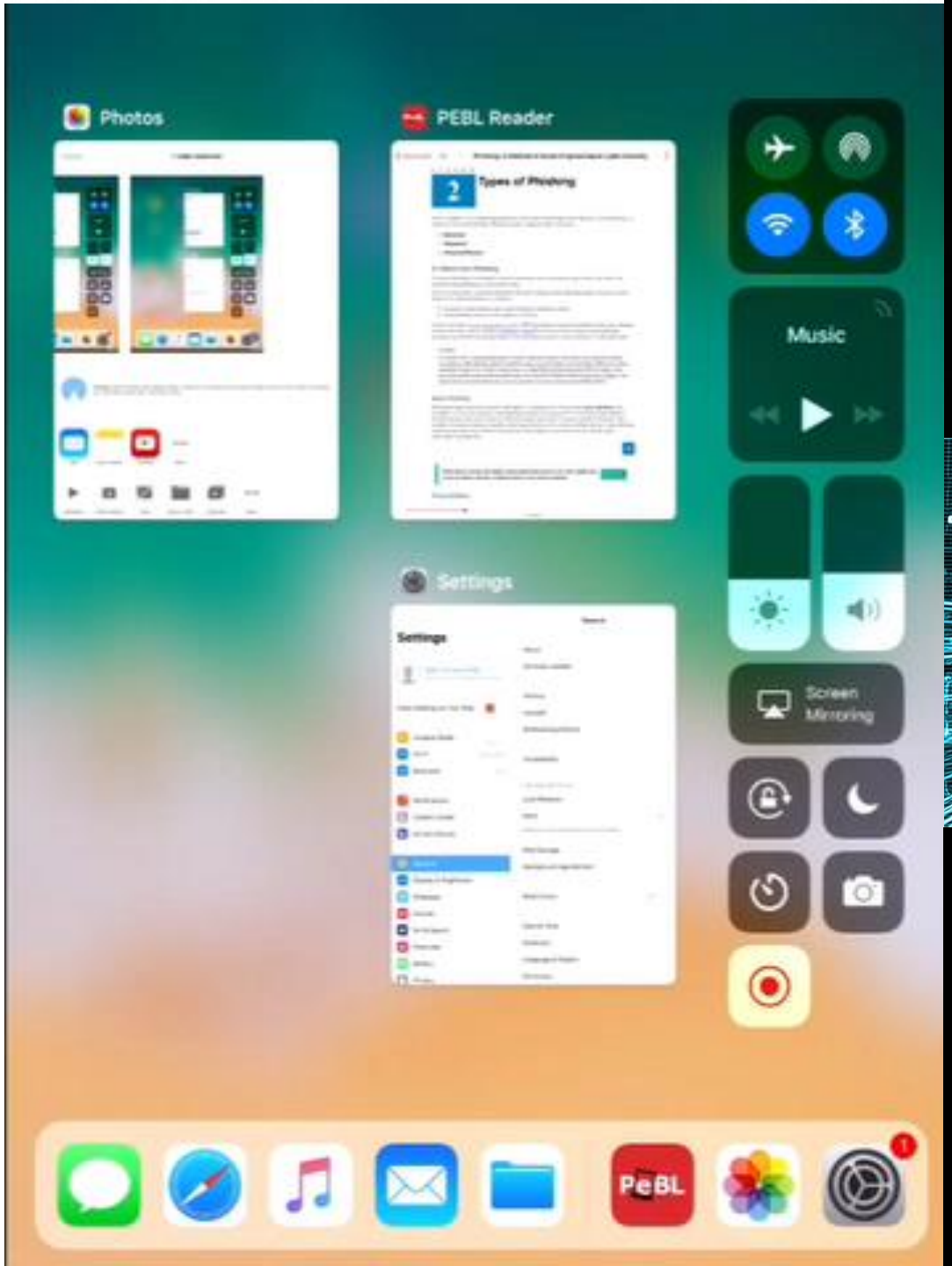
PeBL: *Personalized eBooks for Learning* (Converging standards and tools to achieve a vision)

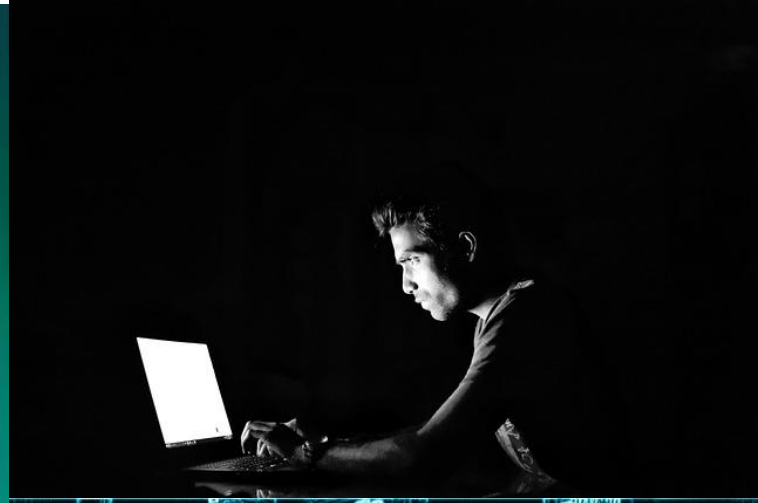
- Open source project (www.peblproject.org)
  - Funded by the Advanced Distributed Learning (ADL) initiative (www.adlnet.gov)
  - PI: Elliot Robson (Eduworks Corporation)
- Existing implementations
  - Extension Foundation (www.extension.org)
  - ADL in its Total Learning Architecture research
- In progress
  - US Marine Corps
  - US National Park Service
  - US Navy Education and Training Command

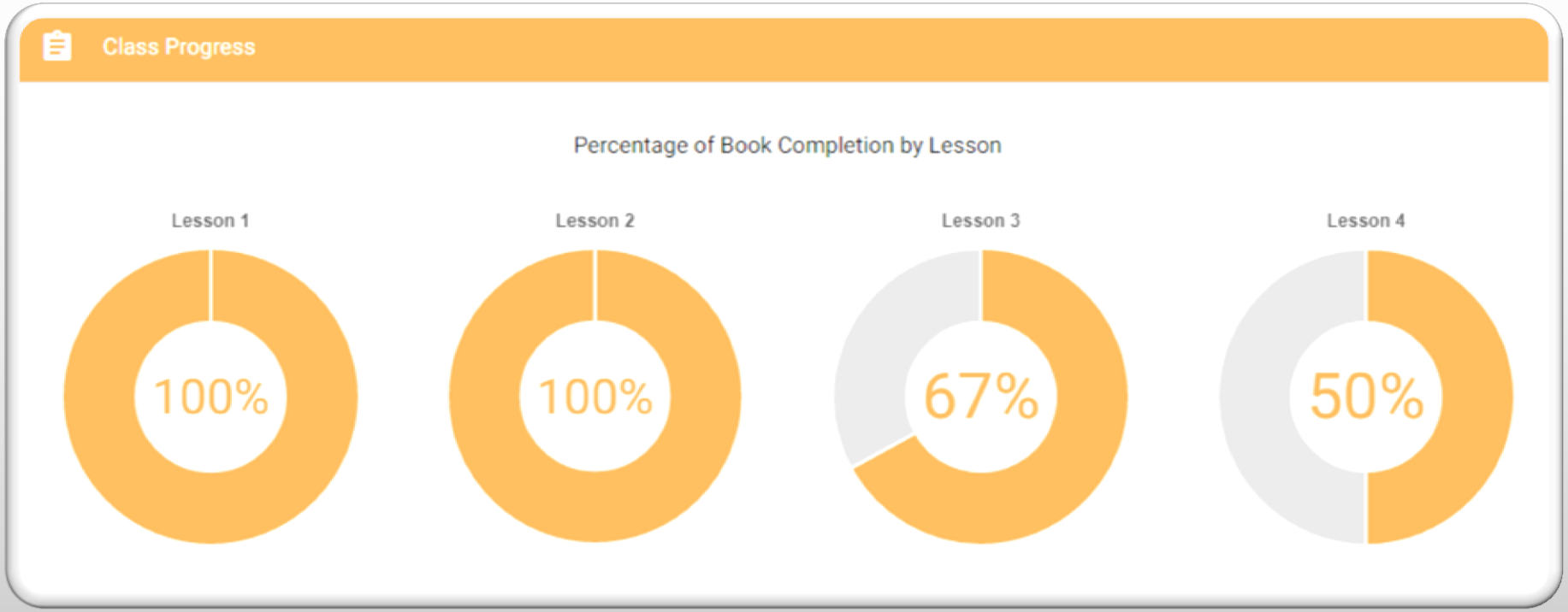


- Primary output for the ADL is the PeBL specification
- Related IEEE Standards Association activities
  - The Industry Connections *Actionable Databook* (concluded)
  - IEEE Learning Technology Standards Committee (P7919.1)

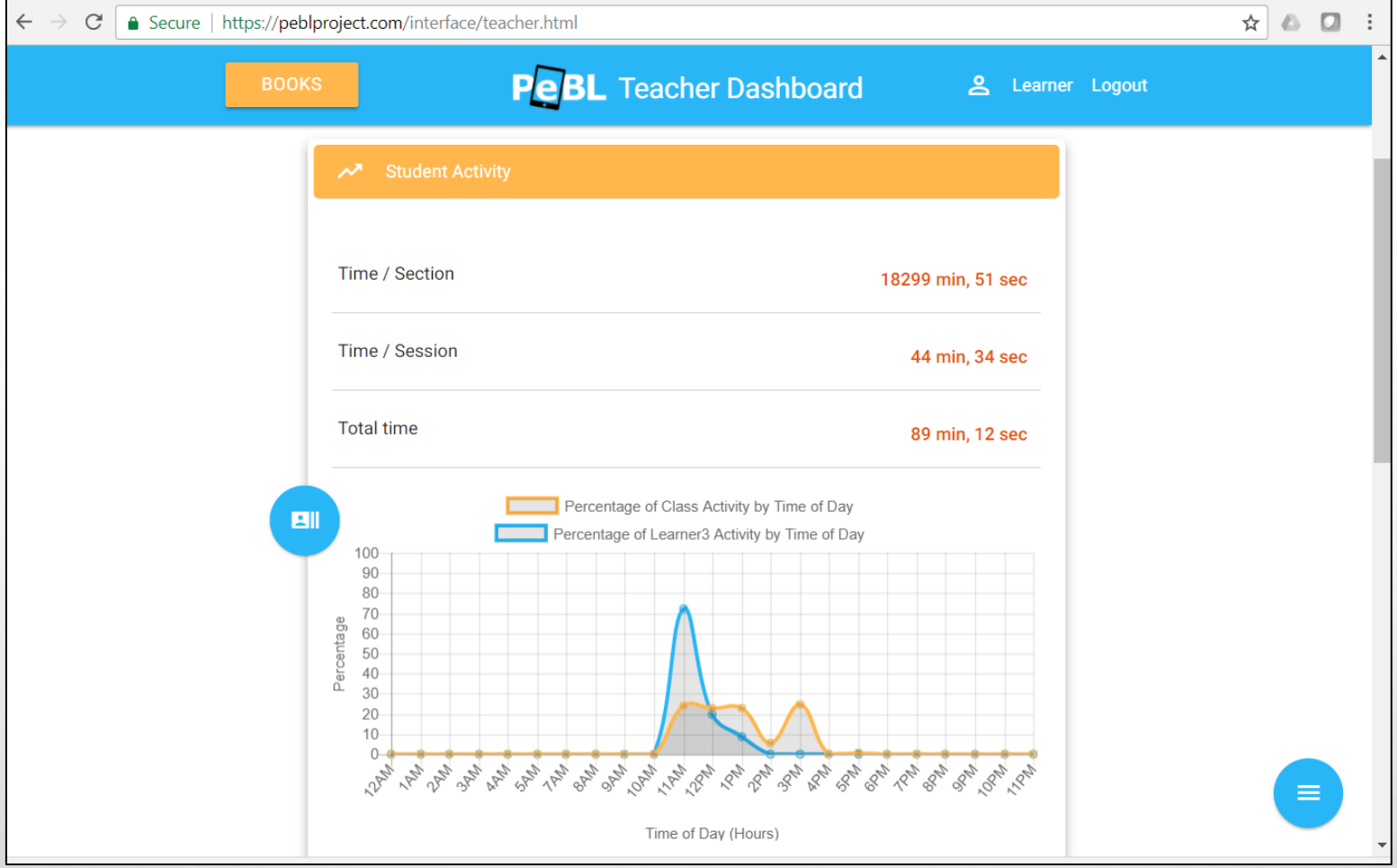
Cybersecurity PeBL Book Developed to show “Tier 2” functionality (explained later)

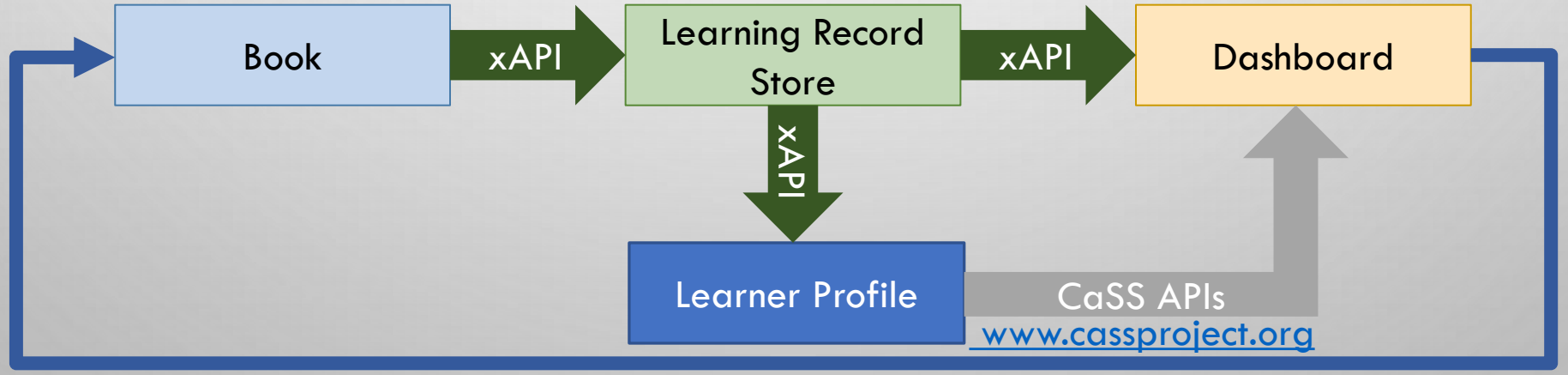






DASHBOARDS: LEARNING ANALYTICS AT YOUR FINGERTIPS


Secure | https://peblproject.com/interface/teacher.html
BOOKS
PeBL Teacher Dashboard
Learner
Logout
Student Activity
Time / Section
18299 min, 51 sec
Time / Session
44 min, 34 sec
Total time
89 min, 12 sec
Percentage of Class Activity by Time of Day
Percentage of Learner3 Activity by Time of Day
Percentage
Time of Day (Hours)


Book
xAPI
Learning Record Store
xAPI
Dashboard
xAPI
Learner Profile
CaSS APIs
www.cassproject.org

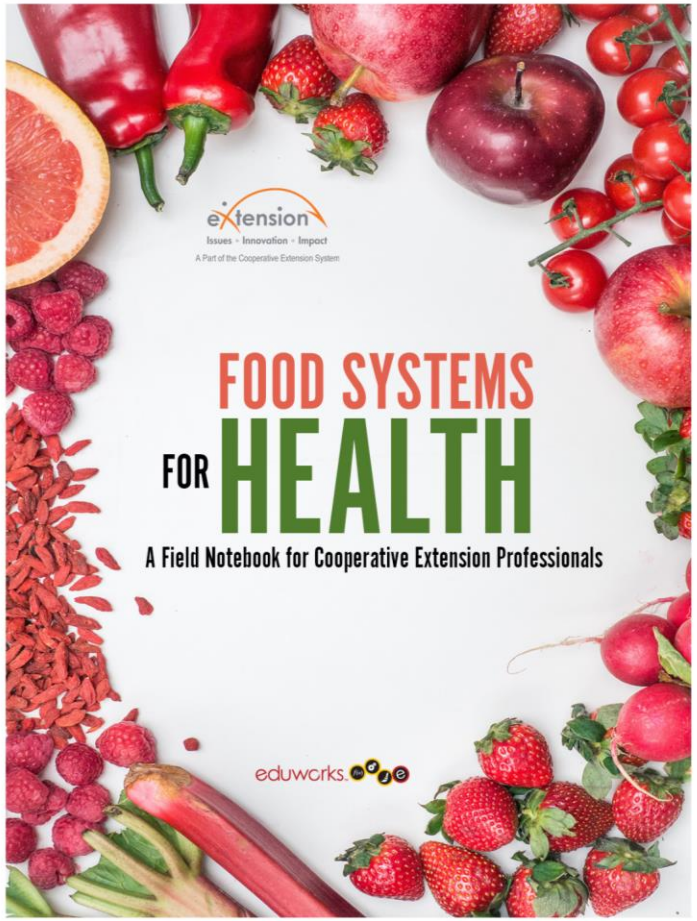
extension

Issues • Innovation • Impact

A Part of the Cooperative Extension Syst

Field Notebook Use Case

- Ask an expert
- Find resources
- Discussion
- Content brokering



Introduction

Fruits and vegetables (referred to as "F&V" in this notebook) provide an important source of vitamins and minerals for adults and children. When prepared without added fats or sugars, most of them are relatively low in calories and are recommended as part of a healthy diet in the Dietary Guidelines for Americans. Increasing intake of F&V instead of higher calorie foods meets an important goal for Cooperative Extension (CE)'s food system and health-related missions: decreasing the prevalence of obesity (one of the "double burdens" of malnutrition).

Menu

https://www.cdc.gov/nccdphp/dnpao/state-local-programs/reach/index.htm

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

MENU | CDC A-Z | SEARCH

Division of Nutrition, Physical Activity, and Obesity

Racial and Ethnic Approaches to Community Health

About REACH

REACH is a national program administered by the Centers for Disease Control and Prevention (CDC) to reduce racial and ethnic health disparities.

Through REACH, awardee partners plan and carry out local, culturally appropriate programs to address a wide range of health issues among African Americans, American Indians, Hispanics/Latinos, Asian Americans, Alaska Natives, and Pacific Islanders.

Why is ending health gaps important?

CDC believes every person should be able to reach his or her full health potential. CDC seeks to remove barriers to health caused by race or ethnicity, education, income, location, or other social factors.

Health gaps remain widespread among racial and ethnic minority groups.

- Non-Hispanic blacks have the highest rates of obesity (48%) followed by Mexican Americans (43%).
- Compared to non-Hispanic whites, the risk of diagnosed diabetes is 77% higher among non-Hispanic blacks, 66% higher among Hispanics/Latinos, and 18% higher among Asian Americans.

How are REACH projects funded?

REACH gives funds to state and local health departments, tribes, universities, and community-based organizations. Awardees use these funds to build strong partnerships to guide and support the program's

Contents | Search Network | Ask an Expert

eXtension Ask an Expert
Issues • Innovation • Impact
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COOPERATIVE EXTENSION

Ask a Question

How it works

Questions are answered by Cooperative Extension, University staff and volunteers from across the United States.

Find an expert

Pick your location

Ask an Expert is powered by Cooperative Extension

eXtension Members
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HOW DOES THIS ALL WORK?

Specification

Version 0.1

1. About PEBL

1.1. Introduction

1.1.1. Vision and purpose

A key element of the revolution in learning, education, and training (LET) is the emphasis on interactive, exploratory, and collaborative learning activities. Many of these activities require tablet devices that are connected to the cloud and to other systems and devices used by students, teachers, parents, publishers, institutions, and more. During this period of rapid change in LET, plug-and-play interoperability accelerates innovation and adoption by lowering the barrier to entry for new products, pedagogy, and ideas, reducing costs and risks. Data sharing is essential: building new functionality on top of existing data is key to innovation in this area. The Personalized eBooks for Learning (PEBL) standard addresses this need for interoperability in LET while maintaining the power of the eBook form.

The vision of PEBL is to offer the familiarity and advantages (e.g., portability, look and feel, etc.) of the book to users while leveraging the technological affordances of the tablet within a connected ecosystem. This enables new PEBL features like:

- Presenting alternative forms of content according to learner skills, preferences, and competencies collected and stored in external sources
- Allowing collaboration between learners and communication with teachers, coaches, and mentors
- Displaying dashboards with information and controls appropriate for different user roles (e.g., student, instructor)
- Presenting fine-grained analytics for authors, publishers, and stakeholders to use in improving the product
- Embedding and exchanging data with other systems, including virtual immersive environments (VIEs) such as simulations, games, mixed reality, Internet of Things (IoT)

The purpose of these and other features included in the PEBL specification is to enable greater interoperability of technology-enhanced eBooks, to enable improvements or efficiencies in LET areas:

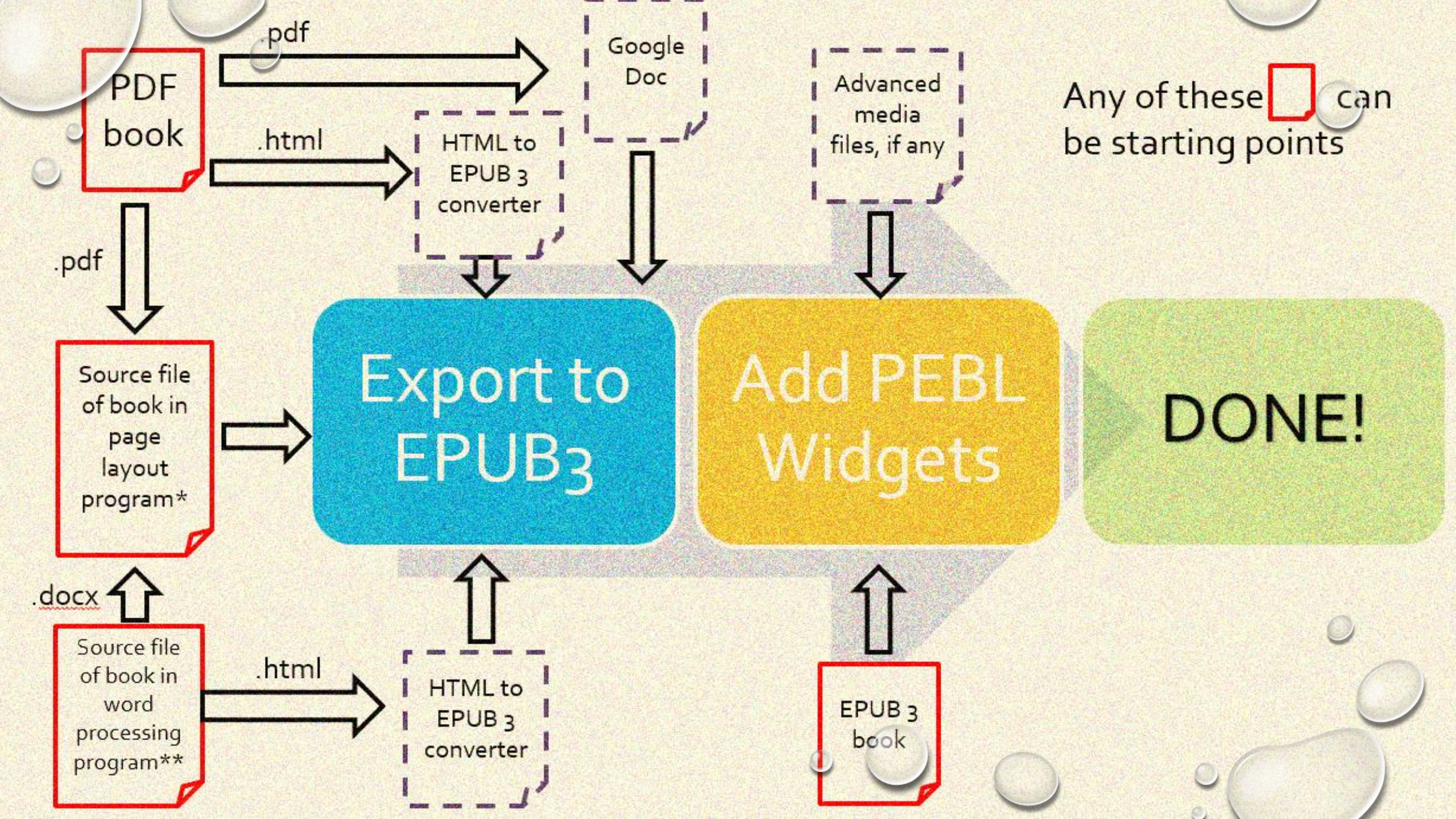
- Engagement and relevance
- Learning effectiveness and ROI (return on investment)
- Organizational efficiency and employee performance
- Evaluation and measurement
- Ease of delivery and access to learning
- Accessibility
- Pedagogy

Through these improvements, the PEBL specification supports the following:

- Enabling the creation of learning eBooks that are more effective than traditional eBooks
- Supporting the development of open source and architecture products that reduce costs for producers and end users
- Integration of eBooks with learning ecosystems
- Creation of a flexible plug-and-play architecture
- Inspiring and enabling new learning designs and learning science-based approaches
- Enabling product improvement cycles, iterative adaptation of content, and advanced assessment based on improved analytics
- Readiness for the emerging 5G mobile network standard
- Stimulating the educational publishing industry to think differently about eBooks for learning

1.1.2. Scope

The PEBL specification defines the overall system architecture as well as the components of an eBook platform. It includes specifications for the design of software only, not hardware, and it is not limited to use in any specific eReader or tablet device (e.g., Amazon Kindle). eBooks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Source file of book in word processing program**
.html
HTML to EPUB 3 converter
EPUB 3 book

Mobile Learning Platforms (P7979.1)

5.2 Scope: This standard describes and classifies the capabilities of eReaders that enable them to be used as a platform for learning, education, and training and provides alternative methods for implementing these capabilities. Methods include applications of industry standards and may include open source reference code.

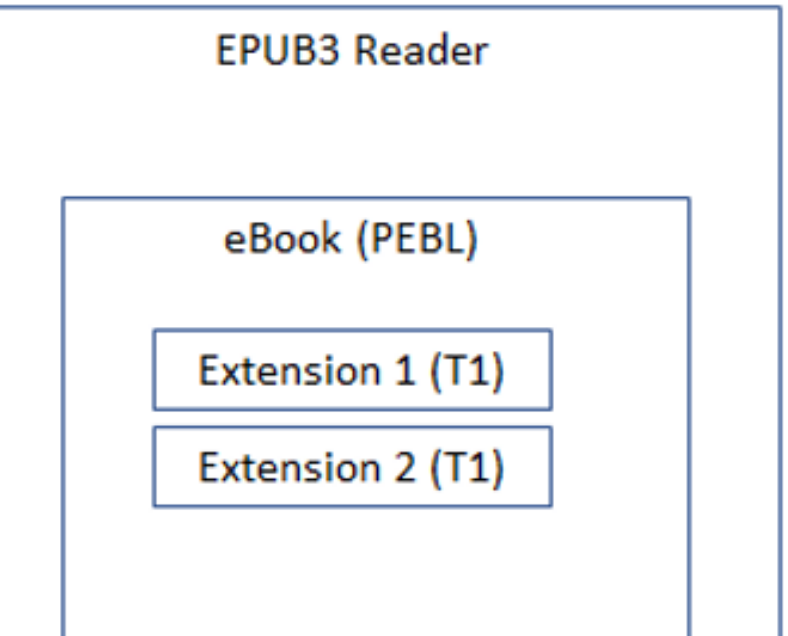
5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: The purpose of this standard is to enable eReader developers, eBook authors and publishers, and consumers to understand the capabilities and affordances offered by eReaders and required by "eBooks" that are used in learning, education, and training. For the purpose of this standard, an "eBook" may range from an interactive traditionally organized eBook to a fully adaptive learning and teaching system. This standard will enable stakeholders to ensure that the capabilities and affordances offered match those that are required.

5.5 Need for the Project: eBooks that build on the EPUB 3 standard are powerful platforms that can access the sensors and radio systems in a tablet or other mobile device and that can include HTML5 content, together with its capabilities and affordances. This has led to the development of eBooks and eReaders that include capabilities such as activity and results reporting, context-dependent chat, content that adapts or appears depending on the preferences and competencies of the user, content that makes use of device sensors for location awareness and affect detection, and many other applications. As these move into the main stream, classifications, reference code, and definitions are needed to match the capabilities and affordances of eReaders with the requirements of eBooks and to provide markings that consumers can use to identify which eBooks will work with which eReaders.

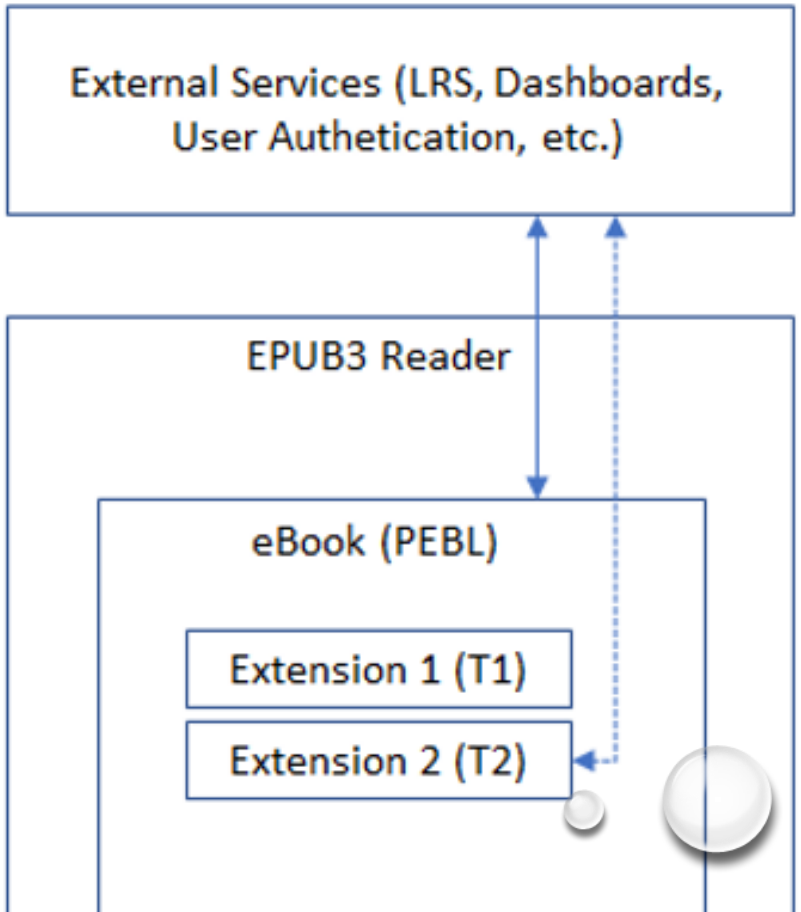
PEBL Tier 1

EBL T1 systems operate in any EPUB3 eReader.
ey are typically local PEBL extensions like
op-ups, glossary hotwords, etc.).



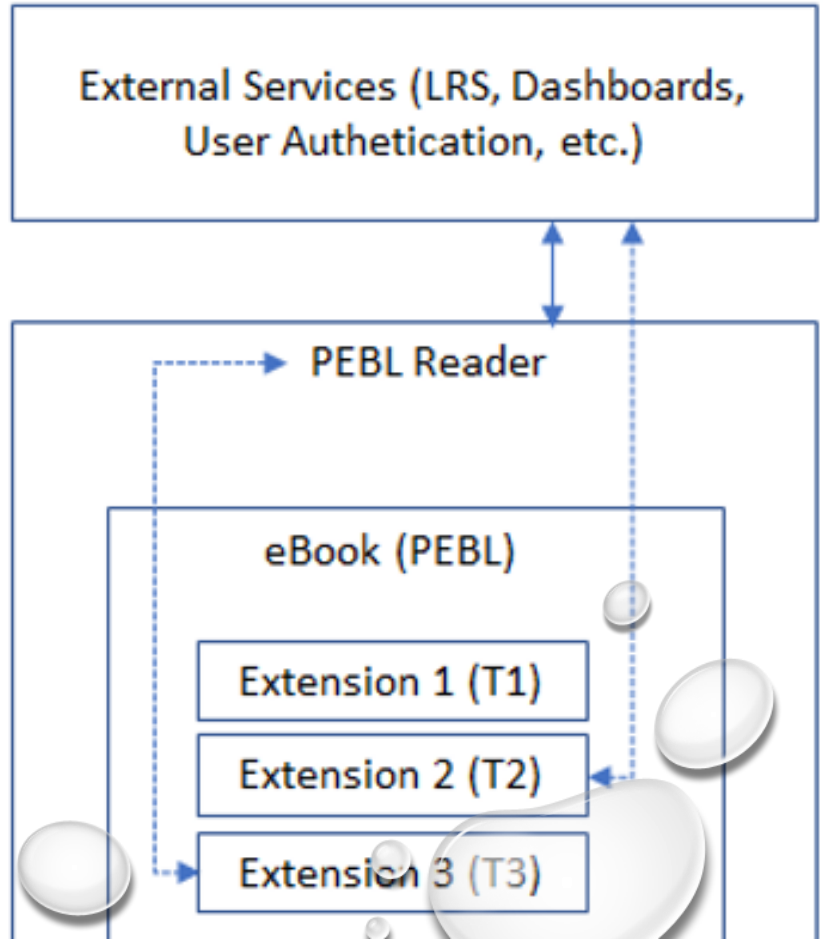
PEBL Tier 2

PEBL T2 systems operate in any EPUB3 eReader that is connected to external systems. These extension often rely on external LRS, share data like xAPI statements, and enable cross-device functionality like chat, adaptive content, and teacher dashboards.



PEBL Tier 3

PEBL T3 systems operate in a PEBL-enabled eReader that is connected to external systems(T2). Extensions requiring T3 support include any reader-level functionality or instrumentation. For example, generation of xAPI statements on page turn, special page numbering, or anything else enabled in the eReader.



ROADMAP

- Authoring tools
- Security & privacy
- Adaptive immersive environments
  - Live – Virtual – Constructive
  - Learning Continuum and Performance Analytics (LCaPA)
  - Synthetic Training Environment
  - Intelligent Tutoring Systems (integrations)

www.peblproject.org

WRAP-UP

- EPUB 3 is an ideal platform for adaptive immersive training
- Its state is similar to that of online learning in the early days of the Web
- We need tools and standards to address the diversity of devices and readers
- PeBL *(Personalized eBooks for Learning)* is an open source project funded by ADL
- PeBL books are networked, adaptive, and interactive – following the PeBL spec
- Standards efforts include EPUB 3 (W3C) and Mobile Platforms for Learning (IEEE)
- Existing implementations show the potential – the roadmap includes LVC, STE, etc.

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