

FMLOPE & RISE

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Digitalization in Learning Ecosystems

Building a Next-Generation Learning Ecosystem for Defense

Today's session

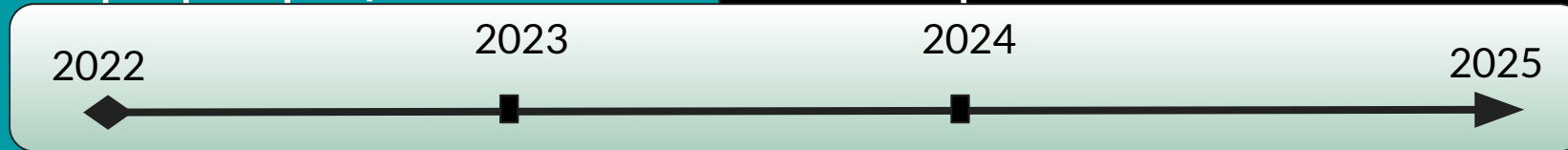
- Pilot project overview: Digital learning ecosystem
- Digital transformation strategies in the Swedish armed forces
- Practical challenges and solutions
- Collaborative approaches to military learning

RISE

Applied research
and expertise in
digital learning

FMLOPE

Military leadership
and pedagogical
expertise



Why This Collaboration?

Our unit identified insufficiencies in the education system - specifically that we weren't capturing workplace learning and informal learning effectively. While we had pedagogical expertise, we needed technical solutions, which required external expertise.

We partnered with RISE, a governmental research organization with experts across numerous fields. RISE can assemble tailor-made project teams with specialized expertise as needed. With approximately 3,500 employees, 1,000 PhDs, and 130 testbeds, they cover everything from battery research to self-driving vehicles and cybersecurity.

A key benefit of this partnership is that RISE can set up sandbox environments where we can test and experiment before implementing solutions in our regular systems.

The Case for Change

- Adapted training
- Personalized learning paths
- Continuous development
- Data-driven decision making



The Case for Change

Our journey began around 2016 when we identified deficiencies in how we captured learning. We started discussing this with American partners who saw similar challenges. While we had implemented our first cloud-based LMS (Learning Management System) in 2013, it was primarily used within formal education settings, not widely adopted in operational contexts.

Project Background: Viking Exercise

In the multinational Viking Exercise, we identified challenges with pre-training for participants. Often, exercise participants need to:

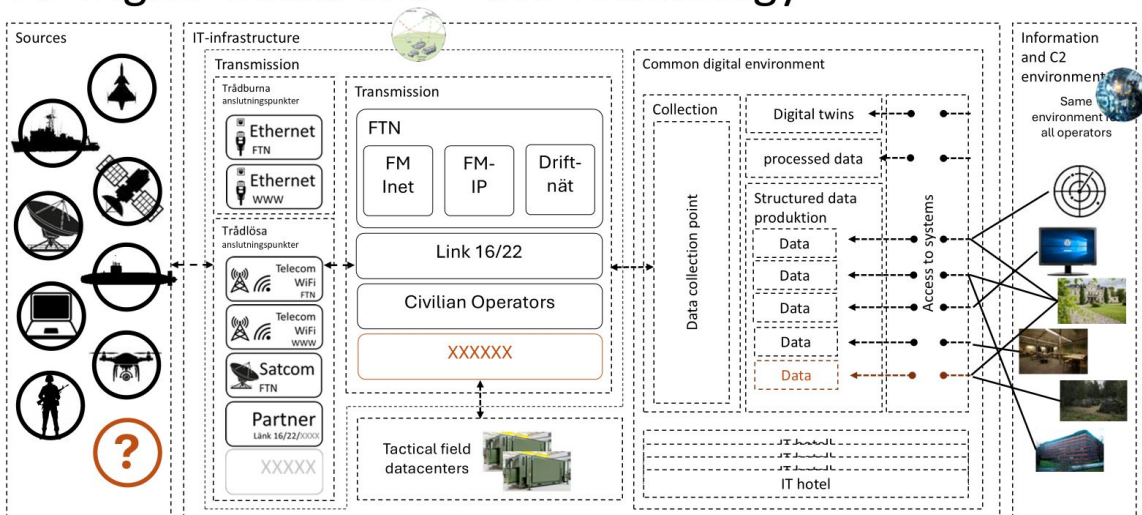
- Understand the scenario
- Get to know the different actors involved
- Learn to use unfamiliar equipment
- Form functional staffs from mixed personnel

We developed pre-training materials to help participants prepare better. This evolved into a multinational effort with NATO and partner nations contributing resources.

Simultaneously, we implemented the Total Learning Architecture (TLA) concept by establishing a learning record store to gather exercise data and created a dashboard solution to evaluate performance. This allowed us to compare the performance of those who used pre-training resources with those who didn't, confirming that pre-training improved performance.

We continued developing this concept through smaller exercises until the COVID crisis halted exercises. When Sweden discontinued the Viking Exercise, we needed to find a new environment for experimentation, which led to our current pilot project focused on guards training.

AF Digital Backbone – the Technology

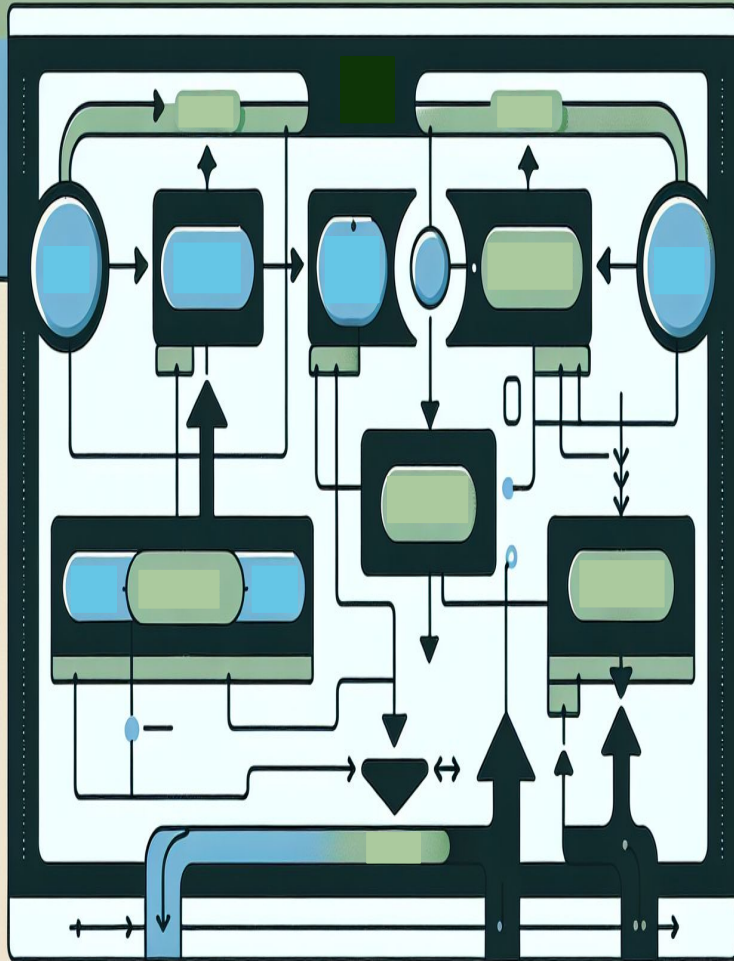


Swedish Armed Forces Digital Strategy

While not yet fully implemented, the Swedish Armed Forces strategy for digitalization aligns with our pilot project. The strategy calls for:

- Better sensors to transmit data securely
- Data storage solutions ("data hotels")
- Applications to analyze data
- Access control based on user roles
- A common system for both office and field use

This framework applies equally well to the learning ecosystem, where various learning data providers (LMS, simulators, VR/AR) need to securely transmit data to learning record stores for analysis and decision-making.



Pilot Project Goals

Our current pilot focuses on military security guard training, a competency needed across all branches of the armed forces. We chose this area because:

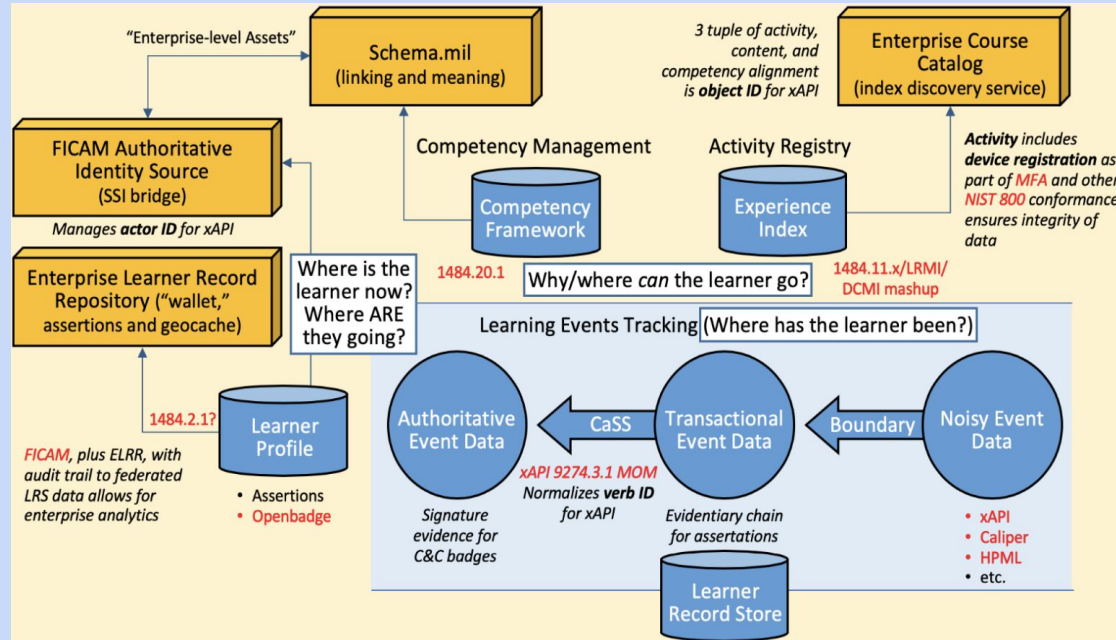
- It's required throughout the armed forces (Navy, Army, Air Force, Home Guard)
- Standards should be uniform regardless of branch
- It's governed by the same laws and regulations everywhere

Our specific goals include:

1. Creating a proof of concept for a digital learning ecosystem
2. Testing integration of diverse learning environments (Moodle e-learning, VR training)
3. Implementing data standards for learning analytics
4. Validating user experiences and needs from different stakeholders

Pilot Project Objectives

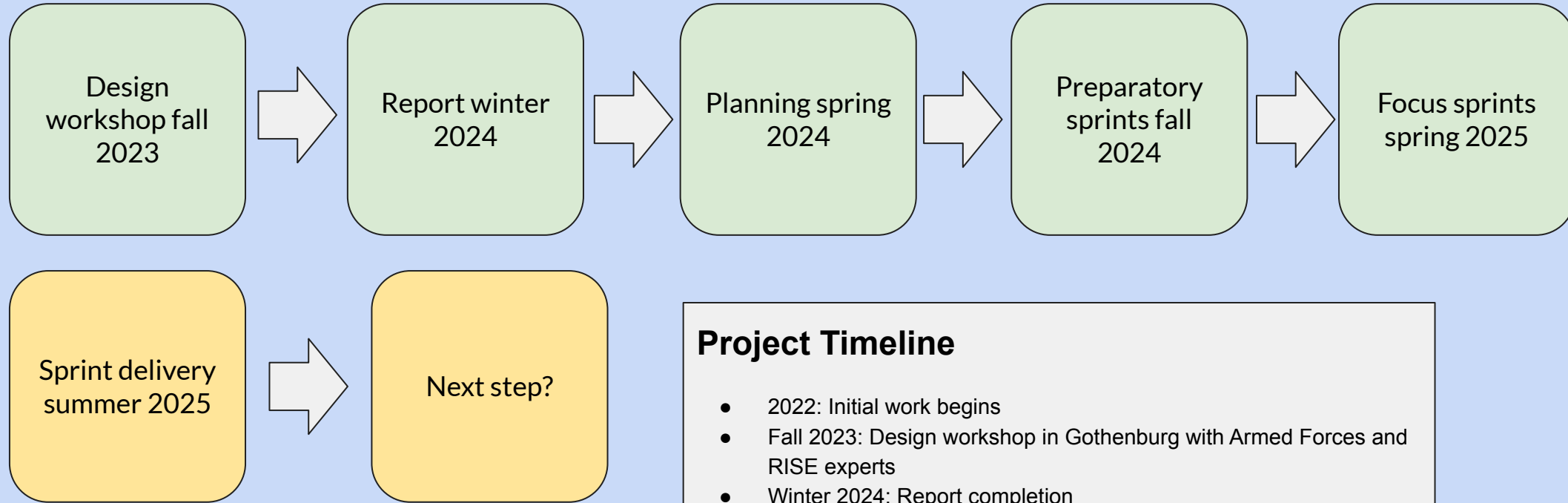
Total Learning Architecture Approach



Total Learning Architecture Approach

We've based our work on the Total Learning Architecture approach from the U.S. Department of Defense Distributed Learning Initiative, adapting it for the Swedish context. This framework provides a structured approach to building our pilot system.

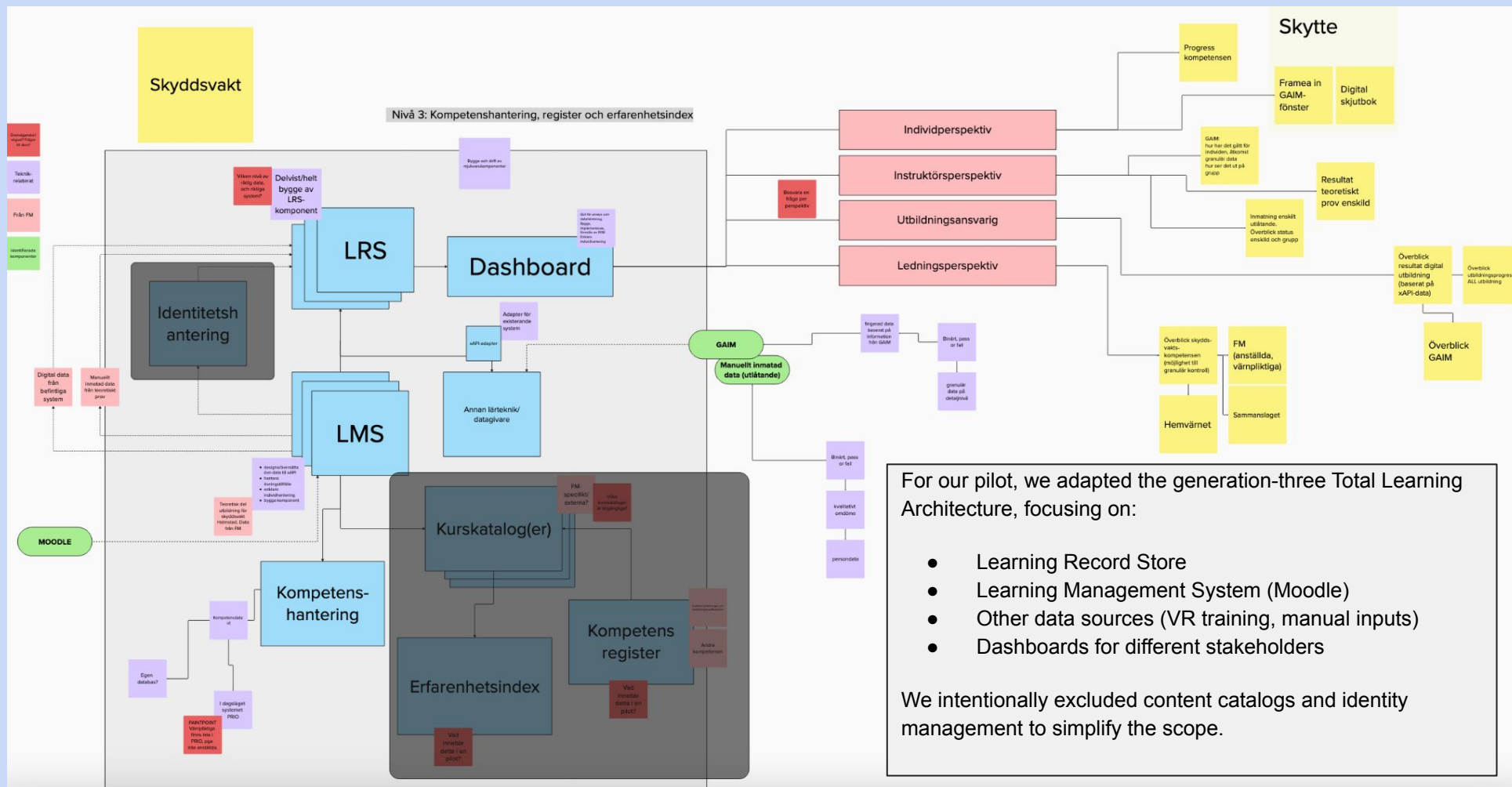
Project Journey



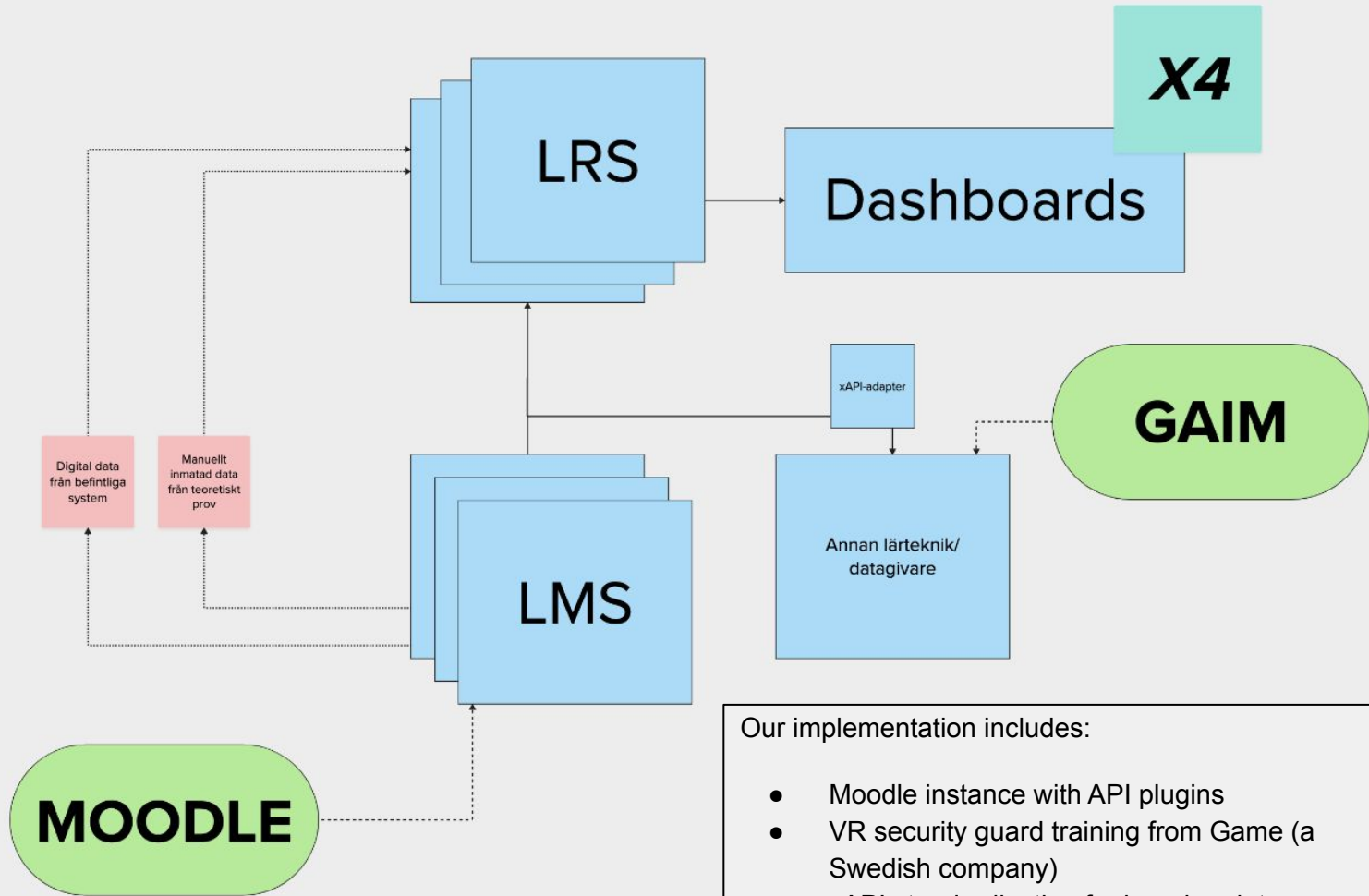
Project Timeline

- 2022: Initial work begins
- Fall 2023: Design workshop in Gothenburg with Armed Forces and RISE experts
- Winter 2024: Report completion
- Spring 2024: Planning phase
- Fall 2024: Iterative development sprints
- December 2024-present: Focus on specific subject matter
- June 2025 (planned): Environment delivery and final report

Technical Architecture



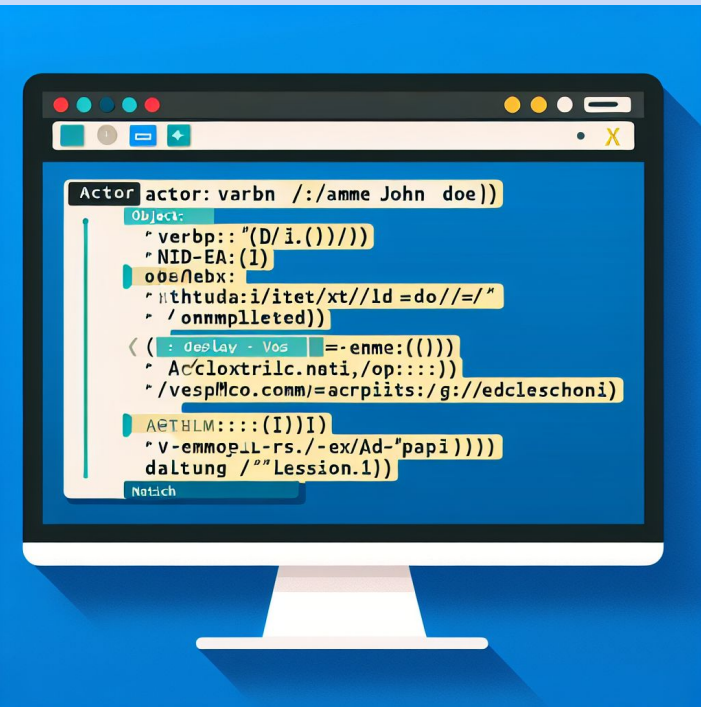
Military
security
guard



Our implementation includes:

- Moodle instance with API plugins
- VR security guard training from Game (a Swedish company)
- xAPI standardization for learning data
- Custom dashboards for different user types

xAPI: Standardizing Learning Data



Standardizing Learning Data

We focused on standardizing learning data using xAPI, looking at both Moodle examination data and VR training data. Key considerations included:

- Determining what data to collect (pass/fail vs. more granular metrics)
- Balancing data storage needs with analytical value
- Translating VR interactions (voice commands, warning shots, etc.) into xAPI statements

```
{
  "actor": {
    "name": "Security Guard",
    "objectType": "Agent"
  },
  "verb": {
    "id": "http://adlnet.gov/expapi/verbs/completed",
    "display": { "en-US": "completed" }
  },
  "object": {
    "id": "https://tla.ri.se/activities/security-exercise",
    "definition": {
      "name": { "en-US": "Security Exercise" },
      "description": {
        "en-US": "An exercise to measure distances during verbal warning, warning shot, and shooting for effect."
      }
    },
    "objectType": "Activity"
  },
  "result": {
    "success": false,
    "extensions": {
      "https://tla.ri.se/extensions/distance-verbal-warning-meters": 12,
      "https://tla.ri.se/extensions/distance-warning-shot-meters": 9,
      "https://tla.ri.se/extensions/distance-shooting-effect-meters": 8
    }
  },
  "timestamp": "2025-04-04T12:45:00Z"
}
```

GAIM: VR Security Training

VR Training Environment

Content:

- Overview of the security officer VR training module
- Translating this into xAPI-statements for our pilot
- Integration with learning record store
- Performance tracking and assessment



Overcoming Technical Hurdles



Technical Challenges

We faced several integration challenges, particularly related to security in the military context. To overcome these, we:

- Created a parallel pilot environment on our own servers
- Focused on building a blueprint rather than a production system
- Identified gaps in identity management (especially between employed personnel and conscripts)

Multiple Stakeholder Benefits - trainer

Skyddsvakt VR

Övningstillfälle 2025-02-10

Elevgrupp: Vårterminen 25 - grupp 1



Skyddsvakt teori

Övningstillfälle 2025-02-19

Elevgrupp: Vårterminen 25 - grupp 1



Skyddsvakt

Vårterminen 25 - grupp 1

Elever

NAMN	E-POST	STATUS
Karl Johansson	student_01@example.com	Skyddsvakt teori Skyddsvakt VR
Lisa Stenqvist	student_02@example.com	Skyddsvakt teori Skyddsvakt VR
Arne Berghammar	student_03@example.com	Skyddsvakt teori Skyddsvakt VR
Åsa Kvik	student_04@example.com	Skyddsvakt teori Skyddsvakt VR
Staffan Larsson	student_05@example.com	Skyddsvakt teori Skyddsvakt VR

Övningstillfällen

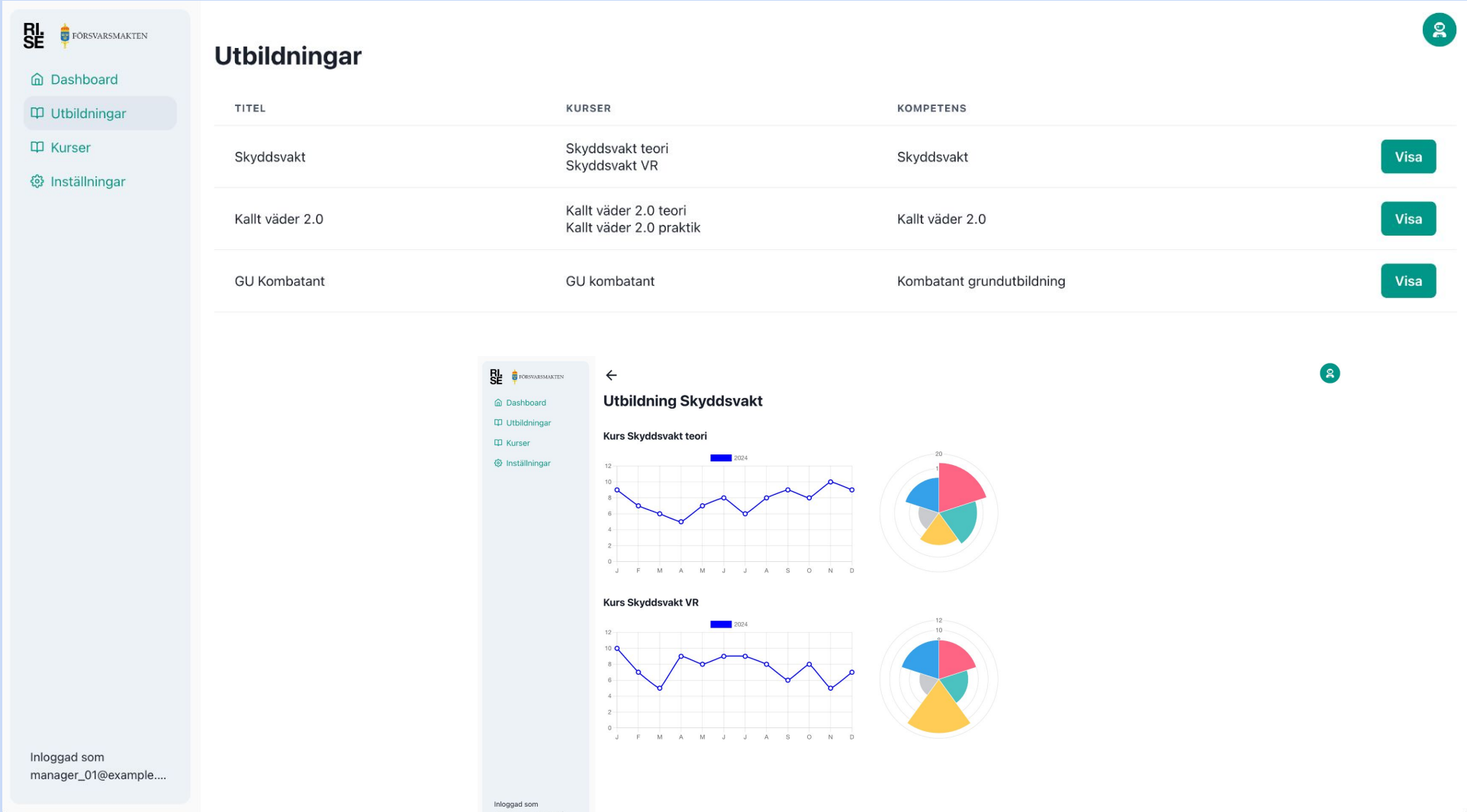
KURS	DATUM	GODKÄNDA (%)	Visa
Skyddsvakt VR	2025-02-10	87	Visa
Skyddsvakt teori	2025-02-19	83	Visa

Dashboard Solutions

We developed four dashboard views for different stakeholders:

- Trainers:** Showing class progress, test completion, and VR training status
- Education Owners:** Displaying aggregated data and detailed question analysis
- Management:** Tracking total qualified personnel by region and forecasting future needs
- Individual Learners:** Showing progress toward qualification and suggesting future development paths

Multiple Stakeholder Benefits - owner



Multiple Stakeholder Benefits - management



Skyddsvakt

Nuläge

NIVÅ	ANTAL FM ANSTÄLLDA	ANTAL FM VÄRNPLIKTIGA	ANTAL HV	TOTALT
I landet	100	230	56	386
Försvarsområde Norr	40	66	32	138
Regemente I12	10	22	10	42

Prognos 1 år

NIVÅ	ANTAL FM ANSTÄLLDA	ANTAL FM VÄRNPLIKTIGA	ANTAL HV	TOTALT
I landet	110	255	75	440 (+14%)
Försvarsområde Norr	45	80	48	173 (+25%)
Regemente I12	12	25	15	52 (+24%)

Multiple Stakeholder Benefits - the soldier



Karl Johansson

Persondata: ...

Kompetenser

KALLT VÄDER 2.0

Fysisk förmåga



Pågående utbildningar

Skyddsvakt

Skyddsvakt teori

Skyddsvakt VR

SKYDDSVAKT



Genomförda utbildningar 2025

Kallt väder 2.0

KALLT VÄDER 2.0

Kommande utbildningar

Körprov

Du måste uppdatera ...

ABC 1.0

En grundkurs i...

What We've Learned

Lean on forward
thinking personnel

A lot of possibilities
within current
platforms

Leadership support

Lessons Learned

- There are prerequisites that must be addressed (though we scoped them out)
- Existing platforms and legacy systems contain valuable data that can be integrated
- Many findings from this pilot can be immediately applied (e.g., digital examinations)
- Progress may be slow but steady ("the tortoise wins the race")
- Enthusiastic personnel should be engaged as part of the solution

The tortoise wins the
race

Finding use outside
the pilot

Moving Forward

- Further work with GAIM and VR-training
- Develop Moodle-courses to further the work with xAPI-statements
- Identifying "quick wins" that can be implemented immediately
- Exploring integration with existing platforms



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