

# COE TTHP Third Annual Technical Meeting

## Best Practices and Methods for Virtual Training Delivery

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**Center of Excellence for  
Technical Training &  
Human Performance**

**EMBRY-RIDDLE**  
Aeronautical University™  
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# Project Overview: Best Practices and Methods for Virtual Training Delivery

Why are we doing this?

The Federal Aviation Administration (FAA) faces great challenges training millennial controllers to **effectively** and **efficiently** meet the requirements of the challenging job

FAA training delivery methods such as instructor led-courses, and PowerPoint with no accompanying assessment, have not kept pace with advances in **simulation** and **gaming** technologies

**Millennials** have expertise in media, tools, and technology than the Boomers. The FAA must change its traditional means of training since the new hires grew up in a digital world and prefer digital technologies to the more static teaching methods used to train their predecessors

# Project Overview: Best Practices and Methods for Virtual Training Delivery

How will we accomplish it?

- Study **training courses** offered by the FAA academy, AT-CTI schools, and other training areas (healthcare, military, STEM)
- Conduct **surveys** and face-to-face **interviews** and studied end-of-course evaluation **reports** to understand ATC students' training experience and expectation
- Collaborate with **industry partners** to research potential training curriculum and delivery improvements and identify potential impacts

# Project Overview: Best Practices and Methods for Virtual Training Delivery

What do we  
hope to  
accomplish?

- **Best** practices and methods will be identified and presented to the FAA
- Research **findings** from training courses offered by the FAA Academy, and AT-CTI schools and in-field facilities will be presented
- Develop **recommendations** for changes to the FAA training process
- Identify potential **impacts** on training for both current and future training delivery systems
- **Communicate** with FAA administrators and **collaborate** with course developers to improve training course delivery

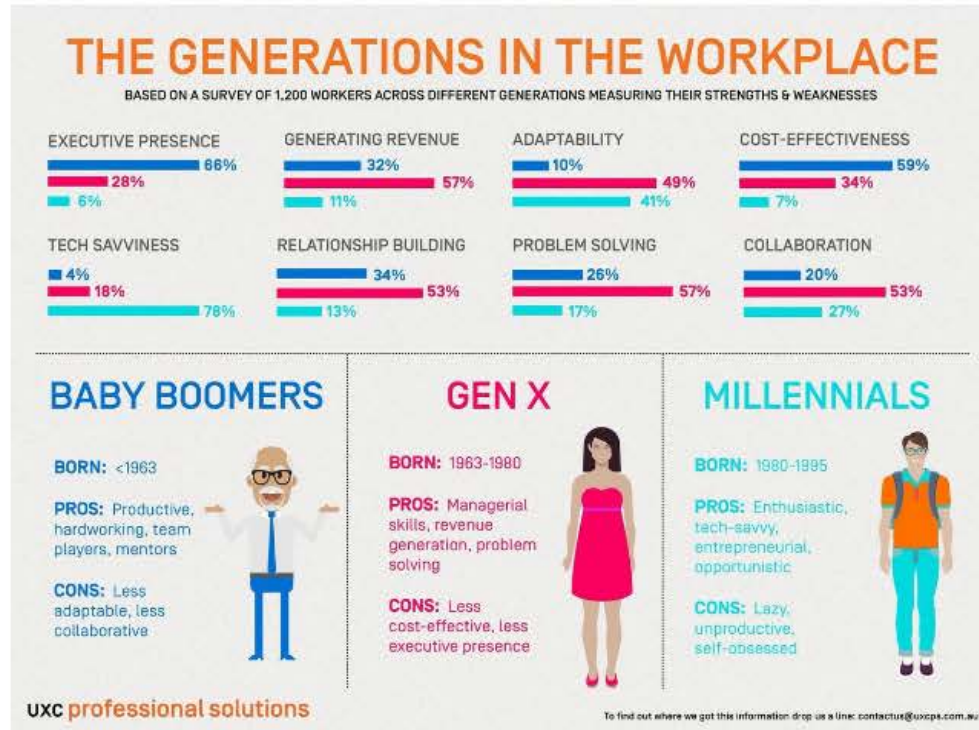
# FAA Quarterly Meeting Gamification Challenge

Get ready to compete!

- You are given 20 seconds to answer the question.
- The quicker response you give, the more points you earn each time.
- Look for your name and points on the leaderboard after running each question

**Who are you? Boomer, GenX, GenY or GenZ?**

# Who are you? Boomer, GenX, GenY or GenZ?



Baby Boomers: Baby boomers were born between 1944 and 1964.

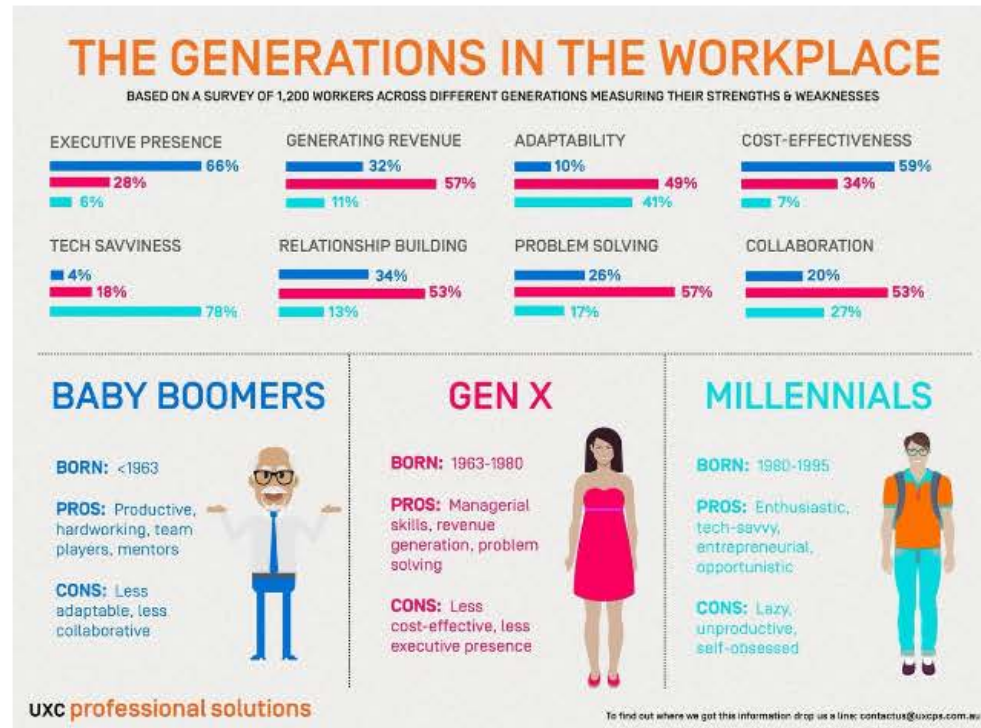
Gen X: Gen X was born between 1965 - 1979

Gen Y: Gen Y, or Millennials, were born between 1980 and 1994

Gen Z: Gen Z is the newest generation to be named and were born between 1995 and and 2015



# Who are you? Boomer, GenX, GenY or GenZ?



Baby Boomers: Baby boomers were born between 1944 and 1964.

45%

Gen X: Gen X was born between 1965 - 1979

34%

Gen Y: Gen Y, or Millennials, were born between 1980 and 1994

10%

Gen Z: Gen Z is the newest generation to be named and were born between 1995 and 2015

10%

0% 10% 20% 30% 40%



# Leaderboard

1	M	Mr. Anonymous	3850
2	W	Woody	3625
3	E	Emma	3500
4	M	Mary Riley	3425
5	D	Dss	3400
6	B	Brian D	3350
7	H	Haley dennis	3325
8	A	Art	3100
9	B	Bass Man	3075
10	J	Jenny571	2975

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First Annual Report

# What is the virtual training?

# What is the virtual training?



Computer-based training

Web-based training

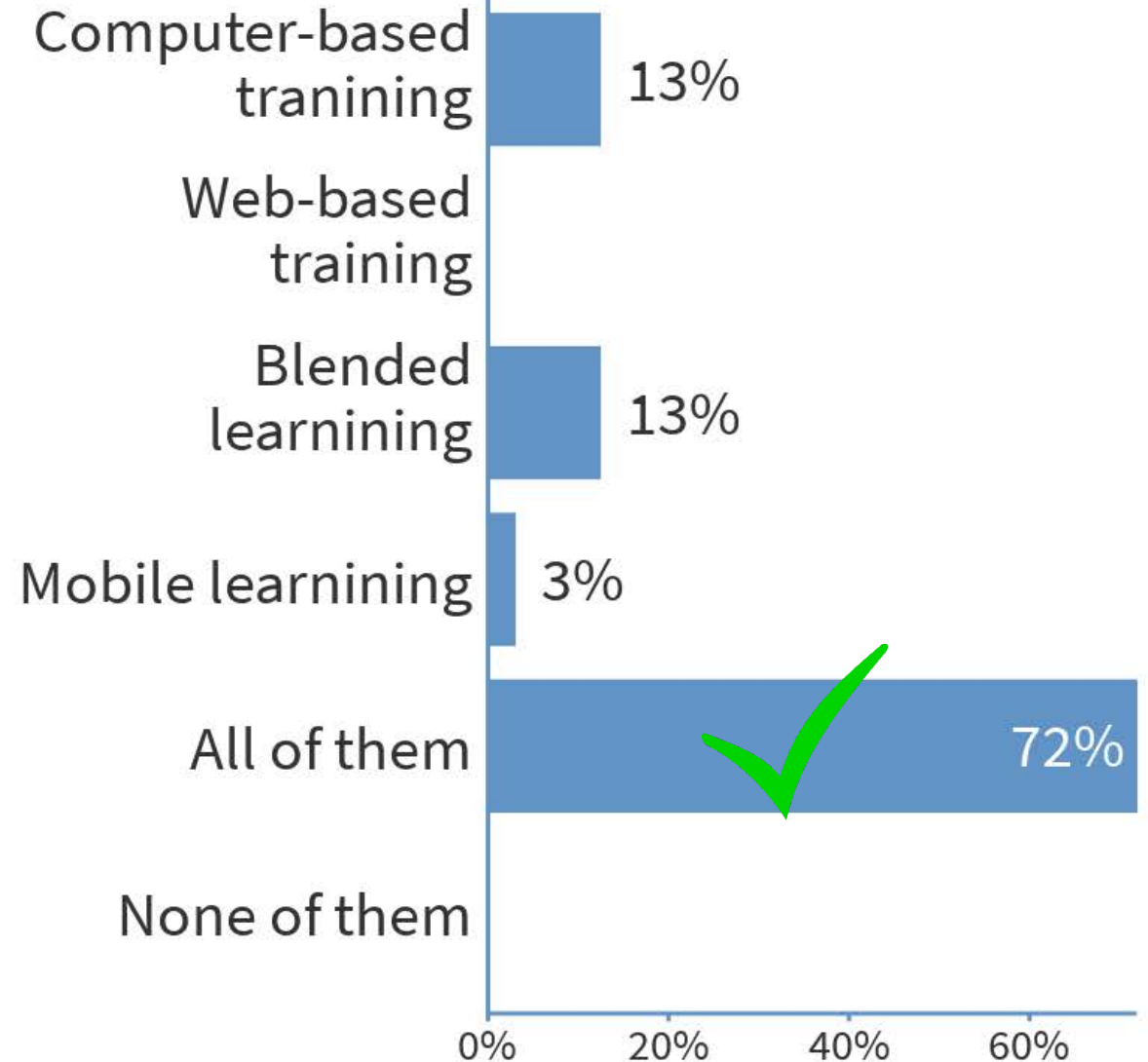
Blended learning

Mobile learning

All of them

None of them

# What is the virtual training?



# Leaderboard

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First Annual Report

**What is the average attention span of Millennial?**

# What is the average attention span of Millennial?



10 minutes

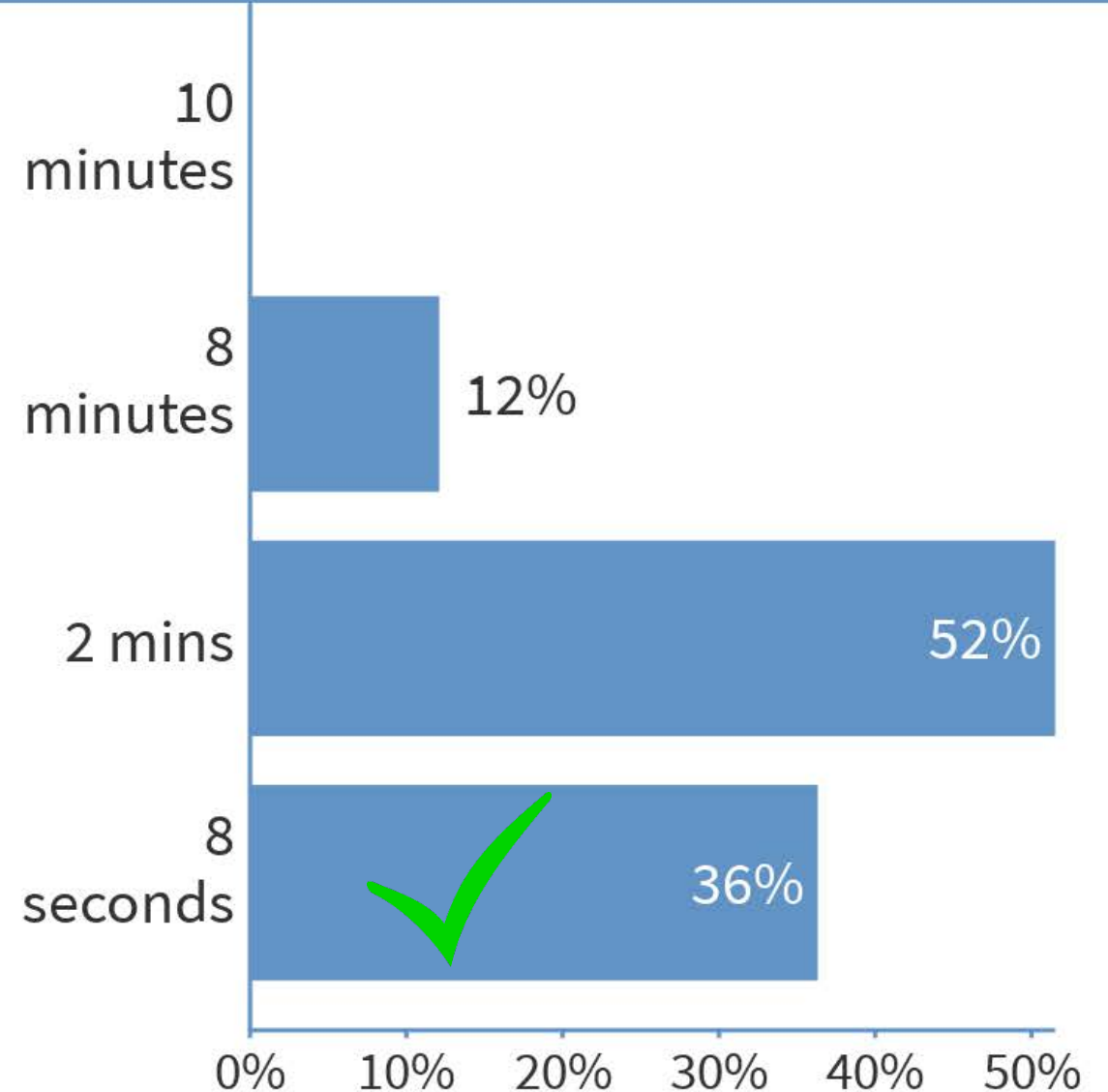
8 minutes

2 mins

8 seconds



# What is the average attention span of Millennial?



# Leaderboard

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First Annual Report

**After two-week study, which activity helps you learn most?**

## After two-week study, which activity helps you learn most?

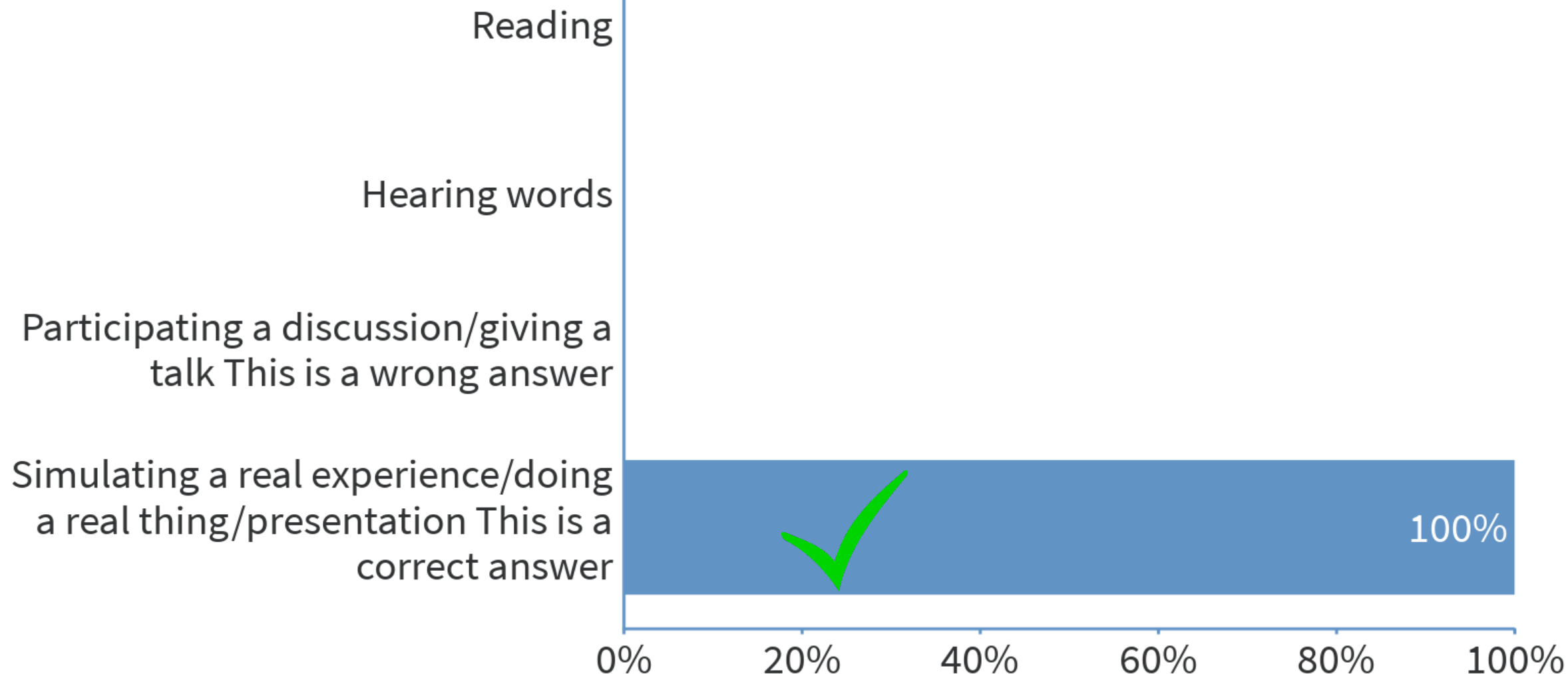
Reading

Hearing words

Participating a discussion/giving a talk This is a wrong answer

Simulating a real experience/doing a real thing/presentation This is a correct answer

## After two-week study, which activity helps you learn most?



# Leaderboard

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First Annual Report

**Which one is not true about the gamification?**



## Which one is not true about the gamification?

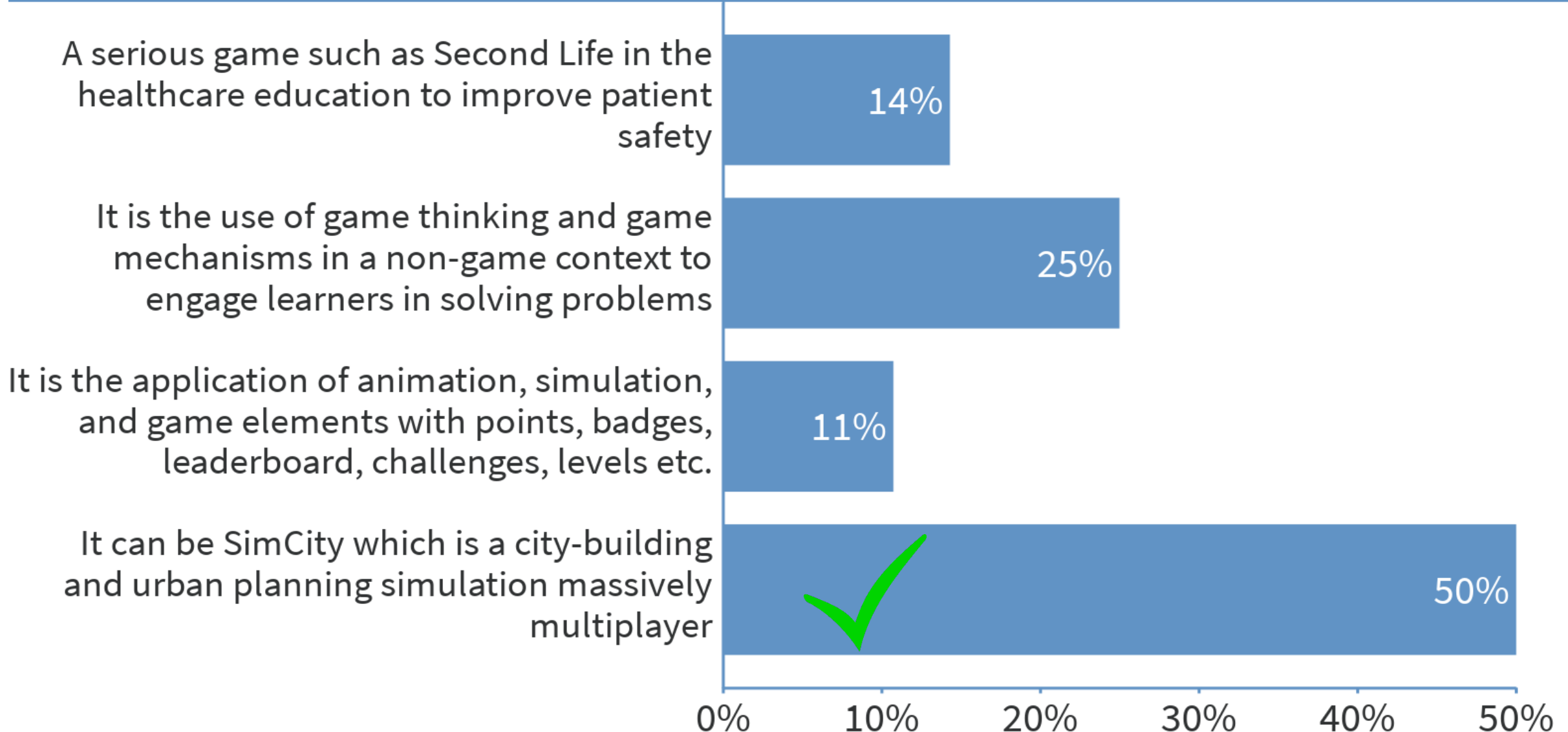
A serious game such as Second Life in the healthcare education to improve patient safety

It is the use of game thinking and game mechanisms in a non-game context to engage learners in solving problems

It is the application of animation, simulation, and game elements with points, badges, leaderboard, challenges, levels etc.

It can be SimCity which is a city-building and urban planning simulation massively multiplayer

## Which one is not true about the gamification?



# Leaderboard

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First Annual Report

# Importance of virtual training delivery

The Chinese philosopher Confucius said, "I hear that I forget. I see and I remember. I do and I understand".

After 2 weeks,

we tend to remember ...



Virtual training delivery

# Research Design

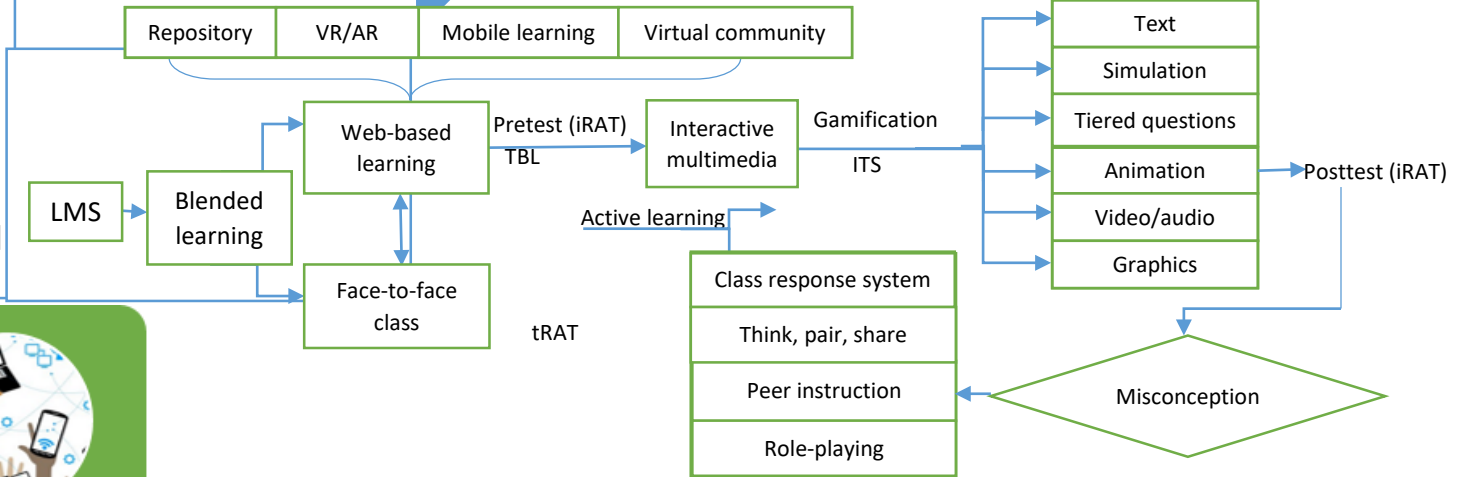
## Literature and background study

- End-of-course evaluation **reports** (Academy, ATI-CTI)
- Best** practices and methods of virtual training (healthcare, military, STEM, MOOC)
- Conference** and **academia** visits (I/ITSEC, ATAC, UCF IST, Drexel immersive research lab)

## Interview and survey

- Face-to-face **interviews** (Academy, facilities, ERAU)
- Online **survey** (Academy, AT-CTI)
- AJI **presentations** (course developers, managers and contractors)

## Recommendation



### Computer-based learning

The use of computers as a key component of the educational environment, which could be offline



### Web-based learning

Online learning that is delivered asynchronously or synchronously



### Blended learning

A combination of the traditional face-to-face instruction and online learning



### Mobile learning

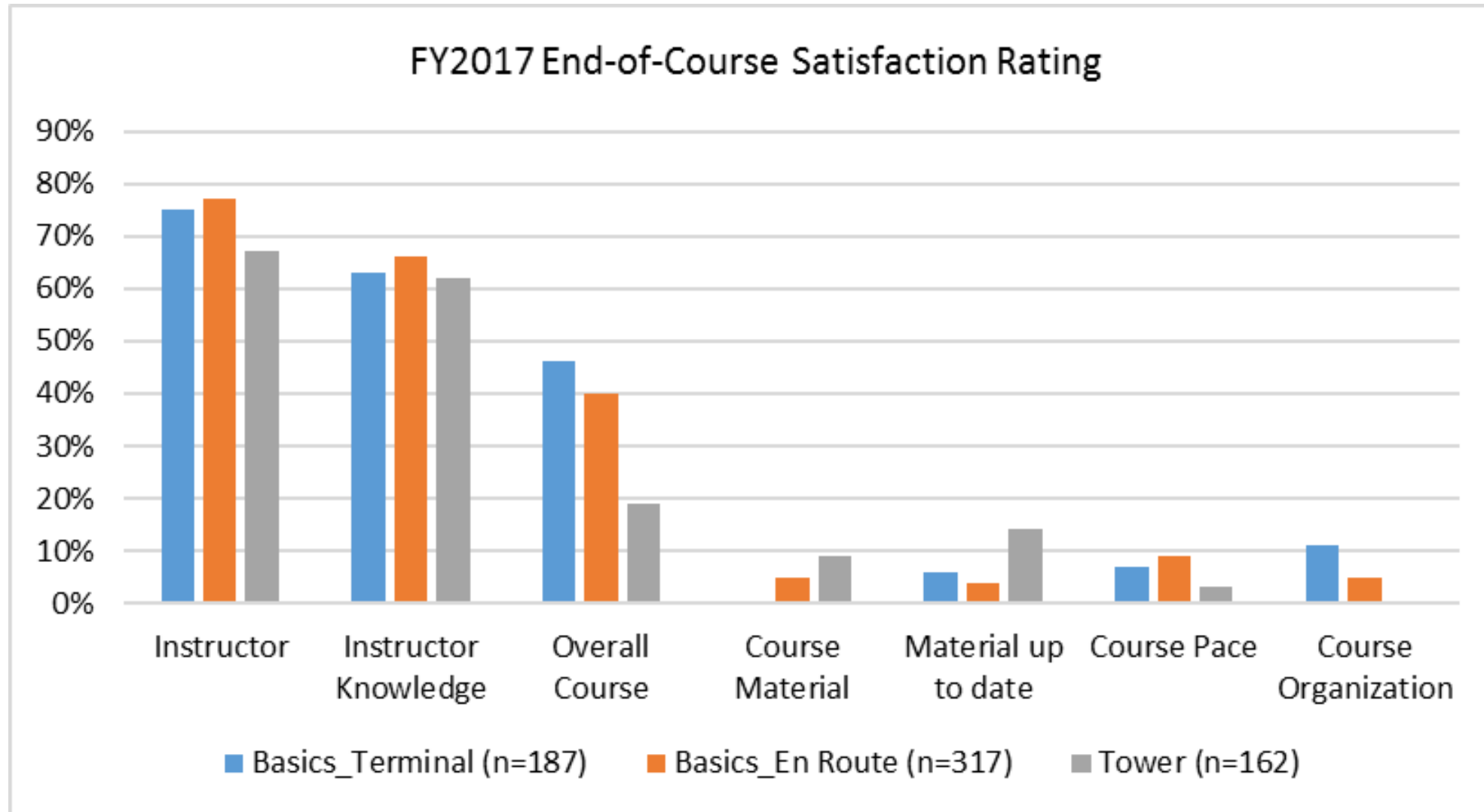
Delivers the learning through mobile devices such as laptops, smartphones or tablets

Virtual Training Delivery

# Preliminary Findings: The FAA Academy classroom observations and course report summary

- Traditional classrooms without learning management system (**LMS**)
- Video quality is **outdated**
- No **pre-tests** and **post-tests** to understand their knowledge level
- Lack of **simulation** practice time after class
- Some lesson **pace** was not appropriate
- No interactive **animation/simulation/gaming** involved in the student study

# Preliminary Findings: The FAA Academy classroom observations and course report summary

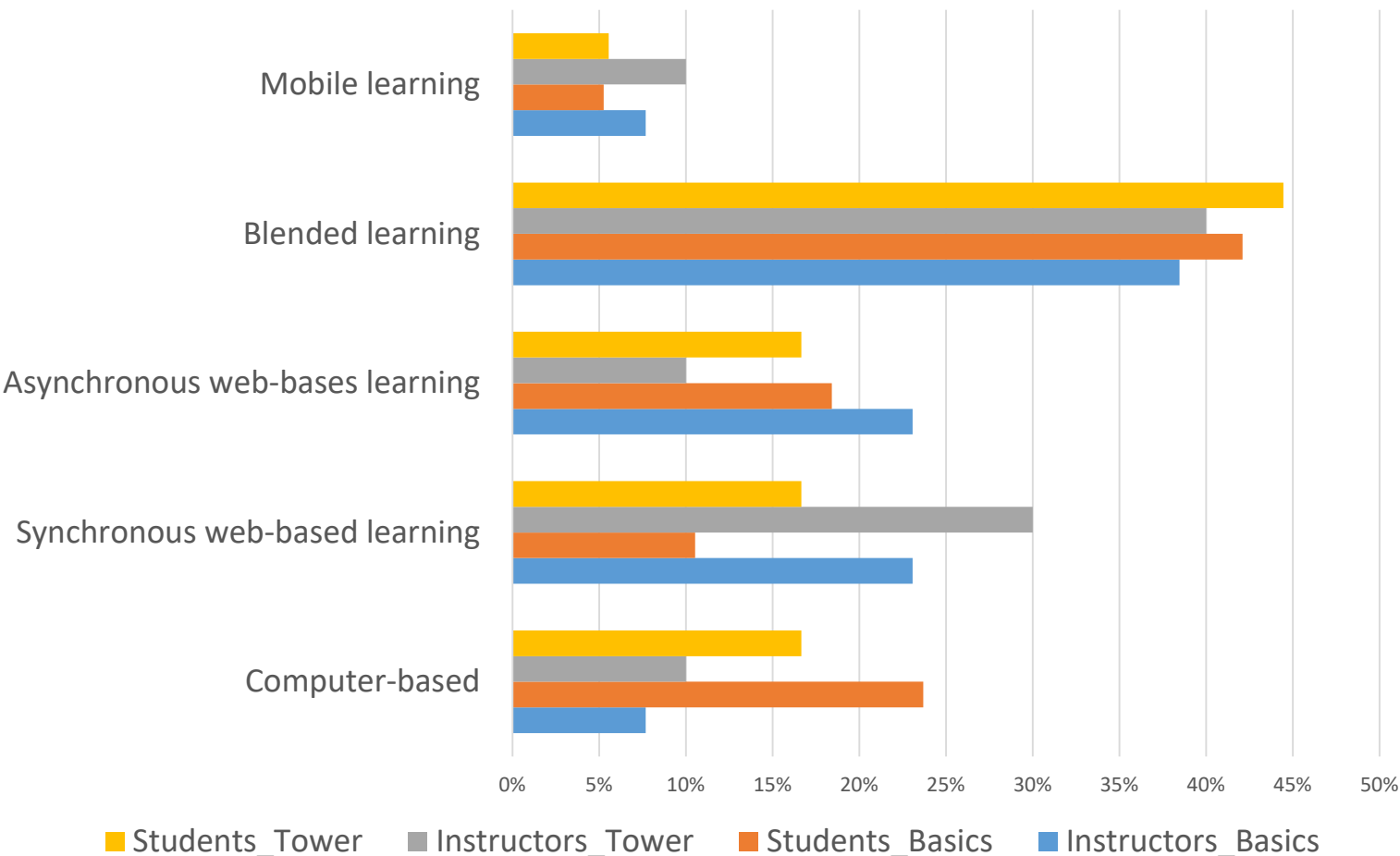




# Preliminary Findings: online survey and face-to-face interviews

Online survey participants		
Location	Type	Participants
FAA Academy	Instructors	12
	Students	6
AT-CTI Schools	Faculty	15
	Students	24

If the course is switched to a virtual format, which modality would you be interested in using?



# Preliminary Findings: online survey and face-to-face interviews

- More **time** in the simulation labs
- Current videos are **outdated**
- **Pre-tests** and **post-tests** are needed
- Good instructor's style should be shared **virtually**
- More **teamwork** in class
- **Millennials** can teach themselves virtually
- **Blended learning** is preferred
- ❖ Do not take the **instructor** away completely, but just add additional effective resources
- ❖ Start with something like a learning management system (**LMS**)
- ❖ Sharing senior controllers' experiences in a **virtual** format is desirable
- ❖ **Team** building activities are important for controller success
- ❖ Additional **resources** should be available to passionate students
- ❖ Stories such as the US Airways Hudson River landing need to be compiled and shared **virtually** with all, not in a single one or two classes
- ❖ **Interactive** training materials should be accessible to the students
- ❖ Interactive and scenario driven **videos/animations** are needed

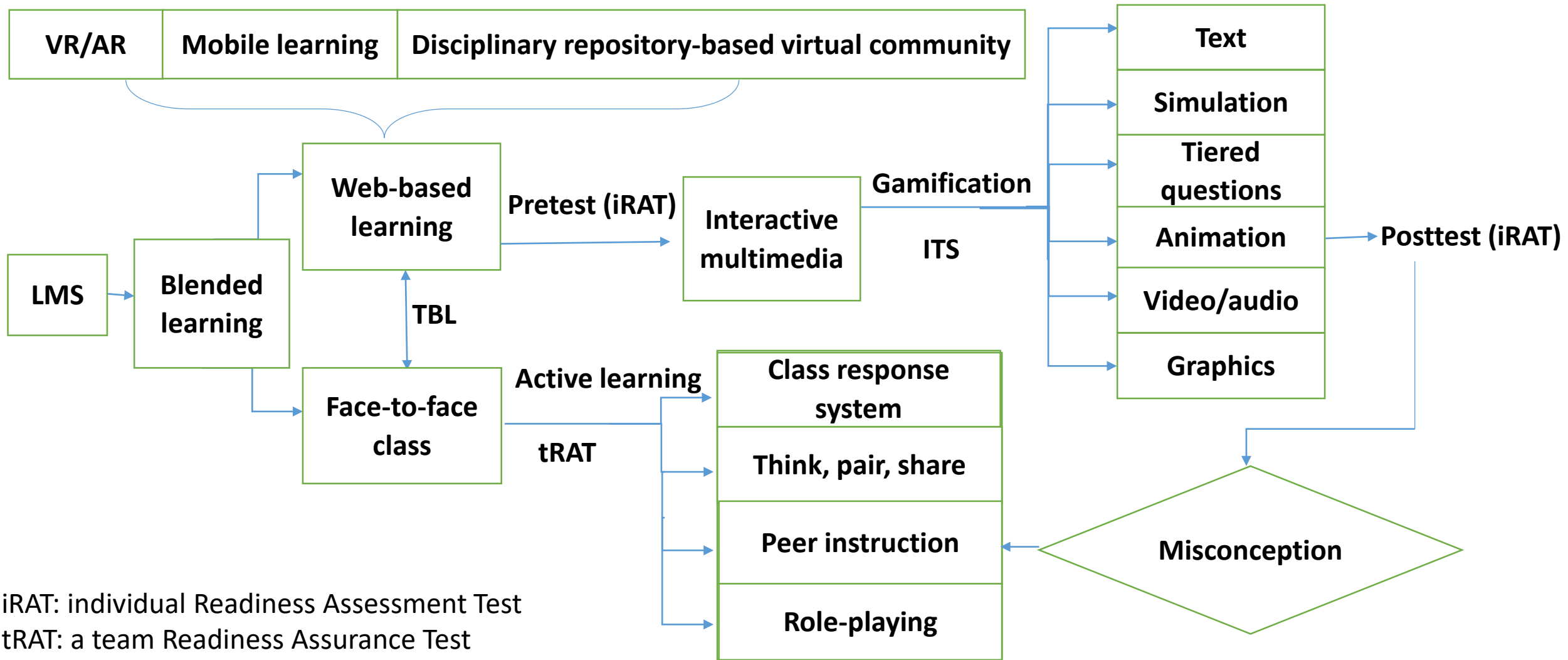
Results from the Academy and AT-CTI school

Results from  
the Facilities

# Preliminary Recommendations

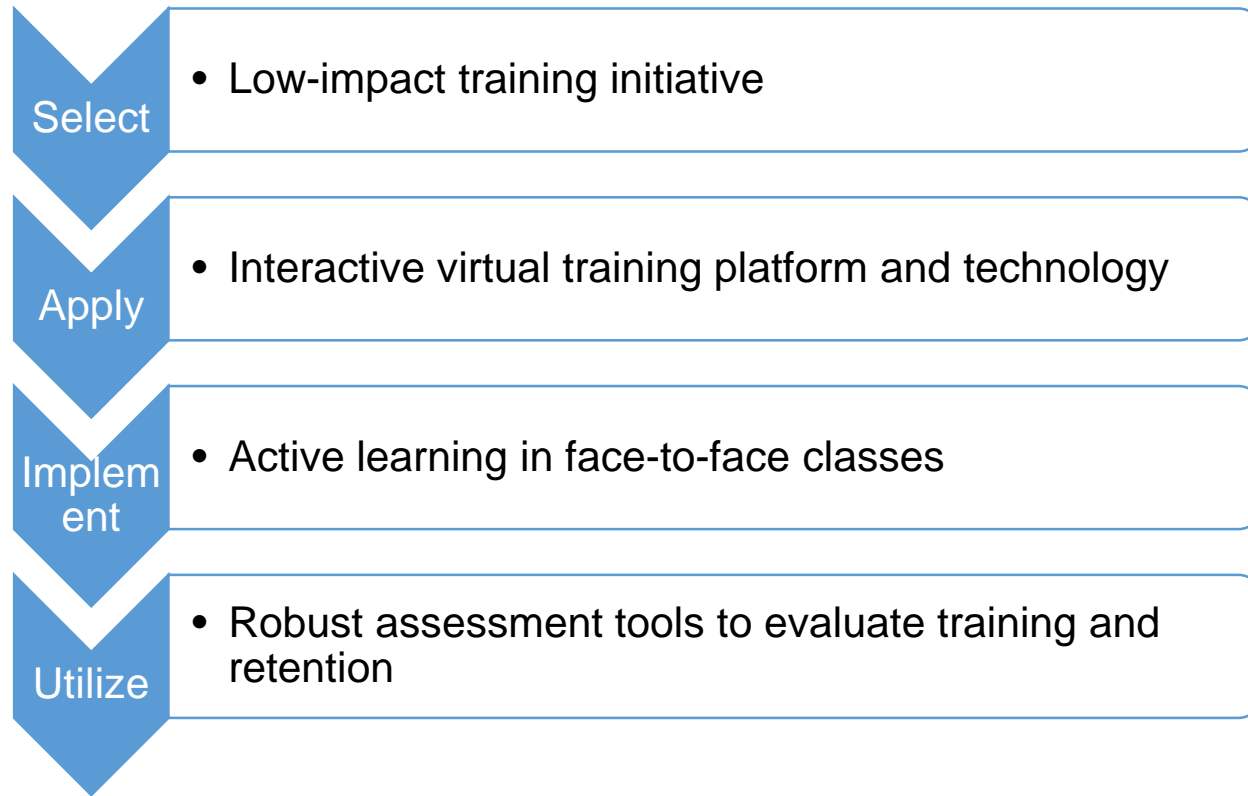
1. Learning management system (**LMS**)
2. **Blended learning**
3. **Team-based learning (TBL)** is preferred, which can be implemented online and in the face-to-face classroom empathize the importance of teamwork and coordination skills required in ATC tasks
4. **Pretest** (individual Readiness Assessment Test:**iRAT**) and **posttest (iRAT)** should be implemented as a formative assessment online
5. **Animation/simulation/gamification** should be included in the interactive multimedia instruction
6. Implement a team Readiness Assurance Test (tRAT) and emphasize **active learning** such as teamwork and discussion in class time with the facilitation of the instructor
7. **Virtual reality** and **augmented reality** can be incorporated into virtual learning to improve student engagement and retention
8. An **Intelligent Tutoring System (ITS)**, which empathize the personalized learning should be applied so that based on the test performance students can have the options to either repeat or move on to the next topic of study
9. A disciplinary **repository**-based virtual **community** should be developed so that case studies and good experiences can be shared online
10. **Mobile learning** can be a supplemental portable study tool to enable more personalized training

# Preliminary Recommendations



# Anticipated Project End State

- Implement Air Traffic Control in A Blended Learning Environment Curriculum Design Pilot program:



# Value and Impact to the FAA

1. It will have a positive impact on the FAA's **hiring, certification** and **retention** outcomes
2. It will benefit students, instructors, and administrators at the **Academy**, and **AT-CTI** schools
3. It will ensure controllers, and managers at **facilities** have access to the best training options available
4. it will attract **more** qualified people to investigate and ultimately pursue a career in the ATC field

# Thank you!

