**Aten**

# RESEARCH ON SIMULATION EFFICACY

WE Remember

ONLY

10% of what we READ !

**90**% if we DO IT OURSELVES

even as a SIMULATION !!

Federation of American Scientists/ESA/NSF Summit on Educational Games 2005

## Research on/ Collaborative Learning/ Training efficacy

1. **Game-Based Training for Airline Pilots -National Aerospace Laboratory** NLR - NLR-TP-2015-480 - August 2016https://reports.nlr.nl//xmlui/bitstream/handle/10921/1089/TP-2015-480.pdf?sequence=1 *

Chittaro [37] investigated how a serious game could be used to improve aircraft passengers' attitude and behaviour with respect to personal safety in aircraft evacuations. He found that just playing the serious game for a few minutes resulted in a significant increase in the user's knowledge and self-efficacy.

## 1.1. Summary of Conclusions :

1.2. As the increasing automation will rely more and more on 21st century skills, zero fidelity games have the potential to play a considerable part in future airline pilot training.

➢ *Annetta (2007).*

1.3. For airline pilots, such zero fidelity games may be useful

1.3.1. in qualification training as well as

1.3.2. continuation training,

➢ *Evans (2008).*

1.3.3. focusing on skills such as SA, team coordination,

1.3.4. and workload management,

1.3.5. or on knowledge such as Shared Mental Models.

➢ *Dede (2004).*

1.3.6. The game mechanics and features need to be consistent with relevant aspects of the real task, and situations, but in an abstract way. When this is carefully done, transfer to the real environment is feasible [59][1].

environment

1.3.6.1. An example of this is using a game of a power-plant simulation to train and exercise the "Problem Solving & Decision Making" and "Workload Management" competencies.

1.3.6.2. An experiment in the EU Man4Gen project demonstrated how the competencies in this desktop game could be trained and affected the performance of the crews in a similar way to that in a full-flight simulator scenario [62].

**"Training benefits of game-based learning have been acknowledged in relation to widely accepted instructional concepts, such as situated learning [4], increased intrinsic motivation [5], experiential learning [6] and deep learning [7].**

*E.C. KUINDERSMA, J.N. FIELD AND J. VAN DER PAL*

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[1] *References from these linked documents are given at bottom of document*

1.3.6.3.Carefully designed desktop-based abstract games can be used to train general competencies that are required for airline pilots, and thereby free up valuable full-flight simulator time for the training of competencies within the flight context, or those that are flight-specific.

1.3.6.4.While game-based learning provides high potential for aviator skills that may be difficult or expensive to train in simulators, many of its principles and effects have not yet reached full maturity and validity. Also, rough notions of training media selection – which training tool to use for which objective using which instructional strategy – are available, but may need considerable refinement to ensure training will be optimally effective and efficient. The same applies for insight on how to blend media and sequence training events over time.

1.3.6.5.As a final remark, we would like to stress that, while academic studies are important to increase the body of knowledge on these topics, professional experiences are equally vital.

1.3.6.6.Careful explorations of game-based learning by training providers can further guide the limited amount of academic studies.

1.3.6.7.Collaboration between training providers and the research communities may speed up progress and is warmly recommended.

1.4. Millennials have specific preferences for learning, work and communication (Table 3).

1.4.1.This implies that other, more appropriate and modern training methods should be considered in order to utilize the full potential of Millennials.

1.4.2.Ultimately this means that traditional training programs may need to be adapted in order to fit the preference of this new generation.

1.4.3.Several scholars agree that game-based learning is a highly suitable training method for imparting 21st century skills to the gamer generation [49, 53], also known as the Millennials or Digital Generation. It provides a match to many of their learning

1.4.4.In a training context simulation and games both offer

1.4.4.1.a safe environment in which a learner is allowed to make mistakes and to retry.

1.4.4.2.They both allow training under conditions that are impossible in real life and they are both cheaper and safer than real life training.

1.4.4.3.Also, both games and simulations use (electronic) technology, can be exciting, entertaining and challenging

1.4.4.4. and provide interaction in an experiential setting.

1.4.4.5. With these traits they both match the learning and working preferences of the Millennials audience.preferences.

1.5. Research shows that

1.5.1. not only young participants with gaming experience appreciate and enjoy game-based learning,

1.5.2. but also older participants and those without gaming experience or who are initially resistant, enjoy playing games [38, 55].

1.5.3. Serious games are also being used for rehabilitation [56] and improvement of cognitive health of the elderly [57].

2. **Skyboard, a Serious Game for Airport- Collaborative Decision Making (A-CDM) Training** - Anneloes MAIJ , Arco JANSEN - http://www.nlr.nl/downloads/skyboard---a-serious-game-for-airport-collabor.pdf

2.1. In each of the testing sessions the game demonstrated that

2.1.1. the trainees enjoyed playing it and

2.1.2. that the high level learning goals were met.

3. **Government Business Council (GBC)** launched an in-depth research campaign in the Fall of 2014. GBC found that **by integrating more virtual simulation into the services' training regimens, the military can reduce costs while better preparing for new challenges**

3.1. The **Air Force** also **considers virtual training to be the cornerstone of its next generation training programs.** It is expected to increasingly rely on virtual training as it fields new, more technologically advanced aircraft. Beginning in FY 2012, Air Combatant Command set a **goal of meeting (on average) 25 percent of training requirements with virtual training.**

3.2. The Air Force estimated it could save about $1.7 billion in its training program by reducing live flying hours and taking other steps, such as increasing the use of virtual training . ( http://www.gao.gov/products/GAO-12-727 )

Further links/details on research in this area can be found below.

In addition please read Aten Inc's white paper on " Filling the Gaps in Current Simulation based Learning using AI, Analytics & Big Data - The ATEN APPROACH "

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