

## Serious Escape Rooms: Downunder II

**Abstract** — Preparing for military operations requires education, training, and rehearsals. Here we present the concept of Serious Escape Rooms. This training concept integrates Game Based Learning with Escape Room solutions. The learning goal regarding serious games is designed to be ‘outside’ the game. Although most Escape Rooms have the purpose to entertain people focusing on an ‘inside’ game experience; it goes without saying that communication and collaboration is key regarding a successful ‘escape’. Our Serious Escape Room Training Solution is focusing on training Non-TEchnical-MILitary-Skills (NOTEMILS) and as a proof-of-principle applied to underground military operations.

### 1 Introduction and background

Preparing for military operations requires education, training, and rehearsals. Soldiers need to master skills associated with new equipment, adapt current procedures, and become confident with conducting operations in new environments, both as individuals and as members of teams. Here we present the concept of Serious Escape Rooms related to Underground Warfare. Training objectives in underground warfare should focus on the development of problem solving capabilities [1]. Our training concept integrates Game Based Learning & Game Analytics with Escape Room systems. Inherent in serious games is that the learning goal lies ‘outside’ the in-game experience; game analytics focuses on analyzing game log data, for example, to derive strategies and tactics based on in-game actions. Although most Escape Rooms have the purpose to entertain people with puzzles; it goes without saying that communication and collaboration is key regarding a successful ‘escape’. Our Serious Escape Room Training Solution is focusing on training Non-TEchnical-MILitary-Skills (NOTEMILS) for military operations (see Table 1 from [2]), such as leadership, cooperation, situational awareness, decision making.

Table 1: Non-TEchnical-MILitary-Skills

Categories	NOTECH elements (*)	NOTEMILS elements	(A)
<b>Managerial</b>	Using authority / assertiveness	Using authority / assertiveness	
<b>Skills and leadership</b>	Planning and coordination	Planning of tasks	
	Managing workload	Managing workload	
	Providing and maintaining standards	Providing and maintaining standards	
<b>Team cooperation</b>	Team climate and personal relations	Team climate and personal relations	
	Considering others	Communicating / exchanging information	

	Conflict solving	Conflict solving	
	Supporting others	Establishing shared understanding	
		Co-ordinating team activities	
<b>Situation assessment</b>	NA	Thinking ahead (projecting)	
	Gathering information about the system	Awareness about system and environment changes	
	Gathering info. about environment		
	NA	Vigilance / preparation / planning	
	Time awareness	Time awareness	
<b>Decision making</b>	Definition of problem and diagnosis	Interpreting info. to define problem	
	Generating options	Generating options	
	Selecting options and risk assessment	Selecting options	
		Risk assessment	
	Critiquing and reviewing decisions	Critiquing and reviewing decisions	

\* adapted from O'Connor et al (2002) see ref in [2].

### 2 Technical Approach and methods

Escape Room Designer<sup>a</sup> (a Dutch company) provides a mobile escape room solution for military recruitment activities that can be deployed on site (Figure 1. Taken with permission from [3])

This company - active for about 25 years in the entertainment business - argues that communication and collaboration skills are the required competencies to solve a series of puzzles and games. Escape rooms

<sup>a</sup> <https://escaperoomdesigner.nl>

increase in popularity and can be found basically everywhere bringing great fun for various team building activities.



*Figure 1: Mobile Escape Room*

An important trend is that educational- and training providers seemingly integrate with escape room solutions. Becoming aware and receiving feedback on communication and collaboration skills, also known as 21st century leadership skills using escape rooms as simulations of real world scenarios. The challenge for the trainer is to facilitate and transfer the in-game experience to real world phenomena.

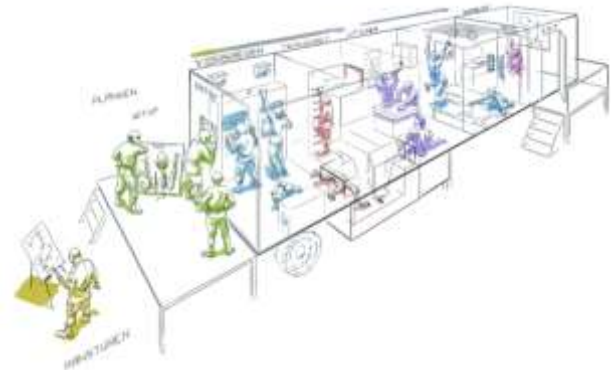
Game based learning solutions on the other hand are explicitly designed with this 'transferable' learning objective in mind; Therefore, the learning goal lies outside the game system. In-game experiences should be explicitly transferable to the real world. Serious games can be considered micro-worlds elucidating players' dynamic decision making, actions, tactics and strategies [4].

Specific key performance indicators for in-game and post-game feedback purposes can be utilized by the trainer to discuss results with the trainees in, for example, in after action debriefs. Using game analytics methods and technologies, including machine learning algorithms or deep learning frameworks, one may even predict the learning journey [5]. This provides the opportunity to personalize the game world and aligning and adapting it to the capabilities of the trainees.

### **3 Innovations, research findings, etc**

In some brainstorm, Thales Research & Technology together with Escape Room Designer combined their experiences and sketched out a merge resulting a serious escape room. As an example we took Underground Warfare. "U.S. Army leaders say the next war will be fought in mega-cities, but the service has embarked on an ambitious effort to prepare most of its combat brigades to fight, not inside, but beneath them" (quoted from [6]). As compared to high fidelity training solutions a game based escape room provides a low cost alternative and could be blended in the overall educational, training and practice solutions. From a blended learning perspective, a game based escape room could be a complementary learning

instrument to address a set of particular skills, e.g., Non-TEchnical-MILitary-Skills (NOTEMILS). The Downunder II concept we came up with is depicted in Figure 2.



*Figure 2: Artist impression Downunder II*

The game starts with a command for action. Next is planning and scenario thinking following by mission readiness and dealing with various challenges along the way such as lightness/dark, smell, small areas etc. Key performance indicators regarding NOTEMILS are monitored and analyzed during and immediately after game play. The game ends with and After-action review (debrief).

### **4 Lessons learned**

Training solutions for Non-TEchnical-MILitary-Skills (NOTEMILS) seems relevant but proper feedback on the proposed concept is still lacking. Therefore, instead of a take-away message to the ITEC audience we raise a question addressing the ITEC audience directly, and start the discussion with respect to the necessity for training Non-TEchnical-MILitary-Skills (NOTEMILS) and utilizing our preliminary ideas on serious escape room solutions.

### **5 Conclusions**

At first glance, serious "game based" escape rooms seem to bring an interesting solution for Training Non-TEchnical-MILitary-Skills (NOTEMILS). The discussion during the ITEC conference may provide a preliminary set of requirements to introduce these low cost training solutions in the military domain.

### **References**

- [1] [https://armypubs.army.mil/epubs/DR\\_pubs/DR\\_a/pdf/web/ARN13662\\_TC%203-21x50%20FINAL%20WEB.pdf](https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN13662_TC%203-21x50%20FINAL%20WEB.pdf)
- [2] Tsifetakis, E., & Kontogiannis, T. (2017). Evaluating non-technical skills and mission essential competencies of pilots in military aviation environments. *Ergonomics*, 1-15.
- [3] <https://escaperoomdesigner.nl/>

- [4] de Heer, J. (2017). Microworld games: being better prepared for the Comprehensive approach. In CMDR COE 3rd Proceeding 2017. Editors; Prlin Nikolov, Vassil Roussinov, Milen Milkov, Svetlin Denchev, Boris Guenov. Published by Crisis Management and Disaster Response Centre of Excellence, CMFR COE, ISSN 2367-766x. p. 248-261.
- [5] de Heer, J., Porskamp, P. (2018). Predictive analytics for leadership assessment. In: *The 9th International Conference on Applied Human Factors and Ergonomics – 3rd International Conference on Human Factors in Management and Leadership*. 22-26 July, Orlando, Florida, USA. © Springer International Publishing AG, part of Springer Nature 2019 J. I. Kantola et al. (Eds.): AHFE 2018, AISC 783, pp. 516–523, 2019. [https://doi.org/10.1007/978-3-319-94709-9\\_51](https://doi.org/10.1007/978-3-319-94709-9_51)
- [6] <https://www.military.com/dailynews/2018/06/24/army-spending-half-billion-train-troops-fight-underground.html>

## Author/Speaker Biographies

**Johan de Heer** (PhD) directs the Thales Research & Technology organization in Hengelo. Focus is on Brain Computer Interface technologies, in particular understanding the value of bidirectional BCIs. bBCIs providing two-way communication and influence between brain and computer, which may open the full potential to exploit human-machine performance.

**Rafal Hryniewicz** holds a MSc in Bioinformatics from University of Twente in The Netherlands. His area of expertise is in modelling and designing game systems.

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