The International Conference for Training and Organizational Development TOD'26

TOD'26
International Conference for Training and Organizational Development

# Driving Skill Shift:
## Competency and Innovation
### for Sustainable Organizational Development

Organizer: معهد تدريب الموانئ Port Training Institute

Co-Organizer:

IHRIM

INSTITUTE OF ORGANIZATION DEVELOPMENT

USN University of South-Eastern Norway

The Nautical Institute



## Prof. Salman Nazir

Professor of Maritime Training and Assessment, Faculty of Technology, Natural Sciences and Maritime Sciences, University of South-Eastern Norway (USN)

8 - 9 November 2026

Crowne Plaza Alexandria Mirage

Media Partner: ربان السفينة Robban Assafina

INNOVATION







# About the Presenter

**Salman Nazir**
**Professor, University of South-Eastern Norway**

- Head of the **Training and Assessment Research Group (TARG)**, focusing on enhancing human performance in complex socio-technical systems.
- Expertise in **human factors**, **virtual reality training simulators**, **Maritime education and training (MET)**, **autonomous systems**, and **performance management**.
- Coordinator of the **EU Horizon 2020 ENHANCE Project**, which advances human performance in critical operations.
- Scientific leader at **Center of Excellence in Maritime Simulator Training and Assessment (COAST)**.
- Author/co-author of over **120** peer-reviewed articles, conference papers, and book chapters in prestigious international platforms.
- Adjunct Professor (**Professor II**)
  Nord University, Business School



# From Training to Competence: Human Factors, Simulation and AI-Supported Learning

Salman Nazir

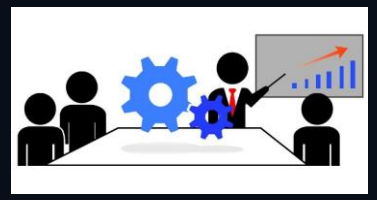
Professor, University of South-Eastern Norway
Head of Training and Assessment Research Group (TARG)
Scientific Leader, Center of Excellence in Maritime Simulator Training and Assessment (COAST)

Professor II NORDLAB NORD University

International Conference for Training and Organizational Development (TOD'26)
Alexandria, Egypt | 9th November, 2026

## Training and Assessment Research Group (TARG)

Our aim is to Improve Human Performance within modern complex systems



### Training

Simulator Training

Assessment and Evaluation

Artificial Intelligence



### Pedagogy

Operative Pedagogy

Socio-cultural perspective

Assessment Methods



### Human Factors

Human Performance

Situation Awareness

Human Error

Human-Machine Interaction



### Safety

Accident Analysis

Safety Training

Safety Management



### Autonomous System

Transparency

Automation

Human-Automation interaction

# From research to real-world application

*Lessons from four research and innovation projects*

## COAST

**Centre of Excellence in Maritime Simulator Training and Assessment**

**TIME**
2020 – 2026 (5 yrs + 2-yr extension)

**BUDGET**
8.6 M EUR (94 M NOK)

Norwegian consortium (USN, NTNU, UiT, HVL) strengthening simulator-based training, assessment practices and maritime educational capabilities.

## InnoTraining

**Innovating Maritime Training Simulators using Virtual and Augmented Reality**

**TIME**
2017 – 2021 (4 yrs)

**BUDGET**
1.46 M EUR

Exploring VR/AR for maritime simulator training, with immersive technologies and learning design for more realistic practice.

## ENHANCE

**Enhancing Human Performance in Complex Socio-technical Systems**

**TIME**
2019 – 2023 (4 yrs, +2 extension)

**BUDGET**
1.1 M EUR (Horizon 2020)

First EU Horizon 2020 project coordinated by USN, on human performance, training and assessment in complex safety-critical systems.

## BZERO

**Zero Emission Ferries: Safe and Efficient Human-Autonomy Teaming in Complex Maritime Transport Systems**

**TIME**
2025 – 2028 (3 yrs)

**BUDGET**
2.4 M EUR (Research Council of Norway)

Investigating how crews and AI-based autonomous navigation systems team up safely, including hand-over, transparency and trust.

**Long-term research projects that connect training, simulation, human factors and autonomy.**

# Outlook

- Changing demands
- Skills
- Organization structure
- Education system
- Geo political situations
- Technology driver
- Evolving societies
- Maritime world



# Science of Training

- Training Needs Analysis
- Task Analysis
- Cognitive Task Analysis
- Learner Characteristics
- Learning Objectives
- Training Method Analysis
- Team vs. Individual Training
- Facilitator Role
- Feedback and Debriefing
- Transfer of Training
- Error Analysis
- Performance Metrics



**Image Credit:** Centre of Excellence in Maritime Simulator Training and Assessment (COAST)



WMU Journal of Maritime Affairs
https://doi.org/10.1007/s13437-023-00318-1

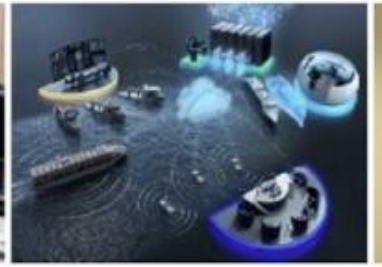
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ARTICLE

# An evaluation of maritime simulators from technical, instructional, and organizational perspectives: a hybrid multi-criteria decision-making approach

Hasan Mahbub Tusher[1] · Ziaul Haque Munim[1] · Salman Nazir[1]

- What **factors** influence the selection of simulator modalities for maritime training, and how can their **importance rankings** be used to evaluate simulators?

| LEVEL 1: PURPOSE | **Evaluation of Maritime Simulators** |
|---|---|
| LEVEL 2: CRITERIA | **Technical**<br>C1: Fidelity,<br>C2: Immersivity,<br>C3: Possibility of remote training<br>C4: Possibility of team training<br>C5: Ease of training<br><br>**Instructional**<br>C6: Ease of assessment,<br>C7: Pedagogic value<br>C8: Appropriate methods for training<br>C9: Diversity of training scenario<br>C10: Training efficiency<br><br>**Organizational**<br>C11: Regulatory compliance,<br>C12: Cost of training,<br>C13: Capacity of institutions |
| LEVEL 3: ALTERNATIVES |  A1: Full-mission simulators<br> A2: Desktop-based simulators<br> A3: Cloud simulators<br> A4: Virtual Reality (VR) simulators |

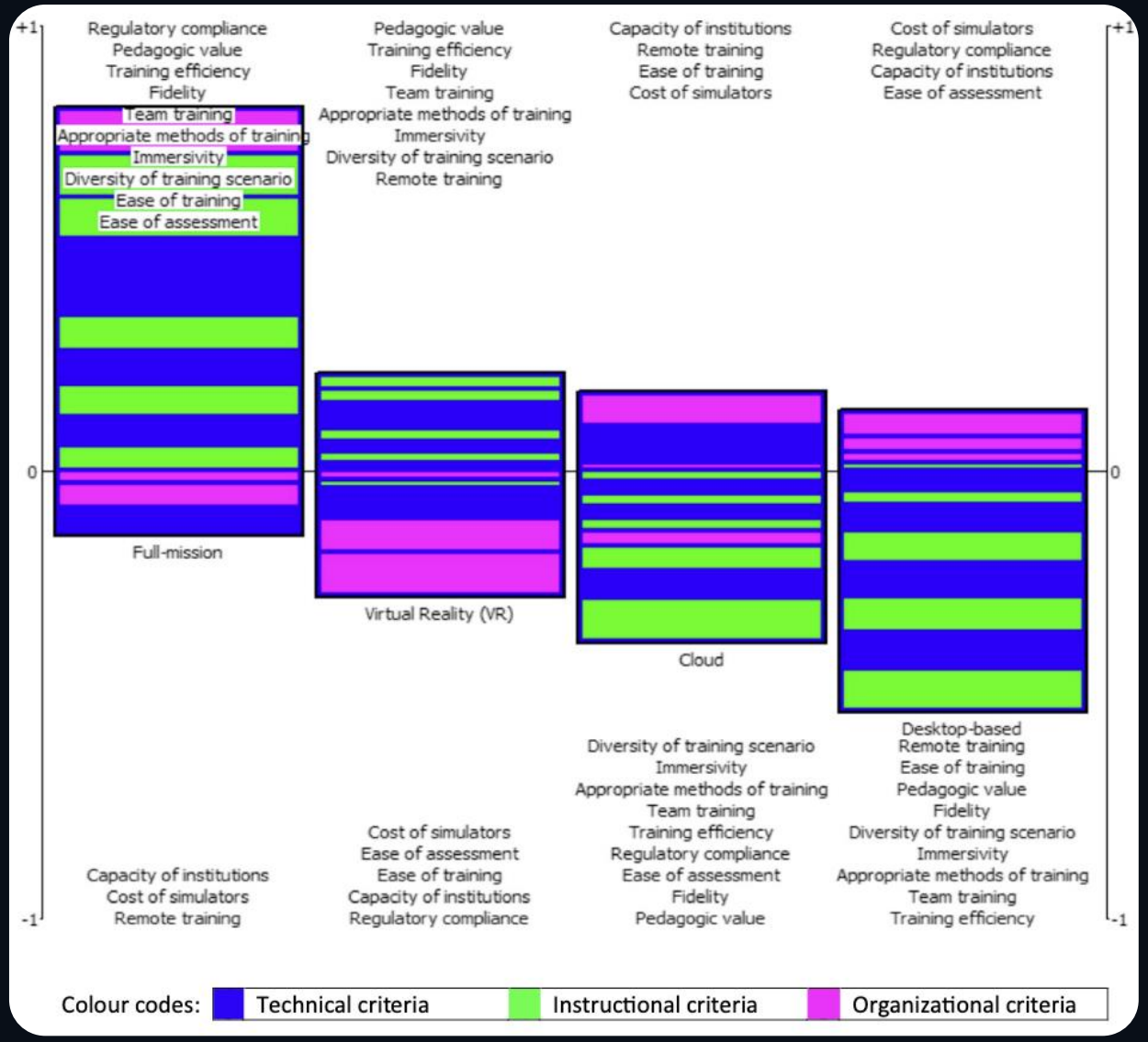


# Respondents' demographics

| No. | Country | Years of experience | Professional background | No. | Country | Years of experience | Professional background |
|---|---|---|---|---|---|---|---|
| 1 | Bulgaria | 4 | MI | 14 | Norway | 6 | MI and MR |
| 2 | Bulgaria | 10 | MI | 15 | Norway | 8 | MI |
| 3 | Bulgaria | 16 | MI | 16 | Norway | 3 | MI and MR |
| 4 | Canada | 6 | MI | 17 | Norway | 14 | MI |
| 5 | Egypt | 10 | MI | 18 | Norway | 16 | MI |
| 6 | Egypt | 25 | MR | 19 | Norway | 4 | MI and MR |
| 7 | Georgia | 10 | MI and HOD | 20 | Norway | 4 | MI |
| 8 | India | 24 | HOD | 21 | Philippines | 22 | HOD |
| 9 | India | 22 | MI | 22 | Türkiye | 12 | MI and HOD |
| 10 | India | 14 | MI | 23 | Ukraine | 13 | MI |
| 11 | India | 6 | MI and HOD | 24 | Ukraine | 16 | MI and MR |
| 12 | Indonesia | 2 | MI | 25 | USA | 25 | MI and HOD |
| 13 | Kingdom of Saudi Arabia | 12 | MI | | | | |

# Results

Simulator ranking with criteria



# From tutor to co-instructor

## Theme

Role of AI across the simulator training workflow.

Ta, Nazir, Haavardtun & Magnussen (USN), AHFE 2026

## Method

- Explorative qualitative study
- 12 semi-structured interviews (about 40 min)
- Thematic analysis, six phases (Braun & Clarke)

## Participants

- 12 simulator instructors (10 male, 2 female)
- 3 to 25 years of experience
- Desktop, VR and full-bridge simulators

## Research question

**Should AI act as a tutor, assessor, co-instructor, or partial replacement for the human instructor?**



*Human Factors in Training, Education, and Learning Sciences*, Vol. 231, 2026, 60–67
https://doi.org/10.54941/ahfe1007996

**From Tutor to Co-Instructor: AI–Human Instructor Roles in Maritime Simulator Training and Assessment**

**Thi-Diem-My Ta[1], Salman Nazir[1,2], Per Haavardtun[1], and Leif Inge Magnussen[1]**

[1]Department of Maritime operations, University of Southeastern Norway, 3199 Borre, Norway
[2]Nord University, Business School, Center for Crisis Management and Collaboration, 8049-Bodø, Norway

**ABSTRACT**

Artificial intelligence (AI) has become increasingly prevalent across diverse domains, including maritime operations, where its potential to enhance training and assessment is gradually recognised. AI-enabled adaptive learning platforms can tailor simulator-based training to learners' performance, delivering dynamic feedback loops that enhance continuous improvement. Such platforms enhance engagement, knowledge retention, and competency development benefits particularly relevant to complex maritime tasks including cargo handling, route optimisation, and machinery maintenance. While previous research demonstrates AI's potential for adaptive learning and assessment, the pedagogical role of AI relative to human instructors remains unclear in maritime education and training. To address this gap, we examine how the integration of AI into maritime simulator-based training redefines roles and responsibilities of instructors and conceptualise the role typology of AI-human instructor within the maritime pedagogical practice: should AI act as a tutor, assessor, co-instructor, or even as a partial replacement for the human instructors? Besides, we investigate instructors' perceptions of possibilities of integrating AI into simulator-based training. We conducted twelve semi-structured interviews with experienced practitioners in simulator-based training and assessment in the maritime domain. The interviews were transcribed and thematically analysed. Our research findings demonstrated the diverse affordances of AI across simulator-based training continuum, including the preparatory, scenario and debriefing, post-simulation phases. Additionally, we proposed three types of AI-integrated simulator training—AI supported, AI augmented and AI instructed—each is featured by the interdependent relationship between human instructors and AI system and contributes to different phase of simulator-based training continuum. These findings provide a foundation for theorising how professional training may evolve as the transformative potential of AI becomes fully realised in future.

**Keywords:** AI, Artificial intelligence, Simulator-based training, AI-human instructor, AI affordance, Simulator-based training continuum, MET

**AI is not yet used at these institutions, but instructors expect support across the training process.**

# Three phases, three roles for AI

### THREE TYPES OF AI-INTEGRATED TRAINING

| AI-supported | AI-augmented | AI-instructed |
|---|---|---|
| **Instructor leads · AI is a tool**<br>Phase: Preparatory and debriefing<br><br>AI builds and tests scenarios and summarises performance data; instructors interpret and validate. | **Instructor collaborates · AI is an assistant**<br>Phase: Scenario phase<br><br>AI monitors the exercise and flags COLREG violations to the instructor. | **Human assures quality · AI is the instructor**<br>Phase: Scenario and debriefing<br><br>Autonomous training for procedural or basic navigation tasks, with human oversight of design and validation. |

**AI's role should match the phase and task; human oversight stays essential.**

# Science of Assessment

- Human Biases
- Halo Effect
- Anchoring Bias
- Confirmation Bias
- Contrast Effect
- Leniency / Severity Bias
- Outcome Bias Scenario and Evidence Design
- Similarity / Affinity Bias
- Non-technical skills
- Method of assessment
- Listening



**Image Credit:** Shutterstock

# What happens when AI is gone?

Nearly 1,000 students. Random assignment by classroom.

| | Practice with AI | Test without AI |
|---|---|---|
| Standard AI | **+48%** | **−17%** |
| Guided AI | **+127%** | No clear difference |

# References


- Bastani, H., Bastani, O., Sungu, A., Ge, H., Kabakcı, Ö., & Mariman, R. (2025). Generative AI without guardrails can harm learning: Evidence from high school mathematics. Proceedings of the National Academy of Sciences, 122(26), Article e2422633122. https://doi.org/10.1073/pnas.2422633122
- Nazir, S. (2026). Training and assessment during digitalisation. In S. O. Johnsen, O. A. Alsos, F. B. Bjørneseth, V. Hepsø, & G. B. Sætren (Eds.), Safety by design: Human-centered approaches to AI, automation, and remote operations (pp. 285–300). CRC Press. https://doi.org/10.1201/9781003741824-19
- Sanders, M. S., & McCormick, E. J. (1993). Human factors in engineering and design (7th ed.). McGraw-Hill.Sharma, A., Nazir, S., & Ernstsen, J. (2019). Situation awareness information requirements for maritime navigation: A goal directed task analysis. Safety Science, 120, 745–752. https://doi.org/10.1016/j.ssci.2019.08.016
- Springer Nature Linkvan de Merwe, K., Mallam, S., Engelhardtsen, Ø., & Nazir, S. (2023). Towards an approach to define transparency requirements for maritime collision avoidance. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 67(1), 483–488. https://doi.org/10.1177/21695067231192862
- Ta, T., Nazir, S., Haavardtun, P., Magnussen, L. (2026). From Tutor to Co-Instructor: AI–Human Instructor Roles in Maritime Simulator Training and Assessment. In: Salman Nazir (eds) Training, Education, and Learning Sciences. AHFE (2026) International Conference. AHFE Open Access, vol 231. AHFE International, USA. https://doi.org/10.54941/ahfe1007996
- Tusher, H. M., Munim, Z. H., & Nazir, S. (2024). An evaluation of maritime simulators from technical, instructional, and organizational perspectives: A hybrid multi-criteria decision-making approach. WMU Journal of Maritime Affairs, 23(2), 165–194. https://doi.org/10.1007/s13437-023-00318-1

# Thank you



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