

Evaluation of the marine game Simple Surface Warfare Model (SSM)

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Background

- Wargames is nothing new but in the 19th century direct representations of military forces were used.
- The Swedish Armed Forces define wargames as;
”Staging of a wargame or war scenario, with a minimum of two antagonistic sides where the outcome is affected by both sides actions.” (Försvarsmakten 1999)
- Reasons for using wargames can be education, practice, operative training, research, or amusement (Brewer & Shubik (1979).

Background

- Realistic simulators are often expensive to build and maintain.
- An alternative approach is to develop a wargame for specific tasks and only include those features necessary to meet the training and educational objectives in that setting.
- Often not necessary to spend tremendous amount of money to make the wargame realistic.

Background

- Important with engaged users and that learning is integrated with the game (Garris, Ahlers & Driskell, 2002).
- SSM was developed by the Swedish National Defence College with focus on;
 - learning basic marine tactics
 - engaging/motivating to use
- This approach was evaluated.

Method - purpose

- Their purpose was to train tactics and evaluate their planning skills.
- Our purpose was to evaluate SSM as a wargame to see strengths and weaknesses (focus here).

Method

- 27 marine cadets participated in the study as part of their course in marine and amphibious warfare tactics.
- A player can take different roles, e.g. commander.
- The commander gives orders to his staff on how to move the units, use of sensors, and when weapons should be used.
- Different environments and multiple marine vessels can be adapted, e.g. boats, submarines and helicopters.

Method

- Four staffs with three SSM-clients installed in each room.
- The staffs played four scenarios, commanding blue (friendly) and red (enemies) side once each day.
- Green (civilians) and yellow (unknown) actors included.



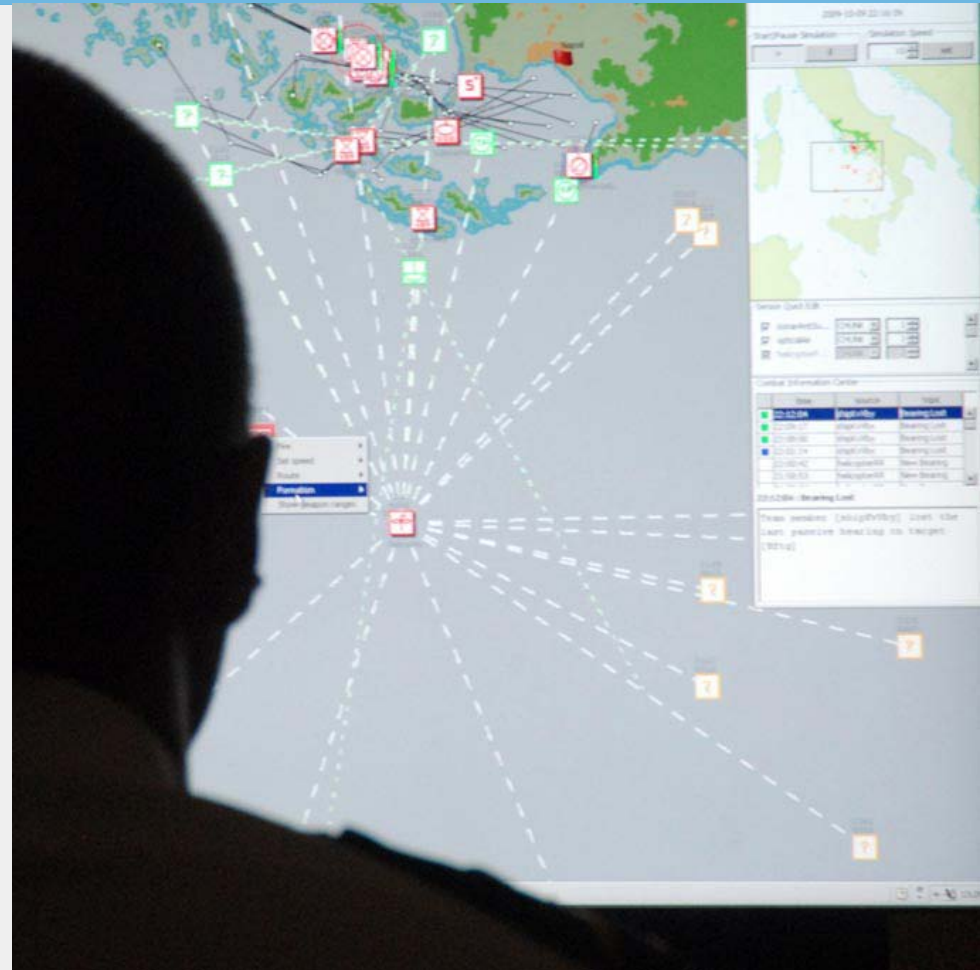
Method

- Staff A: Mission to use own forces in a tactically smart way and disembark troops in three possible harbours.
- Staff B: Defend the harbours.
- Staff C & D: Disembark & defend harbours.

- The experiment had three major phases;
 1. Each team prepared military plans (5 days).
 2. Introduction and practice with SSM (1 day).
 3. Performing the wargame with SSM (2 days).

Method - SSM

- Large map with units visualized.
- Small overall map in the upper right corner
- Function structure with information and interaction possibilities in the lower right corner.



Method – data collection

- Cadets- & instructors ratings of five concepts.
- Open questions.
- After action review.

Method – data collection

- A questionnaire was used to explore cadets and instructors experience of SSM regarding five concepts; **learning** (7 questions), **experience** (8 questions), **feedback** (4 questions), **influence on real situation** (2 questions), and **immersion** (2 questions).
- The questionnaire was developed at FOI (Nählinder, Oskarsson, Lindahl, Hedström, & Berggren, 2009; Oskarsson, 2010).
- The concepts are based on important factors that have been explored in other research (e.g. Garris, Ahlers, & Driskel, 2002; Wiese, Freeman, Salter, Stelzer, & Jackson, 2008; Witmer & Singer, 1998).

Results

- Analysis of variance to see differences between the five concepts.
- Descriptive analysis for each concept.
- Comparison between cadets- and instructors ratings regarding the concepts.
- The questionnaires open questions summarized.
- All together, these analyses and the after action review gave us a good understanding of how SSM worked.

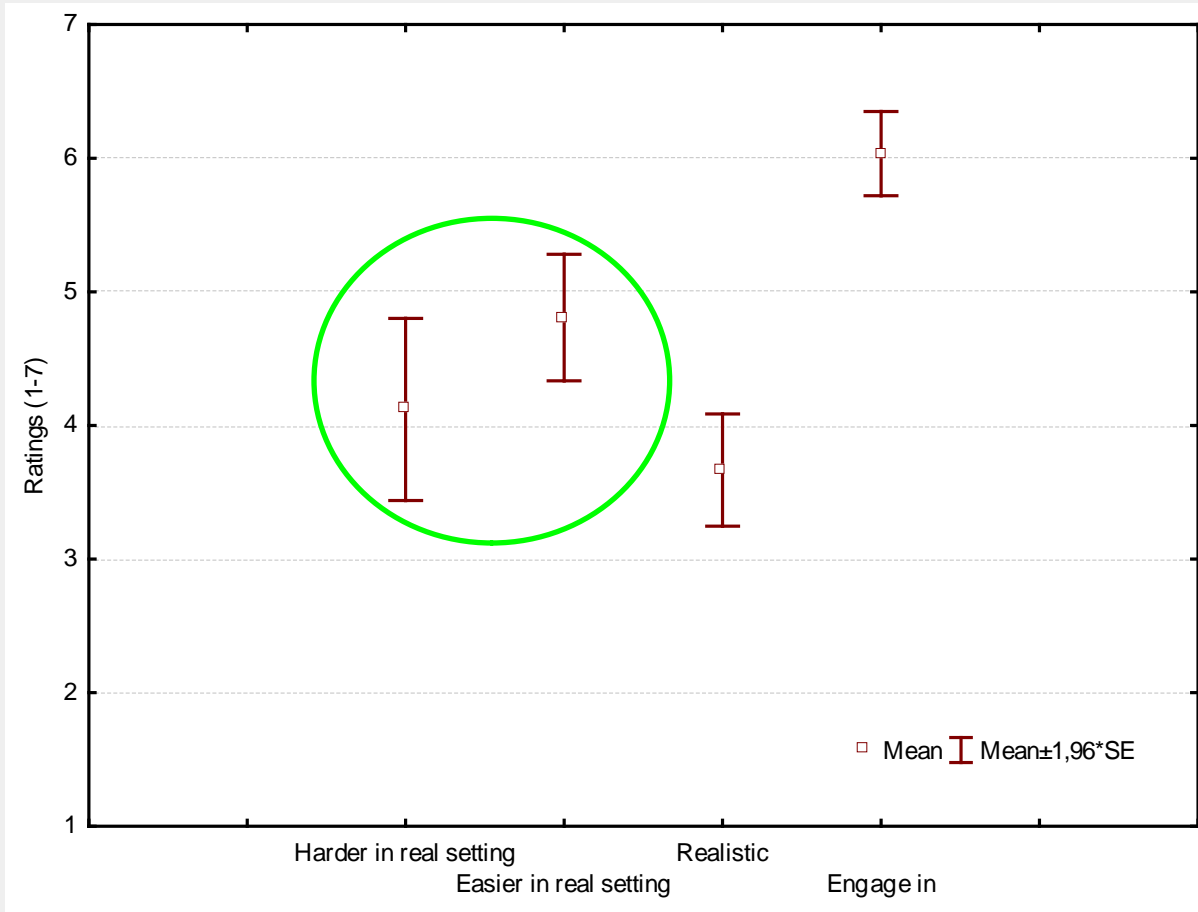
Results - concepts

- ANOVA: significant effect of concept $F(4, 100)=9.08$, $p < .001$.
- Tukey post hoc test: 'influence on real situations' was rated lower ($p < .05$) than learning, experience, feedback, and immersion.



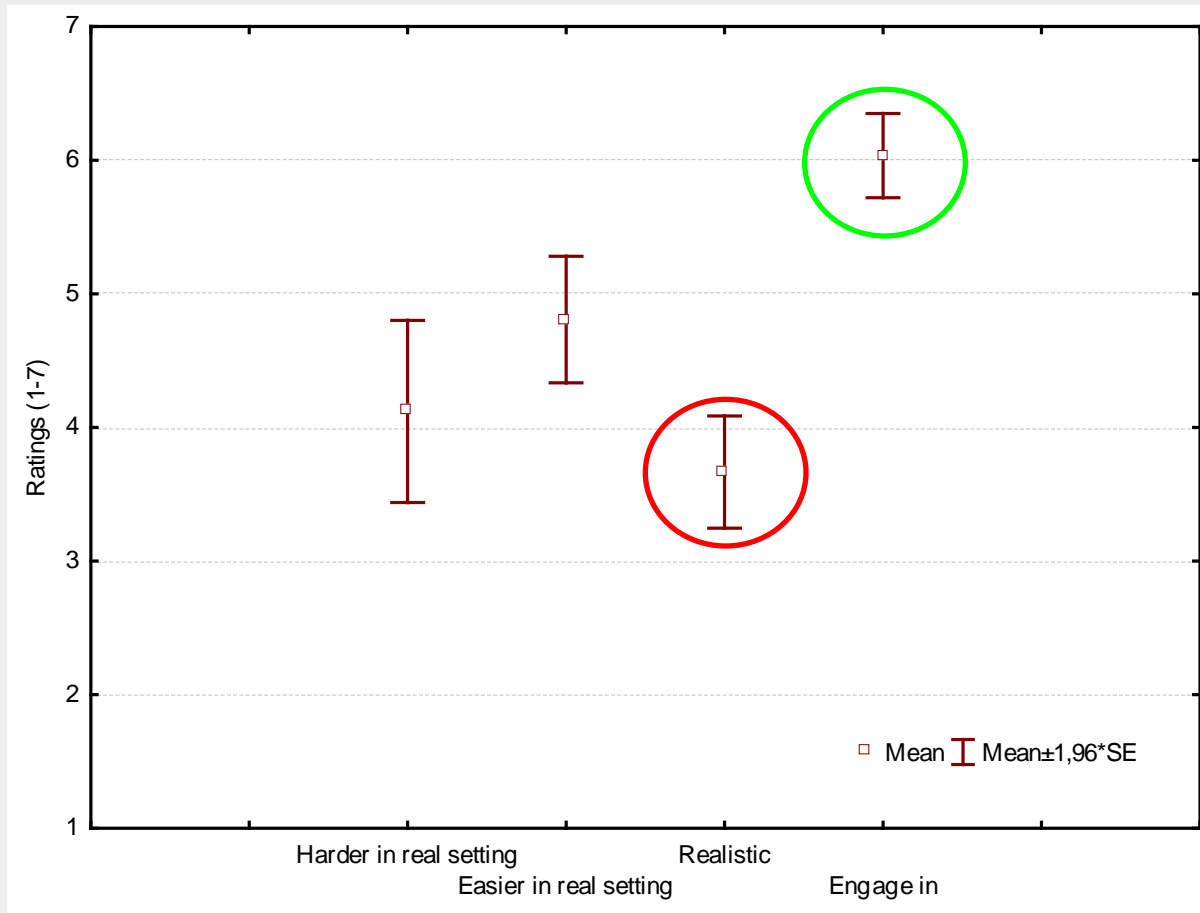
Results

Concept - influence on real situation

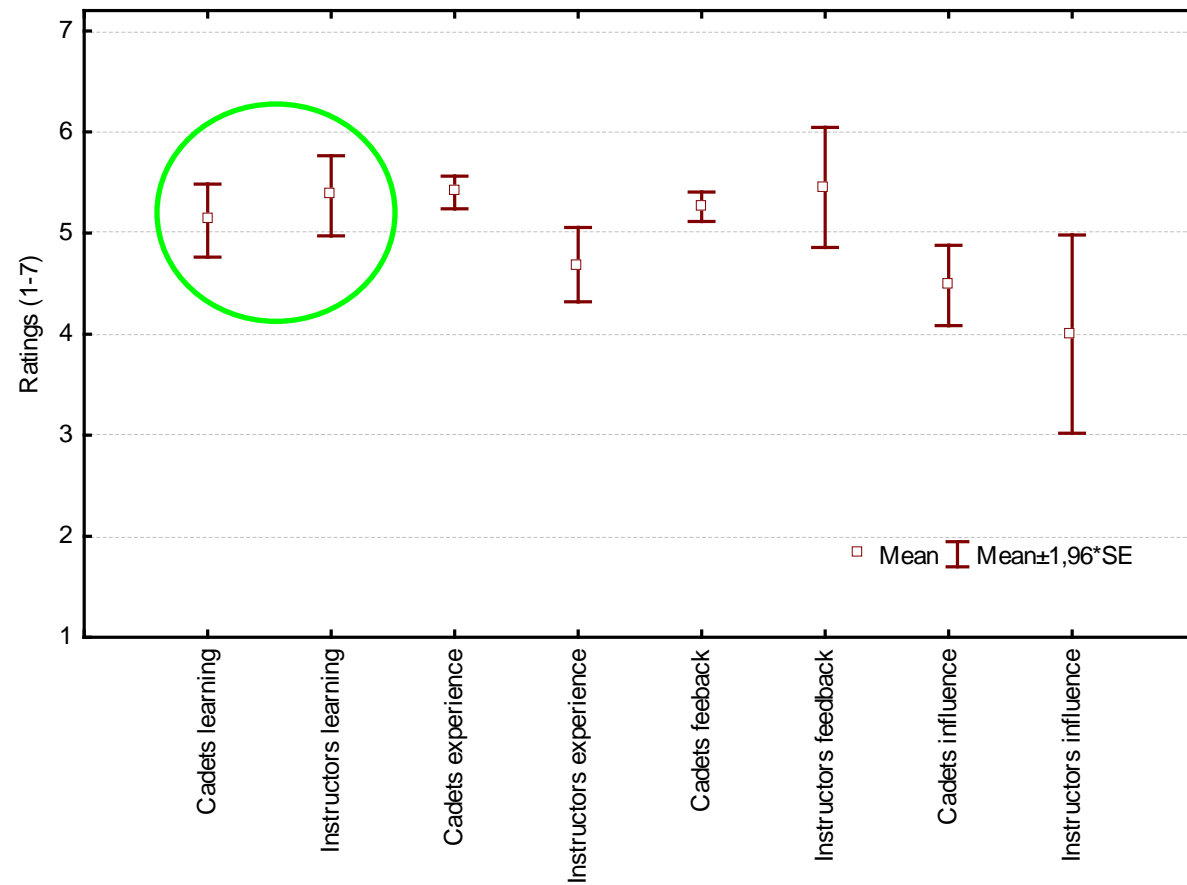


Results

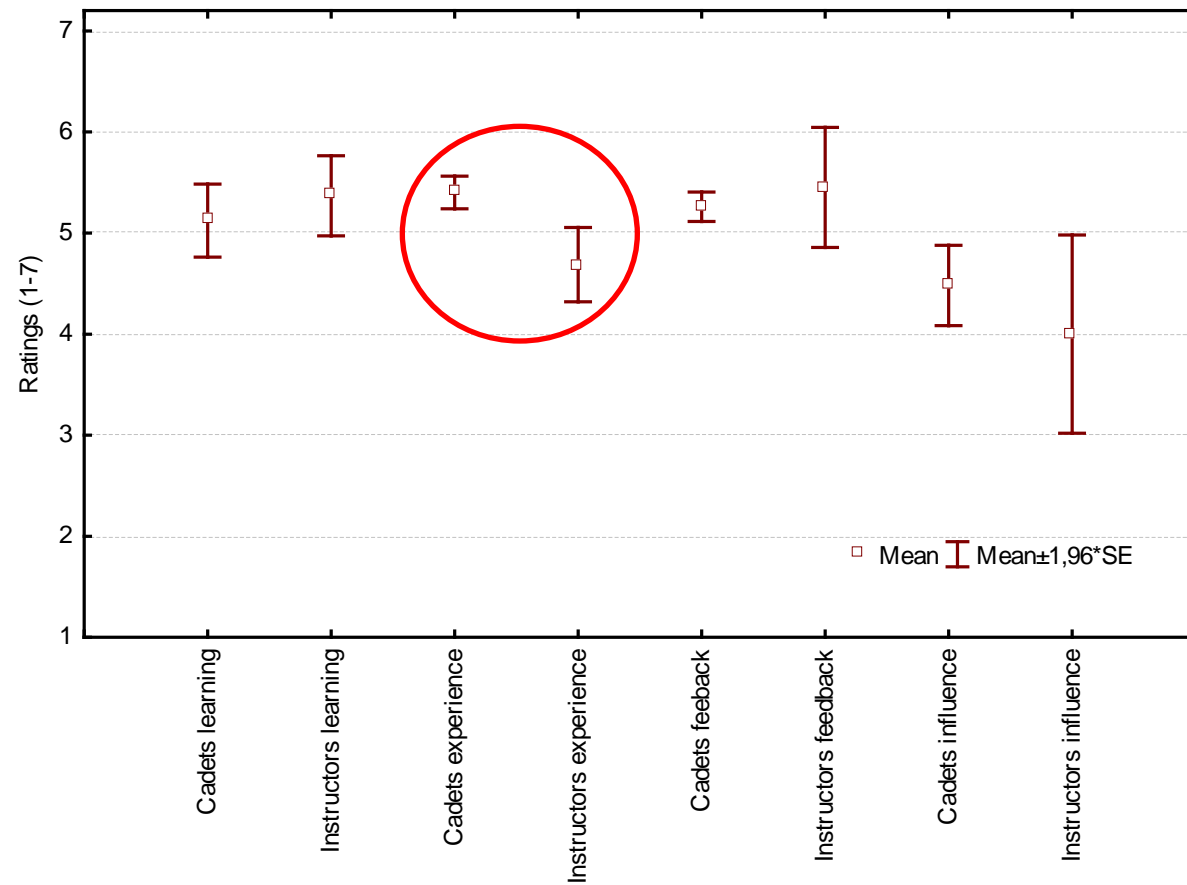
Concept - immersion



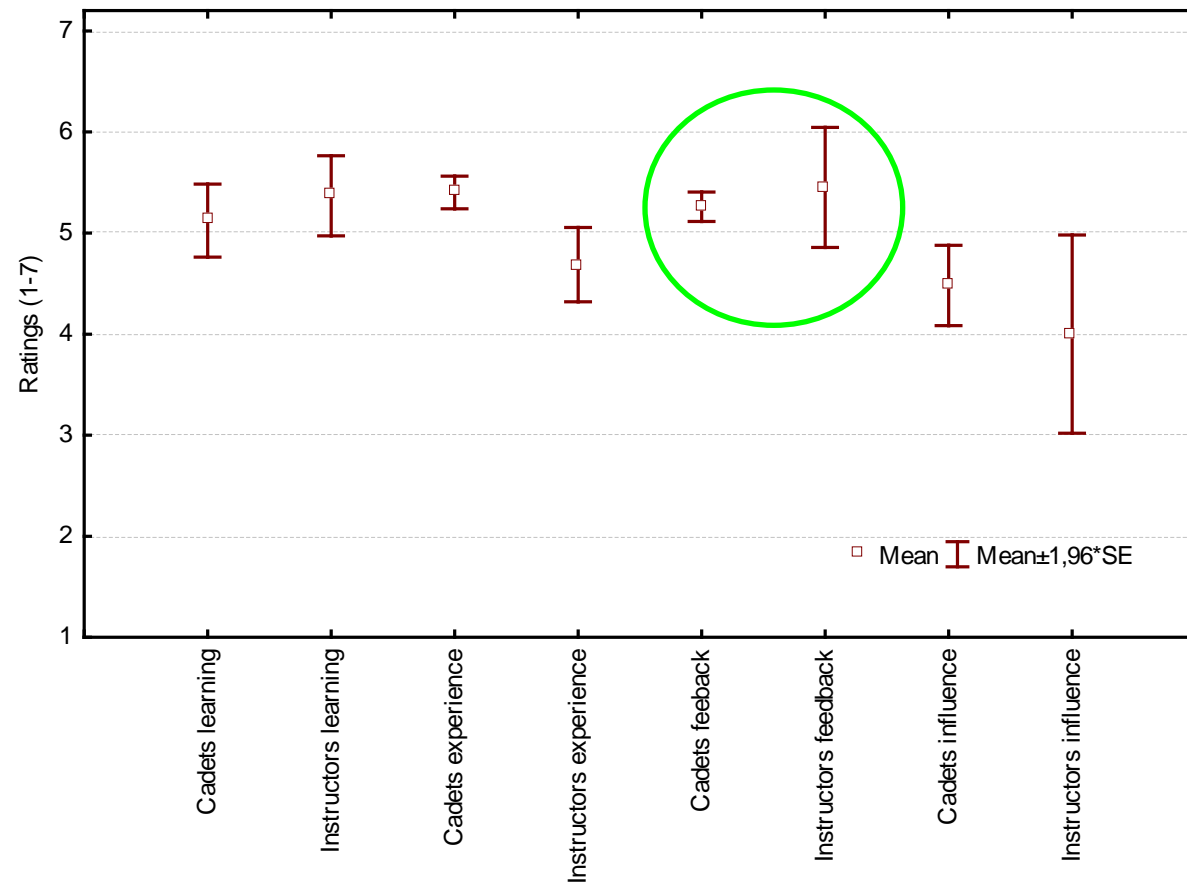
Cadets & instructors: Learning



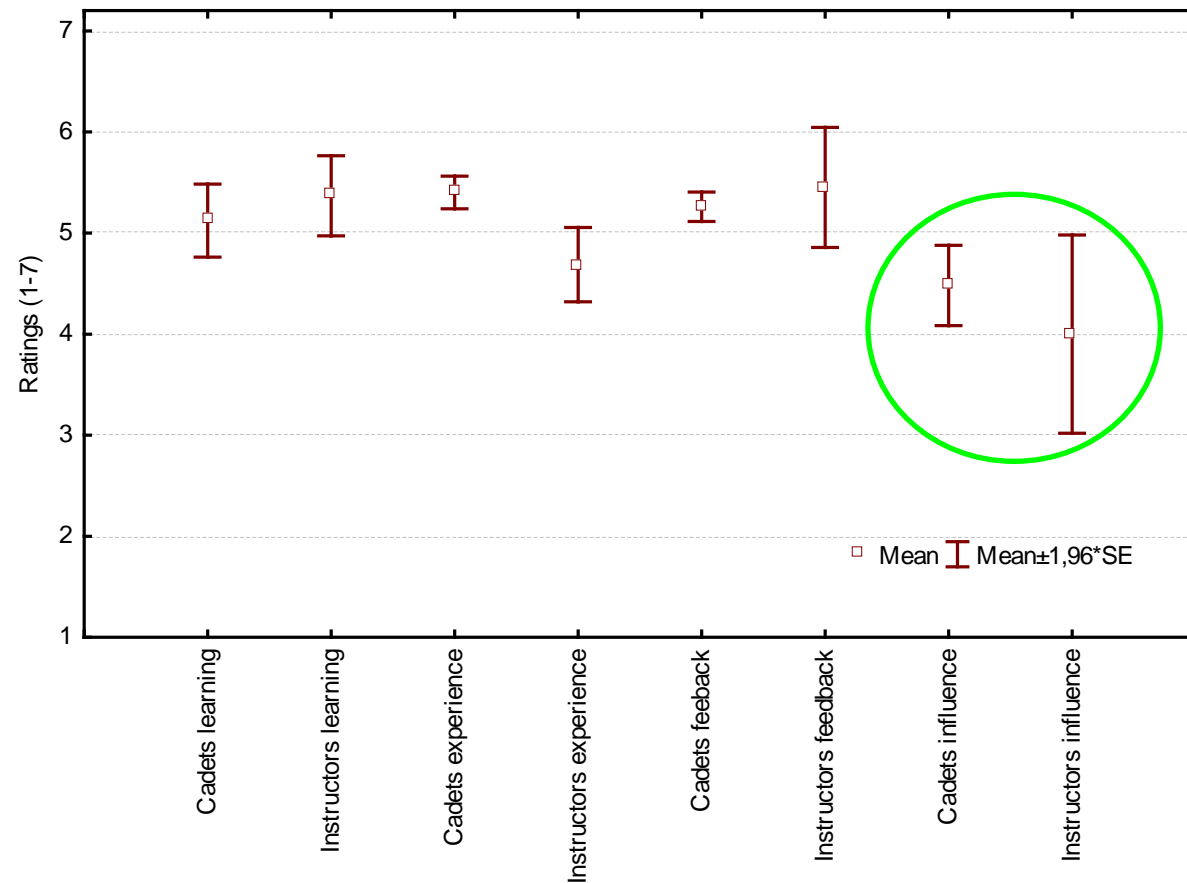
Cadets & instructors: Experience



Cadets & instructors: Feedback



Cadets & instructors: Influence on real situation



Open questions

- Does anything gets easier or harder in the real military setting by using SSM?
- Also some overall conclusions from the open questions will be presented.
- These results are summarized and are not presented in detail.

Cadets:

What gets harder after training with SSM?

- Risk for incorrect learning in the simulator;
 - Situations and abilities in SSM that does not always match the real situation.
 - Sensor and weapon abilities/algorithms do not always match the real situation.
 - Game mode: participants see the game situation as fun rather than training.
 - The complexity in SSM is not always in accordance with the real situation.



Cadets:

What gets easier after training with SSM?

- Overall better understanding of the marine military situation.
- Better understanding of marine tactics.
- Better understanding of sensors and weapon abilities.
- Improve planning skills (same process as in real setting).
- Understand the real situation better.



Instructors:

What gets harder after training with SSM?

- Ethical decisions for own-, enemy-, and neutral forces. It is easier to make a hazardous decision in a simulator.
- However the participants have the possibility to reflect about the decisions.
- Numerous of factors and situations that is not tested, practiced, and experienced in an office setting.



Instructors:

What gets easier after training with SSM?

- The ability to take the whole situation into account.
- Decision-making, since the cadets practice this and have to make the decisions from different basic data.

Instructors:

Other comments and reflections

- Good training of decision-making since the cadets had to make decisions based on insufficient data.
- An alternative is to work and figure out more data before making decisions.
- The preparation phase making plans is of major importance to make sure the game works as intended.
- It is important with preparation for the instructors and coordination with game-command.

Discussion & summary

- The concepts show that both cadets and instructors believe that SSM can be a valuable tool in cadets' training.
- The concept 'influence on real situations' was rated significant lower than the other concepts.
 - Especially interesting since cadets have very limited experience from real military marine situations.
- The overall opinion from cadets, instructors, researchers and technical personnel was that SSM can successfully be used in this training.

Discussion & summary

- The planning phase was very important.
- All together the subjective ratings, answers from open questions, and comments during the exercise show that this, the first major wargame with SSM, was a success.
- Development of SSM to gather objective data would be desirable.
- SSM taught the cadets basic marine tactics and was engaging.