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

![Graph showing ratings (1-7) for 'Harder in real setting', 'Easier in real setting', 'Realistic', and 'Engage in'. The graph includes mean values with ±1.96*SE errors.]

- Harder in real setting: Mean ±1.96*SE
- Easier in real setting: Mean ±1.96*SE
- Realistic: Mean ±1.96*SE
- Engage in: Mean ±1.96*SE
Results

Concept - immersion

![Graph showing ratings (1-7) for various concepts.](image)
Cadets & instructors: Learning
Cadets & instructors:
Experience

Ratings (1-7)

- Cadets learning
- Instructors learning
- Cadets experience
- Instructors experience
- Cadets feedback
- Instructors feedback
- Cadets influence
- Instructors influence

Mean ± 1.96*SE
Cadets & instructors: Feedback

Ratings (1-7)

- Cadets learning
- Instructors learning
- Cadets experience
- Instructors experience
- Cadets feedback
- Instructors feedback
- Cadets influence
- Instructors influence

Mean ± 1.96*SE
Cadets & instructors:
Influence on real situation

![Graph showing ratings of Cadets learning, Instructors learning, Cadets experience, Instructors experience, Cadets feedback, Instructors feedback, Cadets influence, and Instructors influence. The graph displays Mean and Mean±1.96*SE for each category, with ratings ranging from 1 to 7.](image-url)
Open questions

- Does anything get 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 significantly 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.
• 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.