# Planning for Safety when Preparing for War: Competition Brings Out the Wickedness of the Military

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**Abstract**

**The study investigates how two-sided military exercises affect learning and participating personnel's ability to perform tasks safely when confronted with an equally matched opponent. Data were collected from two separate events the Northern Wind 2019 Final Planning Conference and the Northern Wind 2019 exercise using participatory observations and shadowing. The outline of the critical incident technique was used as a guide when designing the data collection and the activity theory framework was used for coding and analyzing the data. The results indicate that a driven desire to win two-sided military exercises can create unsafe work practices by performing work tasks without regard for occupational-, electrical- or fire safety. The results also indicate a need for reshaping the conception of a two-sided military exercise by treating the exercise as a learning opportunity and recognizing the impact of the participating unit on each other's learning. The study is based on the results of one army exercise and requires further research to understand the activities that take place and how they affect learning and safety. However, it gives some insight into the learning problems occurring during military field exercises.**

## 1 INTRODUCTION

Military organizations conduct complex field exercises to test, train and evaluate different units' abilities to solve complex military problems. Field exercises are seen as an important learning activity both for the individual and the organization. To increase the authenticity of the exercises there is a cell planning for different kinds of situations the unit will encounter during the exercise. This serves the purpose to uphold uncertainty and unknown situations to act upon for the trained unit. The purpose of two-sided military exercises is to prepare units for war or conflict by making them solve military problems together with other military units in a dynamic setting. This is done under the guidance of the exercise command and control staff. In a two-sided military exercise, two or more units meet forming two opposing sides, friendly and hostile, they each have different objectives e.g., to attack or defend a certain area or object, and subordinate components within the units need to be coordinated to reach the overarching goal. The two commanders and their staff commanding the friendly and hostile force develop a unique tactical plan to solve the task in a specific manner by tasking and directing subordinate units.

In Sweden, both exercises and actual combat are regulated by national laws, rules, and directives in the same way as hospitals and manufacturing industries are regulated. The Swedish labour law demands safe working conditions and preventive actions to increase safety for the workforce [1]. For instance, Swedish labour regulations dictate the weight an employee is allowed to carry [2]. There is a generally expressed opinion among military personnel in the armed forces regarding the Swedish labour regulations and requirements validity during military exercises and actual combat: if labour regulations and requirements apply, soldiers and officers would not leave the barracks. But from a judicial perspective few exceptions exist, Swedish labour regulations and requirements apply in combat and military exercises.

The dilemma between labour regulations and the military prerequisites is visible when comparing tactical planning handbooks with Swedish work environment regulations. One such regulation states that the employer or Commander should systematically investigate health and safety by identifying and preventing risks. The labour law postulates a risk analysis and preventive actions to avoid accidents and harmful situations from injuring soldiers and officers [3]. Despite this, the systematic method of reducing occupational risk expressed in the labour law isn't transferred to the tactical handbooks.

Several researchers have identified occupation safety risks that military personnel are exposed to, for example, smoking, low physical activity [4], workload, body weight, or sleep deprivation [5]. Other researchers have also studied specific military training, focusing on soldiers' and officers' performance [6]. When examining

previous safety research within military field exercises focus has been on, amongst other things, cold weather exposure, and physical and psychological fatigue [7], [8].

Exercises are a type of game consisting of real-life scenarios where participants can role-play a specific fictional situation with real interactions and unreal aspects mimicking the perception of the real world [9]. What occurs in an exercise is the separation of actions from their consequences [10] e.g., using simulators to practice combat. The exercise's purpose is to create a safe tool, enhancing the learning experience for the participants work *"there is constant, dynamic tension between the competing imperatives of authenticity and safety"* [11, p. 93]. For the exercise to be authentic a certain amount of risk is needed e.g., advancing in terrain in a formation with combat vehicles. In some cases, researchers have found a training strategy incorporating risk exposure e.g., using authentic speed and movement which is believed to promote safety when faced with a real situation to get the job done [12].

Exercise mimicry consists of two types of games: competitions and simulation games [9]. Wargames are a simulation that has been used by military organizations for centuries to promote learning. Two-sided wargames or maneuvers evolved into two-sided military exercises, and with the help of technology, soldiers can engage each other without causing injuries [13], [14]. In 1982, simulators were introduced in the two-sided military exercises [14], [15]. The soldiers could fire their weapon with a mounted laser at the enemy opponent with a receptor on the helmet triggering an alarm and fictionally incapacitating the soldier [14]. At the same time, the exercise generates an invisible and unconscious learning dilemma when several areas are non-authentic, such as occupational safety, healthcare, fire- and electrical safety, maintenance, repairs, and logistics are planned in advance before the exercise or by non-participating personnel which affects the exercise authenticity [16]. According to van Creveld [14] the lack of authenticity affects participation making participants more interested in winning than learning, which also influenced the development of simulators to make cheating more difficult. We often assume that learning is good, but when practitioners generate solutions to an incomplete or incorrect situation faults and errors are learned [17].

> Some games are too structured by their rules to give a good approximation of war. Others are so unstructured as to appear completely arbitrary and even senseless. A game that successfully navigates between these extremes and incorporates all aspects of war has yet to be devised. This gap between the two is precisely why, in military games, post-mortem analysis is critically important. But for this, a game may do more harm than good, imparting the wrong lessons and convincing players that they know more than they do [14, p. 319].

Two-sided exercises contribute to knowledge and experience, which can be misinterpreted by participants as knowledge and experience of actual combat. As pointed out by [16] military activity often promotes speed to act and reduces the basic human ability of thought [18] which shapes the system of military command (human will) and control (Technology) [19, p. 164]. According to Schüler and Bjurström [16] military exercises can unconsciously be designed to train military personnel in speed to act but not reflection and thought. The exercise scenario is an incomplete picture of an authentic military operation and lacks the element of surprise, hence military exercise risks inducing faults, errors, and unsafe working conditions in the military unit. In two-sided military exercises, both sides become each other's teachers*, "The zone of proximal development is the gap between what a learner has already mastered (actual level of development) and what he or she can achieve when provided with educational support (potential development)"* [20, p. 1]. Each action becomes a learning opportunity when one force intervenes in the other force activity.

Simulations have several positive aspects, practice-based games and simulations combine learning and action, *"Simulation games in the workplace – and undoubtedly in broader learning contexts – aim to allow players to become reflective."* [9, p. 49]. Simulations can help the learner develop necessary skills for actual work and prepare the individual for a work-integrated learning perspective [21]. Work-integrated learning is an established research field focused on learning in higher education and participatory practices [22]. During a two-sided military exercise, learning can be either situated to the community [23] or occur authentically [24]. Previously four different types of authentic learning have been identified *"learning that is meaningful for the learner, learning that relates to the real world, learning that provides an opportunity to think in modes of a particular discipline, learning where the means of assessment reflect the learning process"* [24, p. 195].

One establishing method for learning is after-action reviews (AAR) which *"enable individuals and groups to reflect on their performance and to understand why interim objectives were not accomplished, to know what*

*lessons can be drawn from their experience, and to evaluate how these lessons can be quickly internalized to improve performance"* [25, p. 215]. Can AAR be used in a two-sided military exercise? To better understand military activity and two-sided military exercises, [16] suggests that activity theory [26] could be a useful tool for such complex activities. To my knowledge, no researcher has studied safety issues triggered by a two-sided military exercise. In the adjoining area disaster exercises [21], identify the need for developing overall methods, frameworks, or standards and study how they affect preparedness.

In two-sided military exercises in the Swedish Armed Forces (SwAF), safety issues e.g., cold weather exposure and fatigue are common, but also fatal accidents occur. One fatality occurred during an exercise in 2017 and another one in 2019. The purpose of the study is to investigate participating personnel's learning and ability to perform tasks safely during a two-sided military exercise.

## 2 METHOD

This study was inspired by the outline of critical incident technique (CIT) [27] which has been adjusted to contain: 1) determine the general objective, 2) plan and create a specification, 3) data collection, 4) data analyses, 5) interpreting the data and extracting the results [28]. The general objective is to observe naturally occurring safety issues from two separate events: 1) the final planning conference of Northern Wind 2019 (FPC-NW19), and 2) the two-sided military exercise Northern Wind 2019 (NW19).

The data collection was planned to be evenly distributed to ensure the same representation of incidents in the data set. The following questions were used to guide the observations: What happened? Who was involved? What consequences did the incident have? How were these consequences handled by the organization? Did the incident affect other areas? Where used as an observation guide by the researcher when observing actual work to detect safety incidents.

The data collection was performed by using participatory observations [29] and shadowing [30]: 1) participatory observation was conducted during the FPC-NW19 when military representatives from participating regiments planned the exercise, 2) shadowing was conducted during NW19 when participating groups performed their work tasks. The data was then analyzed using the activity theory (AT) framework [31].

### 2.1 THE EXERCISE CONTEXT

Data were collected during December 2018 and Mars 2019. Permission to participate during the final planning conference of Northern Wind 2019 (FPC-NW19) and the two-sided military exercise Northern Wind 2019 (NW19) was given by the Chief of the Army and the exercise director with specific instructions only to collect data from Swedish units. Participating Swedish regiments meet in Boden during December for the FPC-NW19. Military (approximately 50 participants) and civilian personnel (approximately 15 participants) finalized the planning. The conference focused on tactical issues, leasing land from civilian landowners, and safety issues. The field exercise NW19 took place during Mars 2019 in Boden – Kalix – Haparanda – Överkalix with approximately 10 000 soldiers from Sweden (N=1 500), Finland, Norway, the United Kingdom, and the United States of America. Sweden contributed with 1500 soldiers and officers of which I could observe approximately 250 participants.

### 2.2 WORK TASKS OF PARTICIPANTS

Personnel working with the planning was grouped according to the overall work task: exercise planning (Exercise Planning Team), and exercise safety planning (Exercise Safety Team). Exercise participants were grouped into two functions combat units (Combat Units) and units supporting combat units (Other Units).

### 2.3 DATA COLLECTION FPC-NW19

During the first data collection, observations were made by one researcher during the planning conference FPC-NW19 (4 days, 32 hours) equally distributed between issues regarding the Exercise Planning Team and the Exercise Safety Team. The data collection was focused on the group sessions where planning participants from different Regiments discussed problem areas. The hotel restaurant became a second collection site. During the evening the exercise was discussed in informal talks (3 times, 6 hours). Data was documented by using fieldnotes on an iPad.

### 2.4 DATA COLLECTION NW19

The second data collection was made during the exercise NW19 (11 days). Due to the exercise scenario and participating units' movement and combat operations in the terrain, the observations started from the location and building where the Exercise Planning Team and the Exercise Safety Team were housed. The researcher observed the scenario and tried to anticipate where different units could be. A total of 116 hours were observed, specifically for the Exercise Planning Team (22 hours), the Exercise Safety Team (42 hours), the Combat

Units (26 hours), and Other Units (26 hours). The data collection was focused on actual work performed by the different groups.

When using shadowing the researcher followed a specific person or groups, in this case, individuals or groups planning the exercise, safety teams, and battalion staff. Shadowing made it possible to ask questions and have conversations in the gaps between different tasks.

The follow-up conversations after the incident with the same questions made it possible to better understand the general observations and to get the participators' perspectives incorporated into the observation [30]. In these conversations not only, issues connected to the incidents were discussed, but also safety issues related to ordinary work procedures and tasks.

### 2.5 THE ACTIVITY THEORY FRAMEWORK

The foundation of today's activity theory (AT) rests upon Vygotsky's research of the mediating artifact. The theory focuses on human behavior by analyzing the interactions between the *subject* (the person whose behavior is analyzed), the *mediating artifact* (for example an insignia), and the *respons*e (the behavior) [32]. Leont´ev [33], [34] expanded Vygotsky's [32] theory with new domains i.e., *Rules, Community, Division of labour,* and changing the name of mediating artifact to *Tools* [35]. Leont´ev [33] discovered that human behavior is influenced and constrained by more than just the mediating artifact.

The second generation of AT focuses on a collective perspective making it possible to analyze behaviors occurring in a group [31]. *Tools* are something used or made by individuals in a social context e.g., computers, maps, or knowledge [26]. The *Object* contains the problem the activity is addressed towards e.g., creating a document. The *Subject* is the individual involved in the work, to produce the document (object) e.g., a mechanized battalion staff. The *Subject* uses *Tools* to create an *Object* with a desired *Outcome* e.g., the document battle plan (*Object*) which instructs the units on how to act in a certain combat situation (*Outcome*). The *Community* consists of several groups or individuals with the ability to influence the object e.g., the logistic battalion. *Division of labour* describes how tasks and power are divided e.g., order editor. Laws, norms, regulations, doctrine, and handbooks are explicit and implicit *Rules* which create opportunities and constraints within the activity system [36]–[38] e.g. re-supplying units with diesel demands preventive measures to protect the environment and the personnel.

### 2.6 DATA ANALYSES USING THE ACTIVITY THEORY FRAMEWORK

The analysis comprises of three steps: (1) Structuring the data, (2) coding the data, and (3) mapping the data to the activity system.

Firstly, the data from the observations and conversations were digitized and imported to NVivo 12 for analysis. The data was then structured using NVivo cases *Exercise Planning Team*, *Exercise Safety* Team, *Combat Units,* and *Other Units.* Each case contains all data regarding each group. The data was coded using the categories from AT (*Tools, Rules, Subject, Object, Outcome, Community,* and *Division of labour*) as a framework (see Table 1).

*Table 1: Categorized observations*

| **Categories** | **EPT**[1] | **EST** | **CU** | **OU** | **Total** |
|---|---|---|---|---|---|
| Object | 21 | 14 | 13 | 8 | 56 |
| Tools | 6 | 10 | 17 | 25 | 58 |
| Rules | 21 | 28 | 27 | 22 | 98 |
| Division of labour | 4 | 1 | 0 | 3 | 8 |
| Community | 5 | 6 | 5 | 4 | 20 |

*Note:* 1) *Exercise Planning Team (EPT), Exercise Safety* Team (EST), *Combat Units (CU),* and *Other Units (OU).*

## 3 RESULTS

Creating an exercise is a complex process, in conversations with military personnel the exercise process is often simplified; military personnel plan the exercise and participating units train for combat during the exercise. When looking closer at the exercise a different pattern occurs.

### 3.1 OBJECT

The four groups *Exercise Planning Team, Exercise Safety Team, Combat Units, Other Units* all talk about the exercise as a competition and participating units compete, *"An officer expressed that the winner of the exercise was to be presented 30 minutes after the end of the exercise"* (EPT, fieldnotes, NW19). "*A squad leader talked about endangering his soldier by crossing frozen lakes and streams to win, despite experiencing a fatal accident two years earlier"* (CU, conversation, NW19).

Soldiers and officers have a hard time keeping the reality apart from the scenario, the two often become entwined. The desire to mimic a real combat environment affect the priorities of the participants, "*Exercise participants expressed a desire to train properly and allow the units to participate in an exercise with the existing weaknesses and strengths"* (CU, Conversation, NW19). At the same time safety regulations are not allowed to affect the exercise creating a work environment where safety personnel perform some of the soldier's routine work,

"*Safety personnel performs safety checks on equipment without informing the unit"* (EST, Observations, NW19).
Swedish laws and safety regulations are perceived by the participating units to hinder the overall prerequisites of the exercise: "realistic conditions" (*Rules*) which are expressed by officers (EPT, CU, Conversation, NW19). The motive: *Combat Units* winning the exercise is perceived as the most important motive. Determining a winner is also important for the *Exercise Planning Team*, "*Tablets with the unit's personnel and vehicle positions have been distributed to the umpires. In conversations with instructors, it appears that they suspect that both sides will cheat to win. That's how it usually is on exercises"* (EPT, Conversation, and observations with officers monitoring unit results, NW19). "*When observing umpires interact with Combat Units some reveal the actual enemy position on the tablets to the exercise participant to increase their chances to win"* (EPT, CU, Observations of umpires, NW19).

### 3.2 INTERPRETING THE OBJECT

The individual experience and perception of the contradictions when creating the object presents different opportunities and expectations [39]. These opportunities and expectations are acted on and driven by the individuals' desire and will to achieve something important for the individual or the group. Thus, creating transformative agency influencing human behavior which is connected to the conflicting motives among the members of the activity system [40]. The transformative agency (competing) enables us to take the initiative and *"breaking away from the given frame of action"* [41, p. 49] influencing the nature of the exercise. When combining data from the four groups into an activity system the object *Score sheet* emerges. The object supports a desire to participate in an exercise competition with the desired *Outcome*, a winner is crowned. According to [42] the object defines the activity system shaping each category to align with the object. The desire (winning) becomes a crucial part of understanding human activity and the outcome of the activity system [43]. We as humans understand what is important in the activity system due to sense-forming motives attached to the object which gives meaning to the activity [33]. Sense-forming motives make e.g., cheating and revealing positions acceptable activities. According to [44] sense-forming motives can make individuals pursue dangerous goals if they are profitable. The object is defined as "the sense-maker, which gives meaning to and determines values of various entities and phenomena" [44, p. 5]. The object has shaped the activity system which is displayed in the transformed categories of the activity system.

### 3.3 TENSION AND CONTRADICTION IN THE ACTIVITY SYSTEM

Contradictions refer to the specific problem in an activity system which can occur between the components in the activity system [38], [45] e.g., *Rules* and *Division of labour* creating problems. When the task is divided and allocated to different groups a *division of labour* is created. One group could create a fast solution (promoting speed) and the second group could create a safe solution (promoting safety). Creating a potential contradiction between *Rules* and the *Object*. Contradictions are not equivalent to learning and development. Contradictions need to be identified and addressed which makes them dependent on the support of human decisions and participation to create learning and development [46]. The following results from the two-sided military exercise illustrate how non-supportive actions cause contradiction and tension between the *Object score sheet and Tools, Rules, Division of labour, Community* which are presented in the subchapters: *Tool for competing, Rules for competing, Division of labour for competing, Community for competing.* In some cases, non-competitive action is perceived as a hinder to the competitive action aimed at producing the *Object* with the desired *Outcome*.

### 3.4 TOOLS FOR COMPETING

To succeed in a military exercise, units need a network of enablers, such as colleagues working at the home regiment performing routine work but are willing to work for the unit without being perceived as participants. The network distributes information and physical resources giving the unit with the largest network an edge over other participating units. An officer explained*, to be successful in supporting a unit you must have a network outside the unit. Officers and civilians function as invisible enablers. They can help with problems distribute additional resources and contact civilian landowners enabling new terrain or buildings during the exercise* (CU, Conversation, and observations, NW19).
When observing how resources are divided during the exercise "*there seems to be a surplus to support the Combat Units winning the exercise but at the same time, there are not enough resources for Exercise Safety Team and Other Units to enable their work in a resource-efficient way* (EST, CU, OU, Observations, NW19).

Soldiers and officers have knowledge within their area but lack basic safety knowledge and the skills needed to understand adjacent areas. When they plan and perform the task, they do not understand that they are performing them incorrectly and in many cases are violating regulations, directives, or laws. When violations are observed and criticized, tensions arise between the

different groups e.g., "*safety personnel criticizing participants regarding fire safety. The group with competence is accused of obstructing the exercise and hindering the overall objective"* (EST, CU, Observation, NW19).
There is a feeling of hopelessness in older more experienced officers, "*new officers lack sufficient knowledge and skill to perform everyday managerial duties or performing tasks within an operational unit"* (EPT, CU, Conversation, and observations, NW19). *"The personnel are too unskilled. They do not have enough knowledge"* (CU, Conversation, NW19). *"There are officers on many units who have been recruited and trained for a very specific position. When plans change, which they always do, these officers are almost unusable for training soldiers and squads"* (EPT, Conversation, NW19).

Units participate knowing they lack the resource to perform the task according to regulations. It is socially acceptable amongst the participants and the unit the need to adapt and keep on solving tasks. Individuals create shortcuts and bend the rules to be perceived as able soldiers and officers amongst their peers. "*Maintenance equipment is not developed for fieldwork which increases the repair time for the combat units. Soldiers and officers struggle with repairs due to lack of spare parts, tools, lights, and storage surfaces"* (OU, Observations, NW19).

Routines are mainly used by *Exercise Safety* Team to monitor units. Participating units have written procedures, but they do not follow them. Many routines appear to be created for appearances but not to help soldiers and officers in their work. In conversation with an officer, the SwAF safety regulation was discussed. The officer felt it was mainly written for planning military exercises, not for military operations which made it hard to use. He also raised a question; *"can I even use it when it is comprised of several books. Yes, you could use the pdf file, but to do this a computer is needed, what happens when you don't have one?"* (CU, Conversation, NW19)

### 3.5 RULES FOR COMPETING

The exercise scenario is perceived as real by some participants which in some participants (Other unis) created attitude issues. For example, sleep is regarded as a sign of weakness, and it is also socially acceptable to use foul language when interacting with one another (OU, Observation, NW19). *"Sleeping 12 hours after being awake for only 22 hours"* (OU, Conversation, NW19).
Safety is by some perceived as unattainable in an exercise *"When so many people meet during an exercise, we expect a fatal accident"* (EPT, Army officer) but safety is also unwanted *"We have to accept a certain amount of risk when facing a real enemy"* (EST, OU, Conversation, NW19). Many accept that soldiers and officers are injured during an exercise. *"This type of injury is within the expected range"* (EST, Conversation, NW19).
Regulations and rules are not adjusted to fit within the exercise. Soldiers and officers are faced with situations where the rules are created for routine work during normal work conditions. Individuals use their creativity, experience, and knowhow to solve problems not covered by the rules e.g., in conversation with a nurse, The Swedish Patient Act makes it impossible for military units to acquire information about patients admitted to a hospital which makes it impossible for injured personnel to return to their unit. To work around the problem, nurses working in the exercise staff are deployed to hospitals to get soldiers back to their units.

When participating in a military exercise soldiers and officers belonging to the groups (*Exercise Planning Team*, *Exercise Safety* Team, *Combat Units,* and *Other Units*) must navigate through many informal rules within each group e.g., electrical safety is rubbish (CU, Conversation, NW19) and collective informal rules. One such collective rule is bending the rules, it is socially accepted to cheat when participating in an exercise e.g., informing tactical commanders of the enemy position in advance (CU, Observations, NW19). Participating units get access to information or resources that they can't obtain within their unit. *"Everyone seems to be aware of the cheating and it seems to be socially accepted, that's how you win on an exercise"* (EPT, CU, Conversation, NW19).

### 3.6 DIVISION OF LABOUR FOR COMPETING

Participating units have different social statuses: combat units are seen as tough and impressive, especially the armored and mechanized units; supporting units do not have the same social status. Equipment development and resources are mainly concentrated to units with high social status, "*The personnel responsible for the equipment development of the unit is not interested in the safety equipment and the environmental issues which creates immediate problems for the personnel, instead they focus on the direct combat equipment. When confronted they exhibit disinterest in safety issues the unit is struggling with"* (CO, OU, Conversation and observations NW19). The unit's status impacts the development of the unit.
Situations occur during the exercise threatening the reputation of a unit. Depending on group affiliation the situation is covered up or ignored, "*Exercise observers are asking participating personnel leading questions to enhance the unit's" performance* (CU, Observation,

NW19) incorporating their position in the unit. Structural organizational issues are ignored resulting in potentially harmful behavior e.g., "*a platoon is expected to take on tasks a company normally handles"* (EPT, CU, Observation, FCP-NW19).

Safety personnel is often isolated and excluded from military tacticians. The isolation contributes to making safety a sensitive area that is not a subject for criticism, "*Another interesting aspect that has become clear is that supporting functions that are part of combat units are less valued"* (Observation, NW19). Personnel working with safety are often trying to do more than what is practically possible to achieve safe working conditions.

> Criticizing safety personnel or their work becomes personal, indicating individual low performance or misconduct despite having done more than the organizational resources permit. A Norwegian officer makes comments regarding the accuracy of the safety information, a Swedish officer retaliates by defending the information and the competition (EST, Observation, NW19).

*"Safety rests upon personnel knowledge and experience, not a systematic method of analyzing the actual work"* (EPT, CU, OU, Observation, NW19) e.g., tactical planning methods should include safety regulations and directives. *"Interestingly the Norwegian safety officers are not included in all activities during the planning conference, in order not to reveal tactical information giving the hostile side an advantage"* (EST, Observation, FCP-NW19).

### 3.7 COMMUNITY FOR COMPETING

Safety issues resulting in bad press and media coverage influence the division of labour but at the same time media is also used to put pressure on decision-makers higher up in the hierarchy. News, social media, and events are used to illustrate and enhance a specific desire e.g., obtaining new vehicles or a system to determine a winner of the exercise. *Halting the exercise for a day and summoning soldiers and officers to display and demonstrate new products* (EPT, Observation, NW19).

Participants belonging to *Exercise Safety Team* have different safety knowledge and experience when compared to exercise participants e.g., regarding electrical or fire safety. They are often marginalized and are not allowed to influence the tactical solution. *They are placed in a separate room where they can talk about safety* (EPT, EST, Observation, NW19). *They often excuse themselves when visiting participating units* (EST, Observation, NW19).

> Medical personnel not involved in the exercise are placed at the hospital to liaise with the hospital personnel and pick up and return soldiers and officers to their unit. The patient act endangers the health and safety of recovered soldiers and officers, especially during wintertime. In some cases, soldiers can be left on the doorstep outside the hospital without a cell phone, money, credit cards, and identification card making it impossible for them to get transportation and food. The problem is well known, and medical personnel has tried to inform and describe the problem without success (EST, Conversation, and observations, field notes, NW19).

The limited knowledge of medical issues among military personnel affects how medical personnel is treated. They are hard to incorporate into the exercise but at the same time, the exercise is dependent on hospitals for medical treatment.

During the exercise, several different defense companies participate, and in some cases the lines between the SwAF and another government agency (with the responsibility of purchasing equipment) and the defense industry become unclear. The boundaries are blurred, and the three actors act as one organization. From their perspective, the SwAF becomes a subcomponent in the marketing campaign of new military products. *It feels like the defense industry is a subcomponent in the SwAF. The organizational boundaries get blurry* (EPT, Observations, NW19). The blurry boundaries are visible during the recorded commercial video recorded by the defense industry during the actual exercise. *Members of the Exercise Planning Team engage in activities connected to marketing and sales of military equipment during the exercise* (EPT, Observations, NW19).

### 3.8 FOUR GUIDING PRINCIPLES FOR WINNING

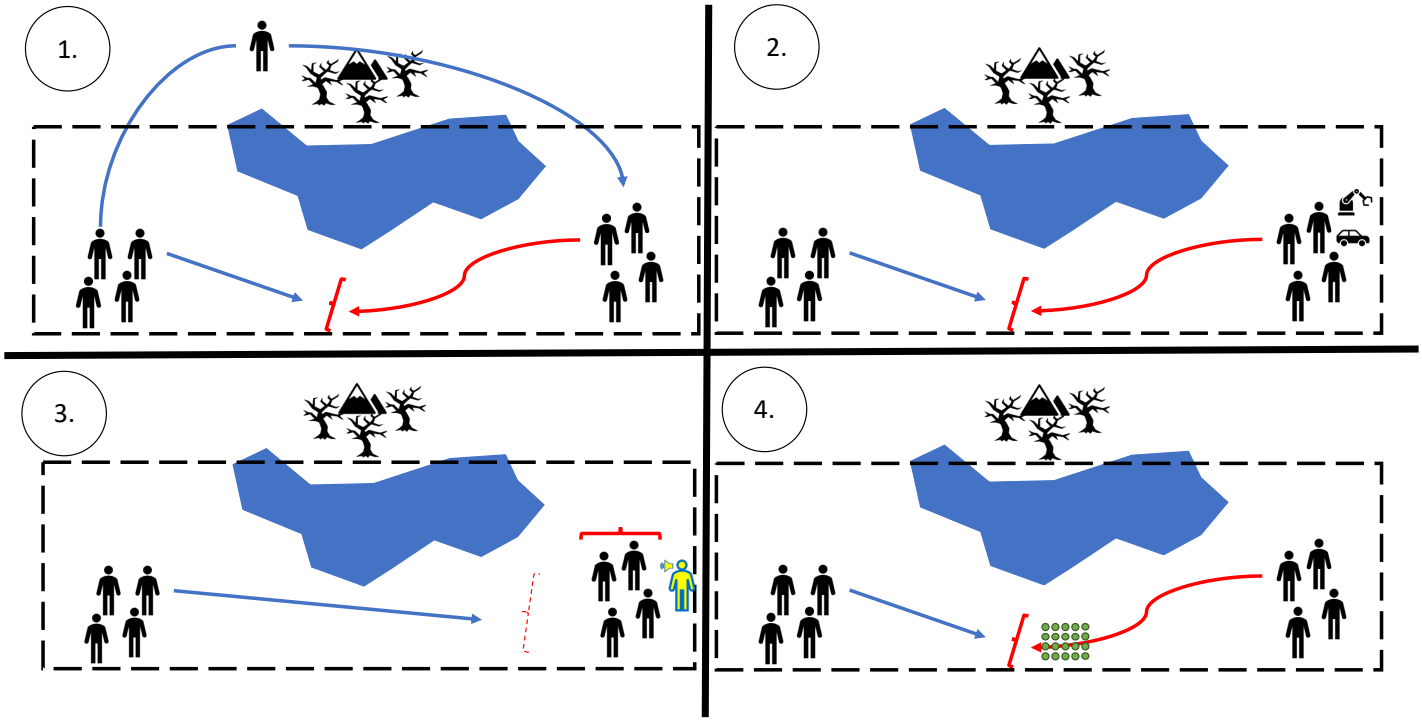


*Figure 1: Adopted principles during a two-sided military exercise*

The illustration in figure 1 represents how participants navigate during the exercise to win.

1. Bending, breaking rules to gain a tactical advantage (Participating units leave the exercise area or disregard rules to gain a tactical advantage).
2. Enhancing unit abilities with unauthorized equipment for exercise purposes (units borrow or lease equipment to gain an enhanced ability)
3. Using an unauthorized network of enablers to gain a tactical advantage (units contact colleges/friends to obtain equipment, spare-part or information/tactical tips to be competitive)
4. Receiving interventions from the exercise staff creates unequal opportunities (Interventions create a tactical situation that favors one side, e.g., exercise mines to hinder a company from being cut off)

## 4 DISCUSSION

Developing military capabilities are important for the SwAF making exercises not only necessary but also the only all-inclusive tool for shaping and creating behavior and experience for military units [47]. The results from this study indicate that the two-sided military exercise is a tool for learning. Following in the footsteps of Goffman [10] where actions influenced by the desire to win are separated by their consequences. Exercise participants are exposed to a two-sided military exercise with non-authentic conditions which is in line with the argumentation made by Schüler and Bjurström [16] and the lack of authenticity. The components in a two-sided military exercise share many similarities with formative intervention described by Sannino and Engeström [39] such as double stimuli, transformative agency, germ cell, and descending from the abstract to the concrete.

The principle of double stimuli allows individuals to change conditions when influenced by human will [39], [40]. The first stimuli are challenging or problematic situation that causes a conflict of motives. The second stimuli are creating or using artifacts to control the problem [39]. Combined with the transformative agency embedded in the construct of the exercise (competing), it allows exercise participants to divert from the intended course of action [41]. Exercise participants are exposed to the conflicting motives (first stimuli) of winning or learning. Tablets with enemy positions, cell phones, and equipment not included in the unit's regular equipment are artifacts (second stimuli) supporting winning which is used to gain a competitive edge on the battlefield.

Exercise participants collectively create the *Object* (Score

sheet) with the *Outcome,* an exercise winner. To understand why the *Object* emerges the principle of descending from the abstract to the concrete must be included, *"method of grasping the essence of an object by tracing and reproducing theoretically the logic of its development"* [37, p. 51]. Shaping abstract military concepts into concrete plans for military action. This can only take place if they are influenced by a (germ cell), *"theoretical abstraction is based on a functional relationship"* [48, p. 586]. During a two-sided military exercise, the germ cell is the opposing force (equipped with simulators) transforming military abstract concepts into concrete military action. The gem cell can be understood as something which has a certain value [48]. The opposing force without simulators has no value and cannot influence the outcome of the battle. A fictional opposing force would have no value compared to a unit with real soldiers and officers participating on equal terms.

The unconscious formative intervention (the created simulation) is not true to the fundamental principles of practice-based games and simulations, combining learning, action, and reflection [9] and separating them from their consequences [10]. Reflecting on one's actions and learning might put the practitioner in a less favorable position increasing the risk of losing the exercise. The only possible learning which could take place during this unconscious formative intervention is learning to win the game. Frank [49] identified that gamer mode is well known in military education in order to win the computer-based wargame. Students who get stuck in gamer mode risk influencing student learning, *"The officers set aside proper military tactical behaviour in favour of exploiting in-game rules to win the game"* [49, p. 4].

The learning which takes place during the exercise follows the principles of [24] authentic learning but is influenced by the unconscious formative intervention: 1) Military personnel perceives the exercise as a competition which makes competitive activities authentic, 2) the learning situation mimics conditions similar to a competition with a winner and a loser, 3) a situation that enables military personnel to think in a competition mode, 4) Authentic assessment and reflection over the competition. But is the type of authentic learning occurring in the exercise wanted on the battlefield? The authentic learning which takes place during the competition can result in learning unsafe work practices [17] which could create organizational incompetence [50] when faced with the authentic situation, actual combat.

The two-sided military exercise creates dilemmas for participants: 1) winning or losing, 2) speed (action), and reflection (thought) both have safety implications and contribute to the safety culture. Using safe work practices, and following rules and regulations creates an exercise disadvantage and is perceived to take more time generating a negative attitude towards safety, *"Safety culture is defined as those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk."* [51, p. 251]. As identified in the data winning the exercise has a negative impact on safety and contributes to shaping a safety culture which in some cases increases the risk for accidents and unsafe work practices. [52] Identify a collective perception relating to workgroup members' acceptance of vulnerability causing soldiers and officers to comply even if the conditions are unhealthy and harmful.

Reason [53] concludes that safety and learning are connected to each other. Participants are exposed to several events during a two-sided military exercise. One way of learning from those events is through an After-action review. The After-action review is a method that could be used to stimulate learning through reflection during the exercise [25]. Due to the nature of the two-sided military exercise, it also raises a question, would units using after-action review during the exercise incorporate errors making them unsafe. Military units performing well (winning) on the exercise battlefield could learn what is needed to win, but not how to perform the work safely, and not what is required for combat.

On the battlefield, learning is vital to defeating an opponent, Schüler and Bjurström [16] define Combat Integrated Learning (CIL) as *"military practices, combat activities and interactions aimed at increasing our own learning opportunities and/or limiting our opponents' learning opportunities."* (p. 4). To incorporate CIL in a military exercise would demand a remake of the design and the nature of the two-sided military exercise incorporating the zone of proximal development [20] recognizing each party as each other's learner, nurturing reflection, and seeing participants as thinking [18], [54] reflective practitioners [55].

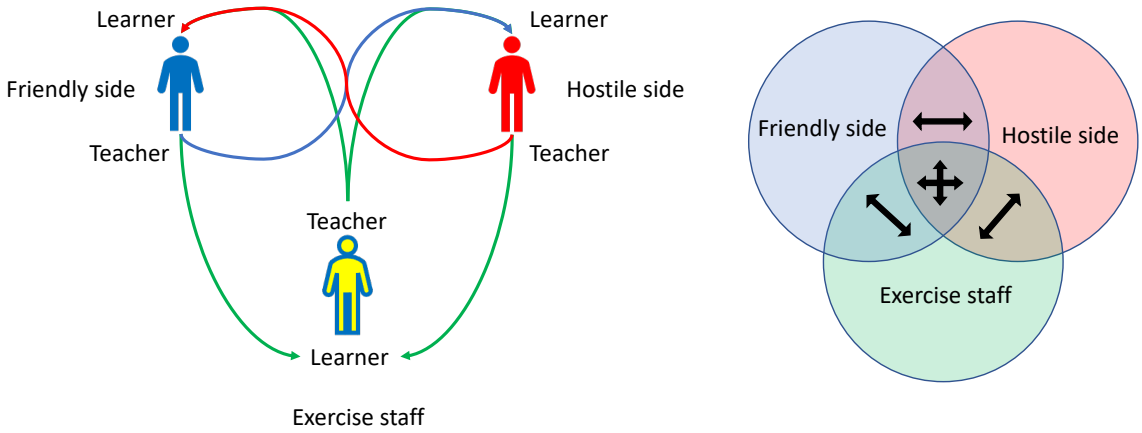


*Figure 2: The zones of proximal development during a two-sided military exercise*

The illustration in figure 2 describes the complex environment which occurs during a two-sided military exercise when three parties try to learn from each other without knowing they are each other's teachers and learners. The blue unit performs an action (Teacher) which the red unit detects (Learner), and the red unit responded (Teacher). The exercise staff (EPT/EST) create injects e.g., safety tasks (check heaters to prevent the risk of fire) which hinder the blue and red units' actions.

The scarce research on two-sided military exercises could perhaps be a starting point for learning, inspired by the research on formative interventions, such as Vygotsky [32], Leont'ev [33], Engeström [26], Engeström and Sannino [36], Sannino and Engeström [39], Allen, Karanasios and Slavova [56]. Activity theory can be used together with the intervention e.g., Change laboratory. Groups performing activities experiencing contradictions and conflicting motives stimulate learning and development [38]–[40], [42]

This study has its limitations; one being the two periods of observations from one army exercise that only uncover glimpses of the two-sided military exercise. Another limitation is data collection, one researcher can only collect a small sample of data from an exercise thus increasing the possibility of misinterpretations. A third limitation is the exercise environment and scenario which acts as a safeguard for some *Combat Units* making them unreachable for data collection. However, as a first steppingstone, it gives some insight for further research and the promise that AT holds as an analytical tool for the SwAF.

## 5 Conclusion

A Military exercise is complex learning activity but is not always recognized as one. The exercise is important for creating military capability, but the study challenges the assumption, that exercises are always good. The study stresses a more alarming issue, what exercises prepare soldiers and officers for, actual work (combat), or a military competition that lacks authenticity. If two-sided military exercises are used as pedagogical tools for learning the design and framing need to support learning. A competitive simulation can create an unhealthy learning environment resulting in unsafe work practices. Workplace learning and practice-oriented research have much to contribute when shaping tomorrows fighting force. Formative interventions and the activity theory framework can be a useful tool in reshaping the military exercise into a learning opportunity for the military, detecting bottlenecks and limitations, and affecting the health and safety of participants. In the future researchers should examine other military service branches to identify learning differences and similarities. Once learning factors have been identified the knowledge can be used to create a learning framework for a two-sided military exercise.

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