

The Instructor Role during Educational Wargaming

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Abstract

The instructor has a vital role in leading the debriefing discussion in game-based learning. The role during the gaming part is however not as clear. Some results suggest that the instructor should take an active and authoritative role, but results provide few clues on how to apply this to military wargaming. Wargaming is a two-sided game activity where both sides are assumed to learn from their play experience. Wargaming against a live opponent can however produce unwanted effects. One such effect is 'gamer mode' that is a result of an exaggerated willingness to win, which can be observed when the players, for instance, exploit the game rules in unrealistic manner. This paper investigates the main responsibilities or duties of the instructor to prevent gamer mode to occur and instead support the desired player-orientation toward the game. By reasoning on the main characteristic features of wargaming, to play the game and to learn from the experience, I conclude that the main duties of the instructor are to frame the game activity and to steer the learning process. This supports earlier results that the instructor should take an active part in the gaming process, yet needs to have the skills, knowledge, and authority to intervene in students' game play. The findings are illustrated with excerpts from videotaped wargaming sessions at the Swedish National Defence College.

Keywords

Wargaming, education, instructor, gamer mode

INTRODUCTION

Professional uses of simulators and games have been successfully employed in military education for centuries (Smith, 2010). In wargaming, the focus is on examining conflict in an artificial environment (Rubel, 2006) and on the exercise of human decision-making (Perla, 1990). However, wargaming and other educational uses of games are not without difficulties; players may use the game differently from what is intended (Rieber & Noah, 2008). One such irregularity occurs when players try to achieve the game goals in ways that divert them from the learning objectives. Their attitude becomes one of gamer mode, which is defined as “gaming the game”; to win at all costs instead of nurturing learning goals (Frank, 2012).

One root cause of this problem is the game itself, specifically the goals designed in the game (Lind, 1985) that tempt players to become over-aggressive. The consequences, beyond the observable deficient attitude toward the game, are un-tactical behaviour and present higher risk tendencies among the players (Frank, 2014).

The players need to be aware of what is demanded from them, that they are both playing a game and are expected to play the game professionally, that is, role-play as if they are commanders that control real military units. However, this dual user requirement is fragile and difficult to sustain; when the game is not perceived realistic enough or does not live up to expectations, players can dismiss the legitimacy of the activity, abandon the idea of professionalism, and enter the gamer mode (Frank, 2011). In gamer mode, player behaviour becomes rational with respect to the game rules and goals, but irrational with respect to the corresponding real-life situation.

Instructors are nearby to facilitate the learning process in wargaming. One important responsibility for them is to monitor and collect information on events that can be discussed later with the learners during debriefing. This discussion after a game event is one of the most important phases for learning to occur (Crookall, 2010; Lederman, 1992). During gaming, before debriefing, one can argue that the instructor role should be more passive if we believe that the students’ active engagement with the game is what generates the learning experience. Yet results suggest that the instructor role is more active than passive. Taylor, Backlund & Niklasson (2012) argue on a coaching approach of the

instructor in vocational training with simulators and games. With a coaching approach, instructors are not silently observing and assessing learners' behaviour but are instead actively taking part in the gaming process to provide feedback and deliberate practice to the students. Kriz (2010) supports this position and argues that the instructor should be "sufficiently active in the background".

However, few results provide information on how to facilitate educational wargaming. Wargaming is a two-sided game activity where both sides are assumed to learn from their play experience. Each side is making decisions and influences the course of events in directions not known from the start, which mandates a slightly different style of instructor control. Instead of trying to control the sequence of events that unfolds, the instructor should not worry so much on the events but instead focus on how the players make decisions. If to play a game and at the same time to behave professionally are not met or not part of the game requirements, then the learning experience could be compromised. Gamer mode (Frank, 2012) is such a problematic player orientation during game play, which is suggested to be corrected as it emerges and not only discussed afterwards. Incidents that occur during game play can produce side effects. Jones (1998) argues on the so-called 'hidden damages' during game play that could pose a bigger problem than just destroying the learning experience. Jones means that after the game, players renegotiate their identities and relations outside their gaming roles, which could influence players' relation with each other.

This paper focuses on the instructor role during game play in educational wargaming and how the instructor handles and supports the desired player-orientation towards the game. This is done by examining earlier studies in wargaming and analysing the literature on game-based learning in general. The findings are illustrated with excerpts from videotaped wargaming sessions. The results show that two major instructor responsibilities can be discerned. First, in framing the situation, the instructor task is to constantly remind learners of what is required from them and how they should view the activity. This includes making clear the difference between performance and learning. Second, in steering the learning process, the duty of the instructor is to uphold the link between the game and the real-world, for instance by assisting players in assigning meanings to and explaining screen events and what

these mean in the real-world. Based on these results, I argue that instructors have an active and central role during game play to help shape the activity and to manage issues like gamer mode when they emerge.

THE INSTRUCTOR ROLE IN GAME-BASED LEARNING

Wargaming is similar to game-based training, and according to Klabbers (2009) includes three phases: preparation, game play, and debriefing. In scenario preparation, the event is planned and scheduled with both the objective and learning in mind. During game play is when the action happens, it is where the simulation or game provides the learner with experiences that are discussed in the last phase, debriefing. During this post-experience analytical process, the learner is given opportunity to reflect upon the experiences and draw lessons to be learned (Lederman, 1992). This combination between experience and reflection is vital for learning to occur (Crookall, 2010; Lederman, 1992), and it is up to the instructor to support this discussion. Although debriefing afterwards is highly recognized as the essential part for learning to occur, few results elaborate the instructor's main duties while players are gaming.

Egenfeldt-Nielsen (2005) argues that a teacher role in learning history through computer games is to maintain a balance between playing and learning. Teachers should also foster students' exploration and provide the link between historical events and episodes in the game. By this, Egenfeldt-Nielsen argues that the teachers need to understand the computer game as well as possess historically relevant knowledge.

Liu and Wang (2006) problematize that teachers are deprived of their leading role in game-based learning and suggest software tools to solve this issue. Kriz (2010) also supports a more active role but not to the same extent as Liu and Wang. He suggests that the instructors should avoid an authoritarian policy, and instead be "sufficiently active in the background". By 'active' Kriz means that the instructor must be aware of the decision processes and group dynamics to ensure that the learning objectives are met (Kriz, 2010).

Taylor et al (2012) suggest that instructors take on an active role during vocational training, not to the extent that they become authoritative, but more a role that is included in the gaming activity. In Coaching-by-gaming (Taylor et al, 2012), the instructor is an active agent in the gaming process and challenges the students in the spirit of deliberate practice (Ericsson, Krampe, & Tesch-Römer, 2006). The many events that occur during game play are managed and somewhat

controlled by the instructor who can steer events into proper direction and provide feedback to learners at an appropriate time.

Yet wargaming is played somewhat differently than in vocational training. Wargaming, as we use it at National Defence College, is played against a live opponent and the events are, in normal cases, hard to predict beforehand as the situations that unfold are a result of the decisions made by opposing sides. It is worth reminding that wargaming can be played differently depending on scope, students' expertise, technology available, learning objectives, and number of supporting persons available. For instance, the instructors can play as the opponents in order to gain more control over events and pilot students into right learning path. Wargaming can also be played on game boards, maps as well as computers. Yet, regardless of wargaming approach, learning is seen coming from the human decision-making process and not what result of the game is (Perla, 1990; McHugh, 2011). This means that reflections on why participants made certain decisions are more important than what the outcome is. However, wargaming against a live opponent can produce unwanted effects. One such effect is gamer mode that is a result of an exaggerated willingness to win, which can be observed when the players, for instance, exploit the game rules in unrealistic manner.

The instructor's main duties during wargaming are the point of departure of this paper. The instructor is faced with dealing with players who are supposed to play a game and learn from their experience.

Setting aside the preparation and debriefing phase for now, I am interested in finding the main responsibilities or duties of the instructor to support the desired player-orientation toward the game and what skills are needed to fulfil these responsibilities. This is done by reasoning on the characteristics of wargaming - to play the game and to learn. Some of the problems the instructors are dealing with are illustrated with excerpts taken from wargaming sessions conducted at the Swedish National Defence College.

THE CONTEXT OF WARGAMING SESSIONS

The examples originate from a study that was conducted among military cadets playing an educational wargame during 3 days, as part of an 8-week course in war science. The wargaming part was one of the final

stages in the course where they would test their plans and apply the theories they have learned earlier. The cadets used a commercial strategic computer game, *The Operational Art of War* (Matrix, 2005), in which a specific scenario was created to match the orders given to the cadets.

Before the wargaming session, all participants planned the complete scenario using paper maps, thus, familiarizing themselves with the terrain and capacities of the military units. Besides learning basic battalion combat, learning objectives included testing plans in a simulated environment. The game scenario, Operation Pajazzo, was specifically created for this course. The scenario was made as a head-to-head battle with comparable forces on the blue (NATO) and the red (Opfor) side. The participants played the game in groups of 2-3 people in duels, NATO side against Opfor side. As they played the game, they were instructed to comment on their choices, revealing their reasoning. The turn-based computer game was played on a hexagon map where each competing side had 15 minutes to complete a turn. The battle continued for eight full turns, and in the end, the players discussed the state of the game and the whole game session with an instructor. Each group played the scenario for three rounds, shifting side between NATO and Opfor. Before playing Operation Pajazzo, the cadets were given 2 hours to familiarize themselves with the commercial game.

The game sessions were recorded using video cameras, audio recorders, and screen captures to enable interaction analysis (Jordan & Henderson, 1995) of the material. I am interested in how the game is played and how the social interaction takes place outside the screen. Interaction analysis provides a good technique for this purpose as I can observe cadets' interaction with the game and their reasoning, which gives clues to cadets' sense-making, and reveals underlying assumptions of the game. From the video material, I specifically searched for interaction between instructor and the cadets that provided insight on how the instructor dealt with issues that emerged. These excerpts then served as examples to my reasoning around the instructor role in wargaming.

INSTRUCTOR DUTIES IN WARGAMING

The two characteristic features of wargaming are that players play a game that simulates warfare and that they are expected to learn from this experience. Instructors need to pay attention to both these features during game play, or else, as I will argue, confusion may arise among

participants leading to the worth or value of learning that might not be as valuable as it could have been.

The gaming in wargaming

The first characteristic feature of wargaming is that participants play a game. Divided as opposing sides, players struggle to reach their objectives in a fictitious operational environment that does not involve any real military forces.

As noted in business gaming, which is similar to wargaming, the challenging game environment can generate excessive competitiveness (Harviainen, Lainema & Saarinen, 2012) when players “stick to what is perceived as winning strategies, even if those strategies would be completely absurd in real life”. Rubel (2006) notes that in wargaming, players tend to be more aggressive than in the real world, which is similarly a symptom of excessive competitiveness.

When players adopt strategies to win the competition, they may lose grip on what the learning objectives are. Instructors must find ways to recognize this unwanted player behaviour and apply methods to suppress them. Not in a sense that competition loses importance, warfare is indeed a struggle to overcome the opponent and the competition matters to the players, but instead find ways to tone down the competition aspects. Harviainen et al (2012) make a distinction between performance and learning in business gaming, which is also useful in wargaming. Players struggle against their opponent and a good performance will lead to victory. However, from an educational perspective, performance is not as important compared to what could be learnt from the games. Who is declared a winner in the end is not as important compared to the insights and reflections upon why and how decisions were made in the gaming environment. For game-based learning in general, and in wargaming in particular, lessons are learnt from both success and failure. It is essential to have the instructor nearby to constantly remind players of this chief educational purpose.

The following excerpt provides an example of how gaming and winning matter to players. While performance and who actually wins may not be important for learning to occur, it is something that needs to be acknowledged. The excerpt was taken just after the final turn of the game and before debriefing. A bystander was having an argument with Stuart and Tom on who won the game. Unfortunately, no instructor was nearby

to resolve the confusion and to explain what should be regarded as important.

1.	Stuart	They went after points...that is what they did at the end. But they have nothing left (giggles)	
2.	Bystander	But they won.	Meaning that the game declared Stuarts adversaries as winners
3.	Tom	Yeah, but the computer calculate points.	
4.	Bystander	Yes, but they won.	
5.	Tom	Don't try it	
6.	Bystander	But that is what they did...you can't sit here and "they won because of the...."	
7.	Tom	Yeah, but that is a limitation in the game itself.	
8.	Bystander	Yes, but the point is based on their attack capability	
9.	Stuart	I think it's funny that we got defeated by them....that their recon troop stood against <u>this</u>	Highlight a reasonable bigger unit that according to them would defeat the recon troop

The dialogue happened just before the instructor approached them to conduct debriefing. According to the computer game, Stuart and Tom have lost the game. They are not willing to accept this as they noticed that their opponents abandoned their professionalism and did absurd and foolish moves in the end, probably only to collect points to be declared winners by the computer game. If so, this eagerness to win at all cost is

one of the typical behaviour of playing in gamer mode. What conditions shall be fulfilled to be declared a winner created confusion, and to some extent, it seemed to matter to the cadets. Tom explained that the limitation of the game was the reason why they lost, but the bystander was persistent that the winner was declared by the computer game. As the instructor was not nearby, there was no one who can dissolve this confusion appropriately. Surprisingly, this confusion was not brought up for discussion by anyone during debriefing. If an instructor would have been present or made aware of the discussion, he or she could have reminded the cadets on the educational objectives and the difference between winning by points and maintaining a sound decision-making process.

Playing as if

Besides playing a game, learners are also expected to wargame as professionals, that is, role-play as if they are commanders that control real military units. However, the gaming part of the activity can produce too much competition that players abandon their professional orientation.

Results show that players who perceive that the game makes unpredicted game calculations, as in resolving a combat situation, can drop out of their game roles (Frank, 2011). Although players are commanding simulated units in a fictional world, they need to adopt a role and play as if it is for real. This means that a suspension of disbelief is maintained during wargaming. When players shift to gamer mode, they drop out of their game roles and it is up to the instructor to force them back in. This can be done by reminding players what is part of the exercise and what can be ignored. Furthermore, the instructor can participate in the role-play to legitimatise the activity towards the players (Taylor et al, 2012).

This requires experienced instructors who know the limits as well as strengths of wargaming as a learning method, and who can deal with issues as they arise and both act as a guide and authority to the players; learning process.

Below is a situation where the instructor acted as in-game commander to the team. Although he role-played as the commander, he swiftly shifted between a game frame and a real-world frame as he explained time periods.

1.	Ron	Major, request to scout south of the battalion border. To place a reconnaissance troop south of....	
2.	Instructor	Where?	
3.	Ron	Down here to have eyes on....	Circle their mouse pointer on an area south of their battalion border
4.	Instructor	Somewhere around map mark 105. South of it	105 is a point on the map
5.	Luke	Yes, to stop the enemy to surprise us in the back.	
6.	Instructor	You don't want them in 107 then?	
7.	Luke	Erhmm, we could....	
8.	Instructor	There is a problem to get access to reconnaissance from the brigade. So you are welcome to send your battalion reconnaissance forward along 107, but then we want reports from that area directly to the brigade staff. Within 12 hours.	
9	Ron	Acknowledged	
10.	Luke	That is three turns?	
11.	Instructor	It's two	
12.	Luke	Two turns, then we'll do it.	
13.	Instructor	What turn are you playing right now?	
14.	Luke	The second one.	
15.	Instructor	OK, so in turn four you must be ready to	

leave that area.

In the excerpt, the team (through Ron) uttered a suspicion that the enemy might surprise them in an attack from south. They wanted to scout in that area so they have time to respond to that threat. However, this area is beyond their battalion border so they asked for permission from the instructor, who instantly adopted the role of their commander as seen in (2). This commander role is clear in (8) where permission was granted and explained in terms what was going on at higher command. The higher command was neither played in the game in other ways than in this spontaneous response from the instructor. The instructor also mentioned the time period in real units (hours) and not how time is represented in the game (turns). This stirred some confusion to Luke, seen in (10), and so he asked the instructor what 12 hours actually meant in the game. The instructor then translates 12 hours into the time represented in the game, in other words, he framed time differently. To make sure they understood, the instructor also told the cadets in what turn they must leave the area.

To both play a game and adopt a role can produce occasions where the players are confused. Based on the reasoning and what I've seen on the videotape, I argue that the instructor should take an active part in the gaming by framing the activity to eliminate this confusion. The instructor should remind players that in the game they are playing there is a difference between performance and learning. Instructors should also support the players' role-play and their professional orientation to the game activity. To be able to frame the activity, the instructor needs to be experienced with wargaming. They need to know wargaming for all its qualities and difficulties; otherwise, it is hard to frame the gaming situation with the learning objective in mind.

Nurturing learning by facilitating the game play

The second characteristic of wargaming is that participants should learn from their gaming experience.

Although the literature points at the importance of debriefing for learning to occur (Crookall, 2010; Lederman, 1992), there are also many situations during game play that serve as opportunities for the learner to come into deeper contact with the subject matter.

Studies show that instructional support in gaming is vital to the effectiveness of learning with games (Hays, 2005). Adjacent to games, in scientific discovery learning with computer simulations, results show that learners have problems to learn by themselves (de Jong & Joolingen, 1998). This is explained by that learners need support in formulating hypothesis and experiment with what they see on the screen. With wargaming, this means that we cannot expect novice students to fully understand the underlying principles of war by just wargaming without the support of instruction.

What kind of events and situations that emerges in wargaming is almost impossible to predict due to the dynamic properties of the activity. To transform an event into a learning session requires either a disciplined learner who is able to extract what can be learnt from a situation or an instructor who can support the process of assigning meaning to a situation. The instructor can explain game events and map these to what they correspond to in the real-world. Although this mapping is important for learning, for practical reasons, it is difficult to constantly have instructors nearby to monitor and follow game events. The ratio between instructor and learner is seldom good enough to be able to observe all events that unfold in a classroom of several separate game sessions.

Alternatively, the instructor could approach the learner at an appropriate time. One such special situation that serves as a good entry point for the instructor to intervene is when events occur unexpectedly (Frank, 2011). Usually, these events occur because of flaws in the game model or that learners do not possess enough knowledge and are simply startled by the outcome of the game. The instructor can intervene and assist players and clarify their confusion by explaining what is going on and by this, the situation is transformed into something beneficial to learning. Otherwise, if no instructor intervention occurs, there is a risk that the game loses legitimacy. If a wargame is perceived to not uphold a truthful representation of warfare, then there is a risk that learners would respond with a 'simulation denial' (Turkle, 1996), which in turn can lead to learners entering gamer mode (Frank, 2011).

Below is an excerpt of a situation where instructors provide explanation to an event that occurred earlier during combat.

1.	Instructor	So, how's everything going?	Approaches the cadets and looks at the screen
2.	Robert	I think it goes well, but we let go of Cassino to easily	
3.	Instructor	But you can get it back, right?	
4.	Robert	That's what we working on right now, with an indirect approach. We thought of attacking here (points at a pass) and go for a breakthrough. And in the same time do some harassing attacks with our recon unit, which will destroy their logistic routes.	
5.	Instructor	Mmmm. That kind of thing.....I don't think a recon troop will harass that much. If you put a company to that task it will harass a whole lot more.....even in the game.	
6.	Instructor 2	You'll take them in the pass?! That's and old native american tactic	giggles
7.	Robert	We got a little surprised when we attacked as the only unit that retreated was a mechanized infantry company. These ones stayed here although we won the combat. And that surprised us.	Points at the screen and refers to an earlier situation.
8.	Robert	(after a pause without response from the instructor) Well dug-in	Seeks answer to the unexpected event by himself.
9.	Instructor 2	Well dug-in and in well prepared defence	Everybody smiles

		lines	
10.	Instructor	(after a brief moment of silence)	
		It would be very hard, even in reality, to attack a dug-in, guided missile anti-tank platoon, which is equipped with both missile 55 and missile 56. That would be <u>really</u> hard.	
11.	Instructor 2	Not fun at all	
12.	Left and right	In silence

This event started with an instructor walking by the cadets just to get briefs on the current situation. The cadets responded that they lost control of the town of Cassino, which is one of the objectives in the game. In (4), Robert commented on their strategy to retake control of Cassino by using a method in the Swedish military doctrines (indirect approach). This strategy is somewhat corrected by the instructor who in (5) made it clear that a recon troop is probably not the right unit for the job. The last phrase in the sentence, “even in the game”, explains that the game is realistic enough to take into account the size difference between a recon troop and a larger unit. Another instructor came by to give his view on the current situation, yet Robert seemed to want to continue the discussion of game realism. Perhaps as if he wanted to say that the game isn’t realistic enough, which then would justify their strategy to use such a small unit to disturb opponents’ logistic lines.

In (7), Robert mentioned an earlier event where the combat calculation produced an unexpected outcome. No one responded to this directly. Instead Robert, by himself, tried to explain why not all units retreated. This was affirmed by the instructor in (9), who not only confirmed Robert’s explanation that the enemy unit was dug-in, but also explained that the enemy was familiar with the terrain. Familiarity with the terrain is not included in the game’s logic but seemed to serve the purpose to explain why not all units retreated. The first instructor was in silence for a moment, as if he searching for explanations to Robert’s earlier critique. In (10), the instructor finally gave his explanation, which was coupled with references to what a real anti-tank platoon is equipped with. The

instructor did not only comment that game has made an accurate adjudication, but also remarked on the foolishness to directly attack a dug-in unit. The cadets' silence in (12) is interpreted as an acknowledgement and an understanding of how they should instead see that event.

This excerpt is an example of how an instructor manages to explain an event in the game by providing real-world references. This is an important responsibility and if properly conducted, as in the example above, it can support cadets reasoning and their learning processes of warfare. The other side of this issue is that instructors must contribute to uphold the games' ability to be a legitimate illustration of warfare. If the learner dismisses the game, they can easily shift orientation towards the game and enter gamer mode (Frank, 2011). This calls for an instructor that follows the gaming process and is given the authority to intervene. It may be the case that players quietly accept the outcome from the game without challenging the underlying assumption, or worse, assume a different meaning to what happens on the screen that have no real-world relevance. The instructor should have the authority over the gaming process, where he or she is given opportunities to steer the learning process and challenge the players' beliefs and assumption. How many instructors are needed to provide this service is up to the setting and the skills of the players, but the responsibility requires that the instructors both understand warfare and the models in the game.

SUMMARY AND DISCUSSIONS

This paper investigates the instructor's main duties during game play in educational wargaming. Previous results from simulator training suggest that the instructor should take on a semi-active or active position during gaming simulation (Kriz, 2010; Taylor et al, 2012). However, the characteristics of wargaming will probably mandate a different instructor role to deal with issues concerning gaming and learning.

Wargaming is played against a live opponent and the events and outcome from the game is hard to predict beforehand. The players are expected to play the game to win while assuming the role of commanders, and this experience is expected to nurture the players' learning of warfare. From a gaming perspective, the instructor should frame the activity, which means to remind learners of what is required from them and how they should view the activity. In steering the learning process, the role is to uphold the link between the game and the real-world by

providing explanation to what happens on the screen. The role is also to be able to identify critical decision situations that should be discussed afterwards during debriefing. Based on these reasoning, I argue that instructors have an active and central role during game play that helps shape the activity toward the learning objective and can restrict occurrences of gamer mode.

However, to make this happen, several instructor requirements can be outlined. First, there is a need to have experienced instructors that understand wargaming, otherwise, it will be hard for them to frame the learning environment. They also need skills in warfare to aid players in assigning meaning to what occurs on the screen. Some events can only be understood by explaining how the underlying game models warfare and, consequently, the instructor needs to understand the features and underlying models of the game. Lastly, as an event will occur that could lead to player confusion, there is a need for the instructor to be able to follow the game process and have an authority to intervene, especially to be able to intervene when players fall into gamer mode.

These results concur with earlier arguments from Taylor et al (2012) and Kriz (2011) that highlight the importance of having an active instructor present during game play. This supplements the argument that debriefing led by an instructor is important for learning to occur. The instructor role during game play helps shape the activity, avoid player confusion, and support players in their reasoning to what is going on. By this, the instructors are active in nurturing the learning process and supports making the game play a valuable experience. This reasoning is confirmed when observing instructors in action. From the video material taken from educational wargaming practice, I have observed how the instructor role-plays to preserve suspension of disbelief, how the instructor explains the details and principles of warfare based on what is happening on the screen. I have also seen situations where it would be beneficial to have instructors who could dissolve confusions.

Consequently, I question approaches where players are left on their own during game play, even in situations where the players possess enough knowledge of the subject matter, and believe they are in no need of facilitation to play the learning game. Gaming is such an engaging and motivating activity that calls for an objective instructor who can constantly remind players of the learning objective and the reasons to play the game.

Furthermore, the game play serves as a huge resource of opportunities where situations that emerge can and should be discussed afterwards during debriefing. Regardless of player expertise on the subject matter, they are probably so much into the game that they cannot see lessons learned from these situations when they happen. In addition, they may be enticed to win the game that they lose sight of the reality aspect to the actions they are performing. This calls for the instructor to observe and intervene during game play as well as collect material for discussions afterwards.

As a final remark, these arguments send a clear message to other educational uses of games. In serious games and distance learning approaches with games, there is an assumption that learning automatically occurs from the playing experience. These approaches often focus on the design of the game and the different phases (introduction, gaming debriefing) are all supported by the software. For instance, the vital debriefing phase is usually a text or audio summary of what should be learnt from the game just played. However, it is not a discussion and it is not supervised and led by an informed instructor who could highlight critical issues experienced by the players in this particular situation. Although game designers could create software that supports debriefing after gaming, I seriously doubt that software alone can direct player attention to the learning matter, support player reasoning, correct a faulty behaviour, and collect valuable situations that should be discussed afterwards. This means that educational gaming, in general, is better executed when supervised and supported by active instructors during all phases: preparation, gaming, and debriefing.

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