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## Theory and practice

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**DOI**
10.1007/978-3-319-78795-4_8

**Publication date**
2018

**Document Version**
Final published version

**Published in**
Intersections in Simulation and Gaming - 21st Annual Simulation Technology and Training Conference, SimTecT 2016, and 47th International Simulation and Gaming Association Conference, ISAGA 2016, Held as Part of the 1st Australasian Simulation Congress, ASC 2016, Revised Selected Papers

**Citation (APA)**
Roungas, B., de Wijse, M., Meijer, S., & Verbraeck, A. (2018). Pitfalls for debriefing games and simulations: Theory and practice. In *Intersections in Simulation and Gaming - 21st Annual Simulation Technology and Training Conference, SimTecT 2016, and 47th International Simulation and Gaming Association Conference, ISAGA 2016, Held as Part of the 1st Australasian Simulation Congress, ASC 2016, Revised Selected Papers* (Vol. 10711 LNCS, pp. 101-115). (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); Vol. 10711 LNCS). Springer. https://doi.org/10.1007/978-3-319-78795-4_8

# Pitfalls for Debriefing Games and Simulations: Theory and Practice

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**Abstract.** Debriefing is considered, by many scholars, to be a fundamental part of learning through games and simulations. Despite its significance, there is a lack of research in the area of debriefing, which results in unaddressed factors that inhibit debriefing. Research in the field is complicated by many influencing factors varying from context to game, the purpose of the game, conditions and player specifics, facilitators etc. Insight in the role of these influencing factors can aid in understanding how debriefing can be optimized. In doing this research so far two viewpoints are relevant, the first is the design of debriefing and the second one is the actual execution of the debriefing. The aim of this study is to identify, on the basis of literature, the influence of factors and their interrelation, and subsequently, to categorize them based on expert opinions, so as to determine which pitfalls have the highest influence on inefficiency and ineffectiveness of debriefing. Based on 12 pitfalls identified in literature, and through the use of an online questionnaire, facilitation experts evaluated the extent to which these pitfalls occur due to the design or the execution of the debriefing, and the extent to which they are influenced by the rules of games and simulations. All 12 pitfalls seem to occur in practice, to some extent, due to both the design and the execution of the debriefing. Nevertheless, some pitfalls appear to be more influenced either by design or by execution. Moreover, the results on the extent to which the pitfalls are influenced by the rules of games and simulations are inconclusive, due to the contradiction between the answers on the pre-defined questions and the comments of the experts. A method for further extending the list of pitfalls and verifying the results, hence minimizing the threat to the internal validity of the study, is proposed, which includes a more extensive literature review, interviews, and case studies.

**Keywords:** Debriefing · Game and simulations · Pitfalls

## 1 Introduction

As Dewey [1] stated*: to reflect is to look back over what has been done so as to extract the net meanings which are the capital stock for intelligent dealing with further experiences*, and debriefing in gaming does exactly that. It is a facilitated reflection in the cycle of experiential learning [2].


A. Naweed et al. (Eds.): SimTecT 2016/ISAGA 2016, LNCS 10711, pp. 101–115, 2018.
https://doi.org/10.1007/978-3-319-78795-4_8

Historically, debriefing originated in the military [3] and it is generally described as a process to elicit information pertaining to an experienced event, in order to gain a better understanding of it [4]. Debriefing has been identified to be the most important step of games and simulations (G&S) [5–9] and it is a competency that simulation educators need to master [10, 11]. Debriefing aims at linking the content presented during the G&S session with reality and thus, it is where learning occurs [12]. Despite this fact, there is only a limited amount of papers on how to debrief, how to learn to debrief, what methods of debriefing exist, and how effective these methods are at achieving learning objectives and goals [13]. As a result of this lack of research, several factors that inhibit debriefing remain either unknown or disregarded, or are poorly addressed. The aim of this study is to identify such factors in the literature and categorize them using expert opinions, to determine which pitfalls are responsible for an inefficient and ineffective debriefing. The goal is not just to create a check-list of pitfalls to use and avoid while debriefing, but to propose an efficient and effective, science-based methodology for structuring debriefing. This paper aims to do that by adopting 2 logic categorizations from a design perspective and from an execution perspective: 1. The extent to which a pitfall occurs due to problems with the design of the debriefing or due to problems with the execution of the debriefing, and 2. Whether a pitfall mostly occurs in rule-driven games/closed simulations (hereinafter referred to as 'closed G&S'), in free-play games/open-simulations (hereinafter referred to as 'open G&S'), or both. Bottom line, the contribution of this paper is the first step towards a methodology for identifying and addressing factors that inhibit the design of debriefing of G&S.

In Sect. 2, the state-of-the-art on pitfalls while debriefing is reviewed. In Sect. 3, the research methodology is described. The results of the questionnaire are presented in Sect. 4 and the paper is concluded in Sect. 5.

## 2 Background Work

In this section, literature on factors that inhibit debriefing is presented, resulting in a list of pitfalls, as identified in earlier work by the authors. The literature study revealed 12 pitfalls relating to debriefing:

1. The debriefers' level of involvement and style is not appropriate [14].
2. Debriefers have a lack of understanding of the debriefing process [15], which can lead into providing "easy" solutions [16] and/or violating the debriefing process [17]. This might occur due to lack of training and/or interest to improve.
3. Lack of plan [17] and/or rules [18].
4. The allocated time for the debriefing is short [19] and/or the complexity of the simulated scenarios, occurring during the debriefing, may require a repetition of the G&S, or lead into violating the planned time of the debriefing [17].
5. Ineffective use of audiovisual (A-V) material [7], which can lead to interruptions in finding relevant video segments [4].
6. Lack of emotional safety of the participant, probably revealed because of (a) different levels of experience between the participants, (b) a difference in education

(c) various other psychological reasons [4] or due to the fact that debriefers might not take into account emotions [17].
7. Factors related to the actual physical environment, where the debriefing takes place [4, 20].
8. Choosing the appropriate structure for debriefing [21].
9. The tendency of the participants to assign blame [17] and antagonize each other.
10. Lack of trust of the participants towards the debriefers [22].
11. The simulation is not organized in a personal basis, which inhibits the effectiveness of debriefing [23].
12. Inappropriate timing/scheduling of the debriefing [24].

As the above list shows, pitfalls while debriefing vary significantly. By no means can this list be deemed complete as it is drawn out of specific contexts, but it is the product of an extensive literature review, and as such, it contains the majority of the most important factors that inhibit debriefing. In Sect. 3, a methodology for identifying the pitfalls that contribute to an inefficient and ineffective debriefing is proposed.

## 3 Research Approach and Methodology

The focus of this study is on the design aspects of debriefing; its purpose is to develop a broad methodology for debriefing and not just a checklist for avoiding pitfalls. Given the list identified in Sect. 2, which already has a considerable amount of underlying complexity, the list could grow quite lengthy. Therefore, a methodology is needed both for practical and scientific use.

The methodology for debriefing might need to be different for the different types of G&S and is influenced by factors like the participants, the facilitator, and the variations in the context of the G&S. The conglomeration of all these criteria would probably render a complex and difficult to analyze result, which is why researching G&S is a challenge [25, 26]. Therefore, it is a logical first step to look at factors that a facilitator is able to influence, such as the design and the execution of the debriefing. G&S is a design science, and therefore looking at design is crucial [27]. The design of the game influences the behavior, which influences the learning during the game, and hence reflection during debriefing. Kolfschoten [21] made a distinction between the person that designs a collaboration – which, for instance, is the debriefing - and the person who executes it. Despite the fact that in a G&S these individuals might be one and the same, this distinction is an indication of the different tasks and skills the design of a debriefing requires as compared to the execution. Hence, this criterion could enable the distinction and focus on those pitfalls that are mostly influenced by the design of the debriefing.

The second criterion used is the division between open (free play) and closed (rule based) games [27], or in other words: whether a pitfall is more likely to occur in a closed or in an open G&S. The design of these games, both at the opposite ends of a continuum, is fundamentally different. In a rule-based game, rules define the actions in the gameplay, whereas in an open game there are nearly no rules other than rules to guide ethical behavior like “do not hurt each other” and “you may stop playing the game at all times after deliberation with the facilitator” [27]. During debriefing, looking back at the game

play is a crucial part. As such, using this criterion allows to identify whether, and to what extent, the rules on a closed G&S, which constrain behavior during gameplay, influence the debriefing. Therefore, the hypothesis is that the rules governing a game affect the debriefing methodology. The aim is to verify this hypothesis by conducting case studies, which will help capture this process in practice, where both the debriefing of open and closed G&S is qualitatively studied.

In order to verify which pitfalls contribute in an ineffective and inefficient debriefing, and whether, and to what extent, the rules of the G&S affect the debriefing methodology, an online questionnaire was built. The questionnaire construction involved the following decisions:

1. Questionnaire type [28]. The online questionnaire is semi-structured, which is evident by the use of a pre-defined set of questions rated on a Likert scale or through boolean values, followed by the possibility for the interviewees to comment on their response. This protocol combines the advantages of the structured, comparable results provided by scale-based questions with the flexibility and richness of feedback from the comments. Moreover, the web-based nature of the questionnaire facilitates approaching people without any geographical restrictions. Additionally, examples of different open and closed G&S are offered, in order to serve as reference point.
2. Selection of subjects. The questionnaire was sent to facilitation experts. A facilitation expert is defined as a professional, who has been active in the G&S field more than 15 years and who has been designing and facilitating G&S for different groups, cultures, and domains. The reason for that choice is twofold. On the one hand, the lack of the ability to be present and explain any quandary regarding the questionnaire, required the subjects to be particularly experienced, if any threat to the validity of the results were to be minimized. On the other hand, the high expertise of the subjects, even when their number is relatively small, ensures that more plausible and valid conclusions are made.

The structure of the questionnaire, for each pitfall, was conducted using Likert scales ranging from 1–5, and asked:

To what extent does this pitfall occur due to the design of the debriefing? (Scale: 1 = To no extent – 5 = To great extent).

To what extent does this pitfall occur due to the execution of the debriefing? (Scale: 1 = To no extent – 5 = To great extent).

Mostly occurs on:

- Rule-driven Games – Closed Sims.
- Free-play Games – Open Sims.
- Both.

From an epistemological point of view, this research is a combination of interpretivist and post-positivist positions. On the one hand, interpretivist enables the incorporation of the complexity that arises from human behavior [29], which is the building block of debriefing [25] On the other hand, reality is better interpreted through post-positivism [30]. In other words, the combination of these seemingly opposed research philosophies

allows to capture the complexity of G&S (interpretivism), through the pitfalls. One may subsequently deduct patterns and propose a methodology (post-positivism), by using the questionnaire both with quantitative and qualitative aspects so as to verify the initial hypothesis.

In the next section, the results from the questionnaire are analyzed in detail.

## 4 Results

In this section, the results from the questionnaire circulated are presented. At the moment, 20 subjects have been approached, of which 8 returned completed questionnaires. Hence, the results presented in this section are preliminary and only the answers of experts that completed the questionnaire in full are considered. The experts' demographics are:

- They are all ISAGA members, and some also members of Digra and Absel.
- They all have approximately 15 years of experience in designing and facilitating G&S for different groups, cultures, and domains.
- 5 of them are males and 3 females.
- 4 of them are academics and 4 are professionals in the commercial market of G&S.
- They come from Germany, Switzerland, Australia, Sweden, USA, and The Netherlands.

The number of experts does not allow for a statistically reliable generalization of the results. Nevertheless, due to their high expertise in facilitating G&S, the results provide interesting information.

With regards to issues occurring due to the design of the debriefing, pitfalls 3, 7, 8, 11, and 12 seem to be affected the most, since they have an average larger or equal to 4. Moreover, with the exception of pitfall 11, all these pitfalls have standard deviation less than 1, showing a convergence in experts' opinion.

With regards to issues occurring due to the execution of the debriefing, pitfalls 2, 4, 6, 9, and 10 seem to be affected the most, since they have an average larger than 4. Again here, with the exception of pitfall 10, all the rest have standard deviation less than 1, showing a convergence in experts' opinion.

Two noticeable facts derived from Table 1, where all the results are shown in detail, are the following:

1. None of the pitfalls in either of the 2 options (design and execution) scored less than 3 in average, which shows that while a pitfall might occur mostly due to the design or the execution of the debriefing, in the end both the design and the execution contribute towards its existence; and
2. All pitfalls with average less than 4 have standard deviation larger than 1, which shows a conflicting opinion among the experts. This might be due to the nature of the pitfalls in reference or due to a misunderstanding on behalf of the experts.

**Table 1.** Results on pitfalls occurring due to the design or the execution of the debriefing.

| # | Pitfalls | Design | Execution |
|---|---|---|---|
| 1 | The debriefers' level of involvement and style is not appropriate | 3.62 (SD: 1.18) | 3.5 (SD: 1.41) |
| 2 | Debriefers have lack of understanding of the debriefing process | 3.25 (SD: 1.16) | 4.75 (SD: 0.7) |
| 3 | Lack of plan and/or rules | 3.87 (SD: 0.83) | 3.37 (SD: 1.3) |
| 4 | The allocated time for the debriefing is short | 3.25 (SD: 1.38) | 4.37 (SD: 0.91) |
| 5 | Ineffective use of audiovisual (A-V) material | 3.87 (SD: 1.64) | 3.75 (SD: 1.48) |
| 6 | Lack of emotional safety of the participants | 3.37 (SD: 1.4) | 4.37 (SD: 0.91) |
| 7 | Factors related with the actual physical environment, where the debriefing takes place | 4.12 (SD: 0.99) | 3.75 (SD: 1.16) |
| 8 | Choosing the appropriate structure for debriefing | 4.5 (SD: 0.75) | 3.87 (SD: 1.45) |
| 9 | The tendency of the participants to assign blame and antagonize each other | 3.37 (SD: 1.5) | 4.5 (SD: 0.75) |
| 10 | Lack of trust of the participants towards the debriefers | 3.25 (SD: 1.28) | 4.37 (SD: 1.06) |
| 11 | The simulation is not organized in a personal basis | 4.12 (SD: 1.45) | 3.75 (SD: 1.38) |
| 12 | Inappropriate timing/scheduling of the debriefing | 4.25 (SD: 0.88) | 3.75 (SD: 1.16) |

Table 2 shows the results of whether a pitfall occurs mostly in closed G&S, in open G&S, or in both. The results do not show any noticeable distinction between these 2 types of G&S, but the outcome should be considered inconclusive. The reasons for this are:

- The controversy of the rendered results when compared with some of the comments the experts gave, in which they made a clear distinction between closed G&S and open G&S.
- The fact that the question is in a boolean form and does not have any granularity, like the questions revolving around the design and the execution of the debriefing.

One of the advantages of the questionnaire is the ability for the experts to comment freely on each pitfall. Here below the most important comments and their contribution on each pitfall are mentioned and discussed further.

**Table 2.** Responses of experts on applicability of pitfalls on open/closed G&S (a dash symbol means 'Not Answered').

| # | Pitfalls | Experts | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | The debriefers' level of involvement and style is not appropriate | Closed | Both | - | Both | Both | Open | Both | Both |
| 2 | Debriefers have lack of understanding of the debriefing process | Both | Both | - | Both | Both | Both | Both | Both |
| 3 | Lack of plan and/or rules | Both | Both | - | Both | Both | Both | Both | Both |
| 4 | The allocated time for the debriefing is short | Open | Both | - | Both | - | Both | - | Both |
| 5 | Ineffective use of audiovisual (A-V) material | Both | Open | - | Both | Both | Both | Both | Close |
| 6 | Lack of emotional safety of the participants | Both | Open | - | Both | Both | Both | Both | Both |
| 7 | Factors related with the actual physical environment, where the debriefing takes place | Both | Both | - | Both | - | Both | Both | Close |
| 8 | Choosing the appropriate structure for debriefing | Both | Both | - | Both | Both | Both | Both | Close |
| 9 | The tendency of the participants to assign blame and antagonize each other | Both | Open | - | Both | Both | Both | Both | Close |
| 10 | Lack of trust of the participants towards the debriefer | Both | Both | - | Both | Both | Both | Both | Both |
| 11 | The simulation is not organized in a personal basis | Open | Both | - | Both | Both | Both | - | Both |
| 12 | Inappropriate timing/scheduling of the debriefing | Both | Both | - | Both | - | Both | - | Both |

### 4.1 Pitfall 1: The Debriefers' Level of Involvement and Style is not Appropriate

**Expert Comments.** "My experience in debriefing practices is that the extent and significance of the debriefing is very much dependent on the instructor/debriefer's own attitudes towards and skills in debriefing."

"The execution is very dependent on the random composition of the group in terms of temperament and group dynamics. When you design a low involvement and nothing happens, you have to do something. And vice versa; when you design a high involvement in a spirited group, a simple procedure will suffice."

"The wrong level of debriefers' involvement could destroy the free play character. In the rule driven games, there are much more situations fixed by the designer. So it should be clearer for the debriefer, how to act."

"In a rule driven sim, the facilitator is basically the TEACHER. The game is a tool that helps transmit the message. The teacher is highly involved."

"When the debriefers' level of involvement is not appropriate, this is mostly because:

- The design mis-directs the debriefer.
- The debriefer implements the design improperly.
- Both.

The link between debriefer error and open/closed sims is most likely to be linked to the expertise of the person, rather than to the type of simulation itself. That is if I am inexperienced, I will be no more - or less - likely to do the debriefing well because of the nature of the game itself. There is some likelihood that I will make fewer errors in debriefing a closed game early in my learning, but that may simply mean that I miss the potential for exploring learning that was present but not in line with the 'closed' debriefing format."

**Discussion.** Experts believe that the attitude and the skill of the facilitator are important factors when determining the level of involvement and the style. Additionally, they consider the composition of the group, and the dynamics formed within, to be directly linked to the target audience, hence influencing the level of involvement. Moreover, experts point out that the role of the facilitator is also influenced by the rules of the G&S, hence the distinction between closed G&S and open G&S makes sense.

### 4.2 Pitfall 2: Debriefers Have Lack of Understanding of the Debriefing Process

**Experts' comments.** "When a facilitator is not up to the job, it is the facilitator's fault. Nothing in the design or type of game can make that change."

"It has a lot to do with the 'Haltung', in which you start to prepare a debriefing."

"Idem to pitfall 1, my experience in debriefing practices is that the extent and significance of the debriefing is very much dependent on the instructors'/debriefers' own attitudes towards and skills in debriefing."

**Discussion.** Experts' opinion converges towards the attitude and the skill of the facilitator to be factors that strongly influence pitfall 2, indicating also a correlation with pitfall 1. This convergence of opinions potentially also shows the importance of these factors.

### 4.3 Pitfall 3: Lack of Plan and/or Rules

**Experts' comments.** "If you like to work according to a plan, you should prepare it in advance - in the execution it would be too late. I have difficulties with the word *'plan'*. It could both mean theory or methodological ideas."

"At first glance, a 'lack of plan/rules' could be primarily due to flaws in the design that flow over into the debriefing. Similarly, it could be due to the debriefer not thinking through what might happen in each enactment of a design. A closed G&S is more likely to have more rules/plans in place but this is not necessarily going to help a debriefer at all times."

**Discussion.** Experts perceive *'plan'* as a term that could be referring both to the methodology and the structure of debriefing. Additionally, *'plan'* can also be considered as the application of theory, and as such it is more applicable to closed G&S, since rules and theory are important components of such G&S. An important outcome of the comments is that experts believe that keeping a strict plan could potentially inhibit debriefing, since the debriefer might not be able to connect and identify what participants need.

### 4.4 Pitfall 4: The Allocated Time for the Debriefing is Short

**Experts' comments.** "A good designer will provide a clear statement about notional debriefing time, based on their beta testing regime. This may take longer or shorter. And it may - or may not - include conditions similar to the one being experienced by any particular debriefer. Thus, the designer may over/underestimate the time required, and therefore cause a debriefer using the activity for the first time to fall into error. This might not occur for a second time for that debriefer but might occur again each time a new debriefer follows the designer's directions. Conversely, the debriefer may over/underestimate the time required simply because of their own prior experiences and encounter error of their own making. For example, I recently used a G&S that usually takes 30 min to play, and generates competition and conflict. In this occasion, it took only 15 and the players collectively deciphered the key design factors and bypassed the errors they would otherwise have fallen into. I allowed too much time for the debriefing, because I was 'secure' in my knowledge about the time this procedure usually takes."

"In a closed G&S, this pitfall can occur the first times the game is played. Because these games are quite straightforward, the pitfall is likely to be solved quickly."

"This could relate to complexity of simulated scenarios - during debriefing."

"This happens frequently to facilitators that have little or no experience with the game at hand, and therefore are missing the capability to speed up or slow down the game when desired."

"Lack of time is a real threat to the effectiveness of debriefing. This factor also leads to problems when researching the effectiveness of debriefing, since it affects the amount of time that the participants are subjected to the content of the game. I don't know how much it differs between different types of games, but my guess is that an open G&S will be more affected by a lack of sufficient debriefing."

"Many times, there is an objective for the G&S. By walking around, asking questions, showing participants what is happening, afterwards walking through a course of actions, etc. a facilitator is able to generate discussions that will be fruitful in the debriefing. When you do this in a right way - *c'est le ton qui fait la musique* - people will not experience this behavior as manipulating. It is just curiousness."

**Discussion.** Experts point out that reality can differ from what has been planned, and this should be taken into account. Their extensive experience indicates that debriefing closed G&S usually take less time and such G&S are relatively easier to plan because they are more predictable. Often, the complexity of G&S scenarios causes the debriefing to take more time, which is more applicable for open G&S.

### 4.5 Pitfall 5: Ineffective Use of Audiovisual (A-V) Material

**Experts' comments.** "This is also a pitfall I have seen in my own studies. Without replays, the instructor can sometimes be contradicted or challenged, lessening the impact of the game."

"It sounds like a lack of preparation. The facilitator must have the presentation organized, if this is not the case, it is due to both the design and the execution."

**Discussion.** Experts' opinion, which is also supported by the literature [31–33], shows contradicting beliefs and practices. Several consider the use of audio-visual material to be essential for an effective debriefing, and the effective use of it should be taken into account when preparing the debriefing. Other experts perceive audio-visual material to be time consuming in debriefing and, thus, less effective for handling emotions.

### 4.6 Pitfall 6: Lack of Emotional Safety of the Participants

**Experts' comments.** "I have learned to choose activities with care to provide for a safe learning context, and still get it wrong sometimes. And each time that the 'wrongness' emerges during the debriefing point, I can trace it back to the choice of activity and what it brings out for one/some players. I have not yet chosen an activity that is wrong for everyone, (I remain alert to that possibility) but do know that when the debriefing reveals issues of emotional safety, it is because of internal factors unique to the individual(s) and not primarily because of either the design or the debriefing process."

"Guarding the safety is a typical pedagogical skill one may expect from a facilitator/teacher. Even when the debriefing is ill designed, a good facilitator can keep it safe."

"Emotional safety is such a multifaceted issue, that it is hard to pinpoint which part of the debriefing affects it the most. It depends on what type of emotional safety we are talking about."

**Discussion.** Experts' opinion show that guarding the emotional safety of the participants can be related to the chosen activities during debriefing, but it can also be related to individual/group traits that cannot be influenced by either the design or the execution of the debriefing. It takes a lot of skill from the facilitator to address this well.

### 4.7 Pitfall 7: Factors Related with the Actual Physical Environment, Where the Debriefing Takes Place

**Experts' comments.** "Mostly you will have to work with a given situation and cannot plan the perfect environment. So you will have to improvise during execution."

**Discussion.** Despite the fact that it was perceived as a pitfall affected mostly by the design of the debriefing (scoring of 4.29 (SD: 0.95) and 3.71 (SD: 1.25) on design and execution respectively), albeit not with statistical significance, the only comment that we received showed that, many times, the securing of an appropriate environment for debriefing requires improvisation on behalf of the facilitator.

### 4.8 Pitfall 8: Choosing the Appropriate Structure for Debriefing

**Experts' comments.** "A facilitator can adjust the briefing process accordingly."
"It depends on random group dynamics."

**Discussion.** Experts' comments show that the structure of the debriefing depends on different circumstances during the debriefing.

### 4.9 Pitfall 9: The Tendency of the Participants to Assign Blame and Antagonize Each Other

**Experts' comments.** "This is very seldom due to problems in the debriefing - but has much to do with the design and management of the activity itself in the first instance. Where the debriefing is concerned, problems of blame/counter blame that arise will less often be caused by the design of the debriefing, but will be influenced by the implementation."

"When this is foreseen, a wise design can help prevent it. A facilitator can also manage the process and try to stop it. When it does occur in a strong way, I would say that it is due to the design of the game itself. When a game triggers a fierce, emotional reaction, the game design is too competitive or confrontational. It is not analogous enough I would say."

"One of the roles of the debriefer is and should be to counteract these behaviors, such as setting up rules for the debriefing session (or rules of conduct for serious gaming overall)."

**Discussion.** Experts believe that not only the design of the debriefing can cause this pitfall but also the design of the game itself. An example of this is the Fish Banks game [34].

### 4.10 Pitfall 10: Lack of Trust of the Participants Towards the Debriefer

**Experts' comments.** "This is another 'more than/less than' question and is very dependent on the quality and capability of the debriefer. It is also dependent on the quality of the management of the activity itself. If the game manager makes changes or interacts in a manner that is not intended by the designer this can generate dis-trust that will inevitably carry over into the debriefing."

"This can be due to many factors, including participants being forced to play the game by their superiors. A good facilitator can reduce the resistance, but cannot make it go away completely. Undoubtedly, if the players do not feel safe in the vicinity of the facilitator, the facilitator is the problem, which is also possible. Then the facilitator is to blame."

"Many times, I have seen facilitators taking over the problems the manager has expressed. This can devastate trust completely."

"In my experience, this is fairly rare, especially for experienced facilitators."

**Discussion.** The skills and the personal traits of the facilitators are considered by the experts to play a significant role, since they can determine for example whether the facilitators act independently or as an extension of the management, or whether they are in-line with the game designer's intentions.

### 4.11 Pitfall 11: The Simulation is not Organized in a Personal Basis

**Experts' comments.** "This is not something that 'occurs due to a problem' with the debriefing in any way. It has happened before the debriefing begins and will have an impact on the quality of the debrief."

"Hosking and Morley state that people are both products of the context and participants in the shaping of the context. In my opinion it is not the individual that should be the central element, but - instead - the relation between individual and the group. Where did you assimilate? Where did you accommodate? People can be accommodators in one setting and assimilators in another."

"Depending on the game, the participants and the purpose of the serious game (i.e. the learning goal) this isn't necessarily something negative. In some cases, it is better to focus on the group rather than the individual, for instance when teamwork is evaluated or when targeting an individual can have negative social and/or emotional effects on that individual."

**Discussion.** Experts state that also this pitfall depends on context factors as well as on the purpose of the game. G&S in essence are always social constructs in which individuals have their role [27].

### 4.12 Pitfall 12: Inappropriate Timing/Scheduling of the Debriefing

**Experts' comments.** "I have heard from colleagues about all of these problems in every combination of simulation types, and originating in both planning and execution. The biggest problem that I have witnessed over the years is a persistent belief that G&S do not need to be debriefed for the students to learn what was intended by the designer/facilitator. This belief seems to be tied up with a feeling that debriefing is a waste of time. In my personal experience, this is very much not true."

"Choices about timing of a debriefing schedule are influenced by a large number of factors: the time available in the overall/larger program, the preceding/following activities, the design of the debrief as verbal only/verbal-written or written first verbal later etc."

**Discussion.** Experts confirm this is an important pitfall that is related to many underlying factors, ranging from the debriefing methodology to the importance a facilitator attaches to the debriefing.

## 5 Conclusion and Future Work

In this paper, a methodology is proposed for identifying the factors that inhibit debriefing because of problems on the design of the debriefing and for ascertaining whether these pitfalls depend on the different types of G&S. The methodology includes a questionnaire, which is answered by G&S facilitation experts, and results in both quantitative and qualitative results. The answers complement each other so the quantitative results could be interpreted and placed into the perspective in which an answer is given. As shown in the analysis of the results in Sect. 4, the conclusions that can be drawn are:

1. On the one hand, the pre-defined questions showed that most of the experts consider all pitfalls to be relevant to both closed and open G&S. On the other hand, the comments showed that some pitfalls (Pitfalls 1, 3, and 4) are more relevant either to closed or open G&S. This contradiction can characterize the results, with regards to this categorization, as inconclusive. If pitfalls prove to be independent of the rules of G&S, they will disprove the initial hypothesis of this paper. Thus, it is important and interesting to research this relationship until the point that it would be possible to support or disprove the initial hypothesis with statistical significance.
2. Despite the fact that some pitfalls seem to occur mostly due to the design and others due to the execution of the debriefing, all pitfalls had an average of 3.25 or higher on both categories, showing that to some extent, both the design and the execution of the debriefing influence all pitfalls. This result came as a surprise, since it was expected that the pitfalls [or at least some of them], were independent either from the design or the execution of the debriefing. Therefore, it will be interesting in the future to validate these results and understand the underlying reason for the above.
3. Both the experts that filled the questionnaire, and the ones that did not, reported that they perceive debriefing as a complex event due to the multiple, context and G&S-related factors it depends on. Nevertheless, their comments gave insight on the relationships among pitfalls and context factors, which in the future can help to model debriefing by abstracting it, the same way a G&S abstracts a real-world system.
4. The personal traits of the facilitators, such as their skills, experience, attitude, style, and overall personality, influence in multiple ways the effectiveness of debriefing. Researching further when, where, and how a facilitator influences debriefing is both important and fascinating, since it introduces new aspects from different scientific fields to our analysis, such as psychology, education, and management.

Additionally, with regards to future work, the list of pitfalls can be enhanced, by further researching the state-of-the-art on the G&S field and conducting more interviews with facilitations experts. Getting responses from additional experts will help establish a statistical significance on the results, and fine-tune the questionnaire wherever applicable. Moreover, decomposing the pitfalls into their core constituents will help identify where and when a pitfall occurs, as well as its origin. Finally, constructing a relationship model of these core constituents can assist in the identification of patterns and the formulation of a methodology for a more effective and efficient debriefing. Throughout this process and in order to verify and build up every step of the methodology, case studies shall be necessarily conducted.

## References


1. Dewey, J.: Experience and education. Educ. Forum **50**(3), 241–252 (1986)
2. Fanning, R.M., Gaba, D.M.: The role of debriefing in simulation-based learning. Simul. Healthc. **2**(2), 115–125 (2007)
3. Pearson, M., Smith, D.: Debriefing in experience-based learning. In: Boud, D., Keogh, R., Walker, D. (eds.) Reflection: Turning Experience into Learning, pp. 69–84. RoutledgeFalmer (1985)
4. Seymour, N.E.: Debriefing after simulation. In: Tichansky, D.S., Morton, J., Jones, D.B. (eds.) The SAGES Manual of Quality Outcomes and Patient Safety, pp. 501–506. Springer US, Boston (2012). https://doi.org/10.1007/978-1-4419-7901-8_50
5. Bond, W.F., Lammers, R.L., Spillane, L.L., Smith-Coggins, R., Fernandez, R., Reznek, M.A., Vozenilek, J.A., Gordon, J.A.: The use of simulation in emergency medicine: a research agenda. Acad. Emerg. Med. **14**(4), 353–363 (2007)
6. Cantrell, M.A.: The importance of debriefing in clinical simulations. Clin. Simul. Nurs. **4**(2), e19–e23 (2008)
7. Crookall, D.: Serious games, debriefing, and simulation/gaming as a discipline. Simul. Gaming **41**(6), 898–920 (2010)
8. Issenberg, S.B., Mcgaghie, W.C., Petrusa, E.R., Gordon, D.L., Scalese, R.J.: Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. Med. Teach. **27**(1), 10–28 (2005)
9. Shinnick, M.A., Woo, M., Horwich, T.B., Steadman, R.: Debriefing: the most important component in simulation? Clin. Simul. Nurs. **7**(3), e105–e111 (2011)
10. McCausland, L.L., Curran, C.C., Cataldi, P.: Use of a human simulator for undergraduate nurse education. Int. J. Nurs. Educ. Scholarsh. **1**(1) (2004)
11. Nehring, W.M., Lashley, F.R.: Current use and opinions regarding human patient simulators in nursing education: an international survey. Nurs. Educ. Perspect. **25**(5), 244–248 (2004)
12. Barreteau, O., Le Page, C., Perez, P.: Contribution of simulation and gaming to natural resource management issues: an introduction. Simul. Gaming **38**(2), 185–194 (2007)
13. Dufrene, C., Young, A.: Successful debriefing - best methods to achieve positive learning outcomes: a literature review. Nurse Educ. Today **34**(3), 372–376 (2014)
14. Dismukes, K., Smith, G.M.: Facilitation and Debriefing in Aviation Training and Operations. Routledge, Abingdon (2016)
15. Arafeh, J.M.R., Hansen, S.S., Nichols, A.: Debriefing in simulated-based learning: facilitating a reflective discussion. J. Perinat. Neonatal Nurs. **24**(4), 302–309 (2010)
16. Ursano, R.J., Rundell, J.R.: The prisoner of war. Mil. Med. **155**(4), 176–180 (1990)
17. Der Sahakian, G., Alinier, G., Savoldelli, G., Oriot, D., Jaffrelot, M., Lecomte, F.: Setting conditions for productive debriefing. Simul. Gaming **46**(2), 197–208 (2015)
18. Sawyer, T.L., Deering, S.: Adaptation of the US Army's after-action review for simulation debriefing in healthcare. Simul. Healthc. **8**(6), 388–397 (2013)
19. Husebø, S.E., Dieckmann, P., Rystedt, H., Søreide, E., Friberg, F.: The relationship between facilitators' questions and the level of reflection in postsimulation debriefing. Simul. Healthc. **8**(3), 135–142 (2013)
20. Decker, S., Fey, M., Sideras, S., Caballero, S., Rockstraw, L.R., Boese, T., Franklin, A.E., Gloe, D., Lioce, L., Sando, C.R., Meakim, C., Borum, J.C.: Standards of best practice: simulation standard VI: the debriefing process. Clin. Simul. Nurs. **9**(6), S26–S29 (2013)
21. Kolfschoten, G.: Theoretical foundations for collaboration engineering. Ph.D. thesis, TU Delft, Delft University of Technology (2007)

22. Dyregrov, A.: The process in psychological debriefings. J. Trauma. Stress **10**(4), 589–605 (1997)
23. Petranek, C.F., Corey, S., Black, R.: Three levels of learning in simulations: participating, debriefing, and journal writing. Simul. Gaming **23**(2), 174–185 (1992)
24. Neill, M.A., Wotton, K.: High-fidelity simulation debriefing in nursing education: a literature review. Clin. Simul. Nurs. **7**(5), e161–e168 (2011)
25. Kriz, W.C.: Creating effective learning environments and learning organizations through gaming simulation design. Simul. Gaming **34**(4), 495–511 (2003)
26. Leigh, E., Spindler, L.: Simulations and games as chaordic learning contexts. Simul. Gaming **35**(1), 53–69 (2004)
27. Klabbers, J.H.G.: The Magic Circle: Principles of Gaming & Simulation. Sense Publishers, Rotterdam (2009)
28. Lethbridge, T.C., Sim, S.E., Singer, J.: Studying software engineers: data collection techniques for software field studies. Empir. Softw. Eng. **10**(3), 311–341 (2005)
29. Bredo, E., Feinberg, W.: Part two: the interpretive approach to social and educational research. In: Knowledge and Values in Social and Educational Research, pp. 115–128. Temple University Press (1982)
30. Denzin, N., Lincoln, Y.: Handbook of Qualitative Research. SAGE Publications, Inc., Thousand Oaks (1994)
31. Grant, J.S., Dawkins, D., Molhook, L., Keltner, N.L., Vance, D.E.: Comparing the effectiveness of video-assisted oral debriefing and oral debriefing alone on behaviors by undergraduate nursing students during high-fidelity simulation. Nurse Educ. Pract. **14**(5), 479–484 (2014)
32. Savoldelli, G.L., Naik, V.N., Park, J., Joo, H.S., Chow, R., Hamstra, S.J.: Value of debriefing during simulated crisis management: oral versus video-assisted oral feedback. Anesthesiology **105**(2), 279–285 (2006)
33. Scherer, L.A., Chang, M.C., Meredith, J.W., Battistella, F.D.: Videotape review leads to rapid and sustained learning. Am. J. Surg. **185**(6), 516–520 (2003)
34. Whelan, J.G.: Building the fish banks model and renewable resource depletion (1994)