Professional Training Through Simulation: Presentation of a Model and a Tool for the Analysis of Trainers' Debriefing Practice

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Abstract
Although fundamental (Neill & Wotton, 2011; Policard, 2015, 2018), the debriefing activity of debriefing trainers (Bastiani, 2017) and the measurement of its mastery (Wazonis, 2015) are the subject of little research. Current approaches, based on recommendations and assessment grids, have limitations in terms of the overall understanding of the trainer's activity. To fill these gaps, our article presents an operationalised model of trainer debriefing activity in simulation: the Pyra Debriefing Model (PDM). This model is structured around five poles (learner, trainer, device, results and objectives) and four areas (objectification, cognition, didactics and psychopedagogy), thus providing a better understanding of the interactions between the trainer and the learners during the debriefing. In addition, an analysis grid, GD-12, was developed to structure the trainer's verbal interventions for each of the 4 areas. The GD-12 makes it possible to analyse verbal interventions at three levels: the function pursued by the trainer, the concrete ways in which they are implemented and the purpose of the intervention. At present, the model and the grid have been used in the initial training of future teachers and future pharmacists, during hot and cold debriefings. In conclusion, PDM and his GD-12 grid open new perspectives for a better understanding of the debriefing activity of trainers, thus promoting a more enriching educational practice in initial training.

1. Introduction and Issue

The activity of trainers in debriefing is 'an emerging area of research, particularly in Francophone research' (Policard, 2018, p. 60), given the importance of the trainer's action for the overall quality of the training device and for the pedagogical effectiveness of the sessions. Indeed, few studies have looked specifically at the 'debriefing' (Simoneau & Pilote, 2017) of the trainer (Bastiani, 2017; Duvivier & Demeuse, 2023a; Policard, 2018). However, it is recognised that 'mastery of debriefing skills is crucial to facilitating student learning' (Neill & Wotton, 2011p.162) and that the way in which a trainer leads the debriefing is a determining factor (e.g. Krogh et al., 2016; Oriot & Alinier, 2018; Rall et al. 2010; Secheresse, 2020), both in terms of their commitment (Policard, 2018), attitude (Bastiani, 2017; Dubois, 2017) and mastery of skills (Wazonis, 2015; Bastiani, 2017).

The literature explores debriefing activities (Simonceau & Pilote, 2017) using three main approaches: the recommendation approach, the evaluation grid approach and the debriefing technique approach. The recommendation approach (e.g. Ross, 2021; Salas et al., 2008) suggests general principles for debriefing, but does not look at trainers' actual practice or how they actually guide learners. As Amigues (2009) points out "professional [training] activity cannot be limited to the prescriptions defined by any form of 'hierarchy'" (p.14).

Evaluation grids make it possible to assess the principles of debriefing, but they do not take into account the actual activity of the trainer or its effectiveness (Coggins et al., 2022; Van Malleghem, 2019). In addition, they are mainly derived from the health sector, which limits their applicability outside this field. Finally, the approach of debriefing techniques reflects the different debriefing methods such as DeltaPlus, advocacy inquiry or circular questions (Bauchat & Seropian, 2020). These techniques are seen as complementary tools that support the trainer's activity and interaction with the learners (Bauchat & Seropian, 2020). However, they require practical training to avoid mechanical and meaningless use (Abulebda et al., 2023).

This diversity of approaches highlights the importance of considering the debriefing activity in all its complexity and of adopting a nuanced approach in order to understand its different facets and practical implications. This difficulty is compounded by the fact that there is currently only one model that theorises the trainer's activity in post-simulation debriefing, called D-STAM (Debriefing Simulation Trainer Activity Model) (Duvivier et al., 2023). Based on the activity theories of Leplat and Cuny (1974), the D-STAM (Duvivier et al., 2023) provides a global understanding of trainer activity in post-simulation debriefing by considering input variables, process variables and effect variables. Despite its theoretical contributions, it presents difficulties in operational practice. Therefore, it seems important to develop tools and approaches to improve its operationalisation, taking into account the concrete realities in the field.

In this context, the aim of this paper is to present a) an operational model, the Pyra Debriefing Model (PDM) (Duvivier et al. 2023), for describing the debriefing activity of trainers and b) a grid tool, the GD-12, based on the said model, for analysing in detail the activity of the trainer during the post-simulation debriefing. The tool was used to analyse 19 'cold' post-simulation debriefings in the context of training future teachers and 52 'hot' post-simulation debriefings in the context of training future dispensing pharmacists.

The article is divided into three main parts. First, a theoretical framework is used to critically examine the trainer's activity during debriefing. Next, we develop the conceptual framework that guided our approach before describing the PDM and GD-12. Finally, the article concludes with a reflective discussion of the limitations of our approach and the prospects for further research.

2. Methodology

PDM and GD-12 grid were based on a literature search in 9 databases, including five French and four Anglo-Saxon databases (Springer, Cairn - Psychology and Education section, Open Edition, Eric, PubMed, Semantic Scholar Paper Corpus, Google Scholar, Pascal et Francis and ERUDIT). Searches were conducted using specific keywords such as 'debriefing', 'simulation', 'vocational training', excluding references to virtual simulation. The selected works focused on the field of vocational training, both initial and continuing, and were selected on the basis of the presence of at least one trainer in the debriefing context. There were three stages in the selection process: first, the titles and abstracts were read, then the full text articles were examined, and finally the works cited in the bibliography and in the connected papers were reviewed. In the end, 33 papers were selected to support the construction of the PDM and the GD-12 grid (Table 1).

Table 1: Database review of the trainer in post-simulation debriefing

Database	First round	Second round	Retained
Open Edition	18	3	1
PubMed	86	10	5
ERUDIT	23	6	1
CAIRN	475	7	3
Pascal & Francis	34	6	0
Google Scholar	371	12	6
Springer	861	2	2
ERIC	156	14	1
SCOPUS	765	22	4
Addition to the margin			9
TOTAL	3439	87	33

Once the PDM and the GD-12 grid had been developed, a practical test was carried out in two initial training fields at the University of Mons. The first field involved 19 debriefings of future teachers. The debriefings lasted on average 50 minutes and were conducted in a cold and individual way between a learner and a trainer. The trainers were two women (34 and 36 years old) with 8 and 5 years of experience in debriefing. The second field includes 52 post-simulation debriefings of future dispensing pharmacists, carried out on the spot in groups (between 15 and 18 learners). Two trainers were involved in this system. They are a man (26 years old) and a woman (45 years old) with an equivalent debriefing experience of 1,5 years.

There are several reasons for the very different contexts in which the model and the tool were tested. Firstly, testing the model and tool in a variety of contexts gives us a better

understanding of the scope and relevance of these two elements in different educational settings. Secondly, by confronting the model and the grid with heterogeneous contexts, we are looking for consistency in the results, which will attest to the effectiveness of the model regardless of the specifics of the training under consideration. Then, the use of deliberately different samples allows us to explore the factors that might influence the debriefing of the trainer (for example, the fact that some work individually while others work in groups). Finally, by exposing the model and the tool to a wide variety of situations, we assess their internal coherence, thus ensuring their adaptability and applicability in different educational contexts.

The approach adopted in this study is both deductive and inductive. It is deductive because it relies on a pre-existing theoretical framework to guide the analysis, as emphasised by Savoie-Zajc (2000, 2004 cited by Bocquillon, 2020). However, it is also inductive because the pre-established GD-12 is enriched by integrating other elements that emerge from the data itself (Mukamurera et al., p. 114 cited by (Kelsey & Hayes, 2015). This makes it possible to broaden the scope of the study and take into account aspects that may not be explicitly provided for in the initial theoretical framework.

3. Theoretical Background of Pyra Debriefing Model and GD-12

3.1. The Post-simulation Debriefing Trainer: Primarily a Facilitator Trainer

The definition of debriefing now seems to be established, resembling a reflective conversation with the learner at the centre (Kelsey & Hayes, 2015), able to support and trigger reflection (Tutticci et al., 2018) and aims to understand the underlying reasons for the results obtained during the simulation, while focusing on the quality of the processes and behaviours used during the simulated situation, with the aim of improving the learner's future performance (e.g.Bauchat & Seropian, 2020; Dubrous, 2020; Duvivier & Demeuse, 2023b; Policard, 2018; Secheresse, 2020). This debriefing phase is usually supervised by a trainer (Sawyer et al., 2016; Dubois, 2017; Bastiani, 2017), who may be referred to by various names such as 'teacher', 'mediator', 'instructor', 'mentor' and 'facilitator' (Jones et al., 2014, cited by Policard, 2018). Nevertheless, "facilitator" is the most commonly used term (Duvivier et al., 2023; Policard, 2018).

Despite the range of facilitation styles reported in the literature (Tuttici et al., 2018), the essence of a trainer-facilitator's (TF) debriefing activity can be characterised in three ways. First, the debriefing activity of a TF is first and foremost a pedagogical act. Indeed, the TF assumes the role of mediator between the learners, the knowledge to be acquired and himself/herself (Simoneau & Pilote, 2017), recalling Houssaye's concept of the pedagogical triangle (1998). This role of mediator aims to encourage learners to develop their understanding, analyse and synthesise their reasoning, emotions and actions during the simulation (Fanning & Gaba, 2007; Rudolph et al., 2008).

Secondly, the TF's debriefing activity focuses on the relationship and interactions with the learners. This stance of the facilitator, as described by Policard (2018), involves accompanying, questioning and guiding the learners (Simoneau & Pilote, 2017), fostering a fraternal or even co-learner approach, as evoked by Fanning and Gabba (2007). This orientation thus moves away from a more traditional transmissive or authoritarian role, as Horcik (2014) also points out. The importance of this stance is all the more evident given that the process of analysing learners' actions is reflexive in nature, going beyond simple

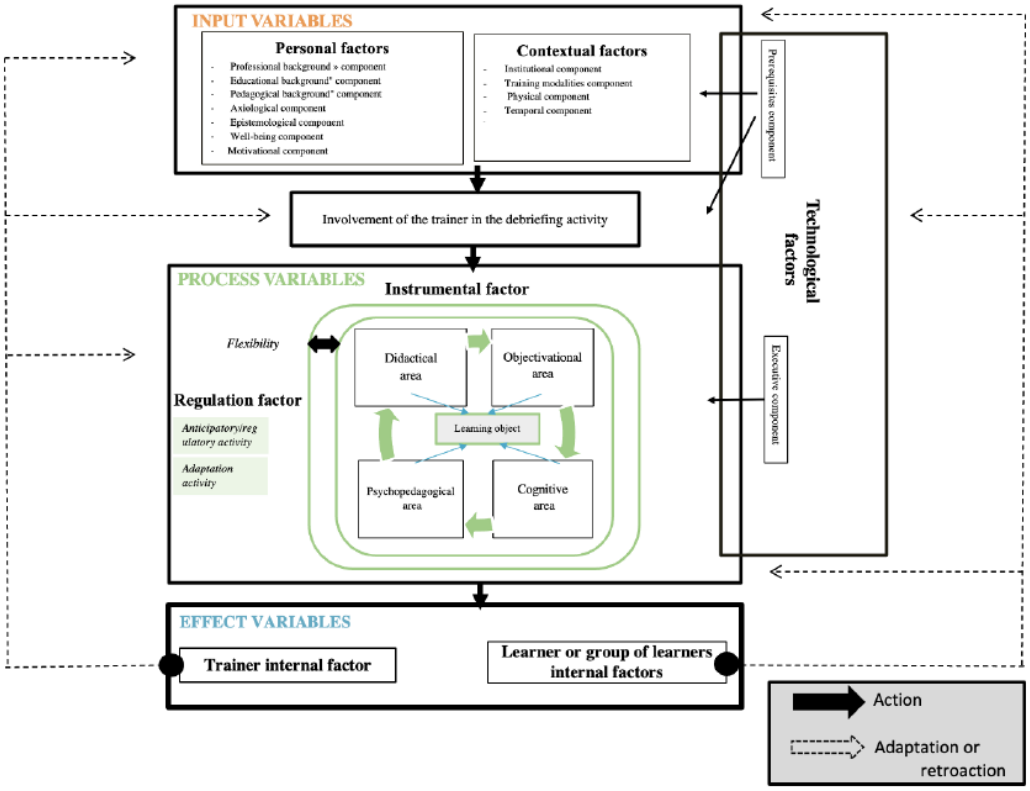
observation (Tuttici et al. 2018) and requiring a transformation of perspective (McDougall & Davis, 2011), through mechanisms of awareness, assimilation and accommodation, in a dual movement of putting the action back into context and distancing oneself from the action in order to give it a different meaning (Dubois, 2017). Furthermore, the trainer's activity is linked to his or her motivation and interest in the practice. According to Policard, (2018), the engagement profile influences the trainer's pedagogical stance and determines whether he or she adopts a controlling or an "empowering" approach towards the learner.

Finally, the debriefing activity of a TF is subject to double regulation by the trainer. The double regulation of the activity refers to the dynamic process by which the trainer adjusts and regulates his activity a) as a function of both the external factors of the work situation and the characteristics of the learners and b) as a function of internal factors, in particular his professional experience, his pedagogical skills and his ability to facilitate the learners' learning (cf. Duvivier et al., 2023). By ensuring this dual management, the trainer thus tends to regulate, on the one hand, his own role as facilitator in order to promote the co-learning approach and stimulate the learners' active engagement (Samurçay & Rogalski, 1998) and, on the other hand, the group dynamics and the progress of reflection in order to achieve the specific learning objectives (Simoneau & Pilote, 2017).

3.2. From D-STAM (Duvivier et al. 2023) to Pyra Debriefing Model

As we pointed out earlier, neither the recommendation nor the grid approach seems to me to provide access to a complete and nuanced record of a trainer's debriefing activity. The current situation can be attributed to the fact that there is currently only one model that theorises the trainer's activity in post-simulation debriefing, called D-STAM (Debriefing Simulation Trainer Activity Model) (Duvivier et al., 2023).

Figure 1: D-STAM (Debriefing. Simulation Trainer Activity Model) (Duvivier et al., 2023)

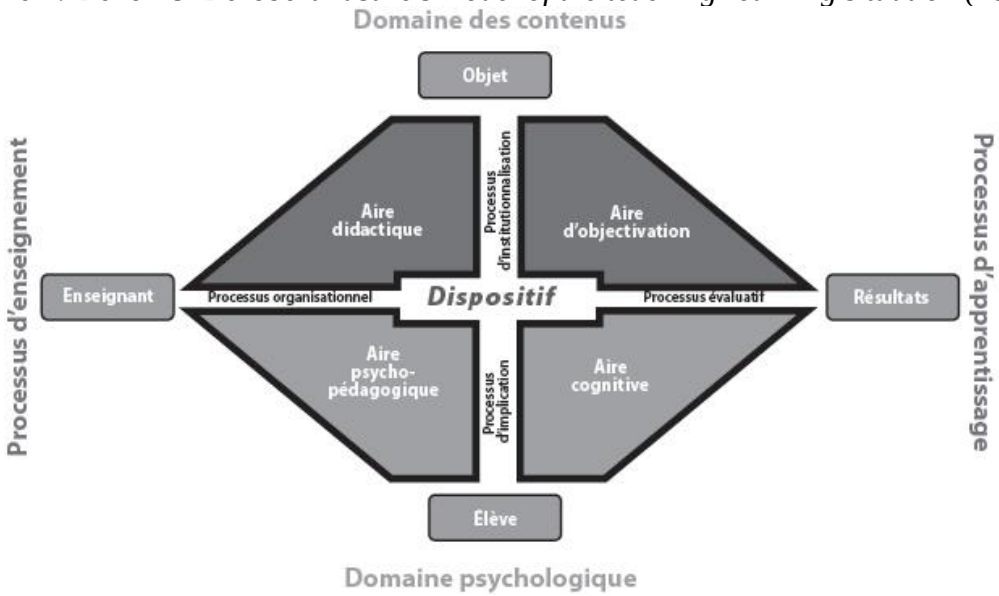


Based on the activity theories of Leplat and Cuny (1974), the D-STAM (Duvivier et al. 2023) provides a global understanding of the activity of trainers in post-simulation debriefing by considering input variables, process variables and effect variables (see Duvivier et al. 2023 for a summary). Despite its theoretical contributions, it poses difficulties in operational practice. It is therefore important to develop tools and approaches to improve its operationalisation, considering the concrete realities on the ground. The authors of the D-STAM (Duvivier et al. 2023) chose to focus on level 2 process variables, following the framework established by Dunkin and Biddle (1974) and emphasising instrumental factors. The result of their work is the PDM, which is presented below.

3.2.1. Presentation of the Theoretical Basis of the Pyra Debriefing Model (PDM)

The PDM is an activity model for debriefing trainers in a simulation-based training context. Debriefing is seen as a pedagogical activity that includes both teaching and learning. According to Hérold (2019), a teaching-learning situation involves trainers and learners who are brought together in the same space-time and are subject to specific constraints and resources, making the situation unique, event-driven and experiential (Pastré, 2011, cited by Herold, 2019). Although few studies have dealt with the modelling of teaching-learning situations, and even fewer with post-simulation debriefing, some proposals for models have been put forward, such as Dunkin and Biddle (1974), Gage (1978) or Hérold (2019) (cited by Hérold, 2019). We chose the teaching-learning model of Dehon & Derobertmasure (2015), which, based on Houssaye's (1993) pedagogical triangle, postulates that a pedagogical teaching-learning device is structured in four components: the didactic, psycho-pedagogical, cognitive and objectification domains (Dehon & Derobertmasure (2015).

Figure 2: Dehon & Derobertmasure's model of the teaching-learning situation (2015)



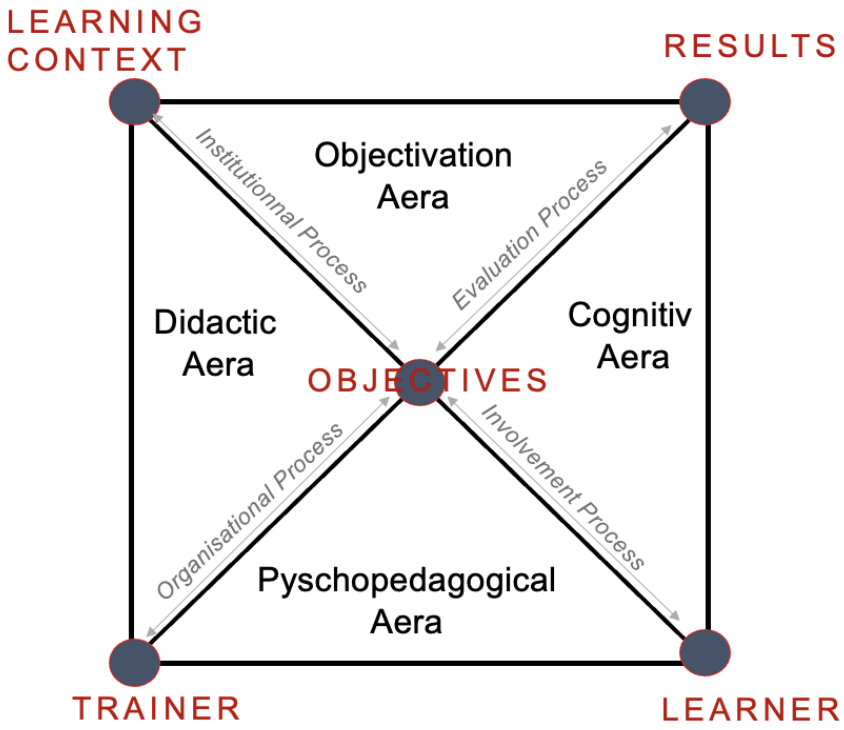
The teaching-learning model is justified in relation to the problem under consideration in several ways. Firstly, according to its designers, it allows us to focus on the trainer. Secondly, the model is developed and applied to debriefing after microteaching sessions, a form of simulation according to Chernikova et al. (2020). In addition, the model highlights the relationships and interactions between the trainer and the learners that are central to the debriefing process. Finally, the theoretical underpinnings of the model promote a pre-

reflective environment among learners (Derobertmasure, 2012), which is directly aligned with the aims of debriefing.

3.2.2. Presentation of the Pyra Debriefing Model (PDM)

As Dehon & Derobertmasure (2015) , the design of the PDM focuses on "what the trainer does" during the debriefing situation. This conception encompasses the specific and complex operational gestures and discourses that the trainer implements to facilitate student learning. This leads us to conceive the trainer's activity in debriefing as being at the intersection of several axes (or pole) characterised by actors, spaces, actions and interactions (Pastré, 2006). More specifically, the PDM (Figure 3) presents five equidistant poles, each of which is associated with key factors in post-simulation debriefing according to the scientific literature (giving the model a pyramidal structure).

Figure 3: Pyra Debriefing Model



The 'learning context' pole refers to the specific setting or circumstances in which an educational activity takes place. It encompasses the setting, conditions and elements that influence the learning experience (Cheng et al., 2015; Oriot and Alinier, 2018; Bauchat & Seropian, 2020; Secheresse, 2020; Arafeh et al., 2010; Peters & Vissers, 2004). This may include factors such as the physical environment of the debriefing room (e. g. Diaz-Navarro et al., 2021; Oriot & Alinier, 2018; Savoldelli & Boet, 2013).

The 'learner' pole concerns the trainee and his profile, including his level of expertise, his learning style, his place in the dynamics of the group of learners (Cheng et al., 2014; Sawyer et al., 2016; Dubois, 2017; Bauchat & Seropian, 2020), as well as the other individual factors of the D-STAM cited by Duvivier et al. (2023).

The "trainer" pole concerns the person who leads the debriefing, taking into account his or her personal factors (Duvivier et al. 2023), preferences (Secheresse, 2020; Bastiani, 2017; Dubois, 2017) and style (Policard, 2018).

Considering that the trainer is interested in the question of "results" (e.g.Chinara & Pellerin, 2014; Oriot & Alinier, 2018; Rudolph et al. 2008), in particular between what is expected and what is achieved by the learner (Rudolph et al. 2008; Oriot & Alinier, 2018, Vanpee, 2010), the "results pole" includes the behaviour implemented by the learner during the simulation and the reflections verbalised during the debriefing.

These four areas are related to the learning objectives of debriefing and, on a larger scale, simulation. They are considered central by many authors (e.g.Vanpee, 2010; Ross et al. 2021; Levin et al., 2019; Sawyer et al., 2016 ; Bastiani, 2017; Oriot & Alinier, 2018), including Secheresse (2020), who states that the ultimate aim of debriefing is to "make the link between the learning achieved during the training and a precise action plan" (p. 66). This link is part of an institutional, evaluative, organisational or participative logic (Figure 3), depending on the trainer's activity.

Furthermore, by cross-referencing the relationships between the five poles, four domains emerge (according to Derobertmasure, 2012; Dehon & Derobertamsure, 2015), which are presented in table 2.

Table 2: Description of the 4 domains of the Pyra Debriefing Model

Pyra Debriefing Model Area	Interrelation of aeras	Definition
Didactic	Device — Trainer — Objectives	Related to content and its transmission, this area encompasses the selection, organization of information, pedagogical methods, resources used, etc. Its aim is to make the training content clear, relevant, and accessible, thus fostering understanding and assimilation of knowledge by learners.
Objectification	Device — Result — Objective	Puts the simulation results (observed behaviors) and debriefing discussions into perspective with the learning environment. It encourages the analysis of learners' actions, identifies strengths and areas for improvement, and promotes critical reflection in line with learning objectives. Objectification aims to increase learners' awareness, facilitate knowledge integration, and encourage metacognitive reflection.
Cognitive	Learner — Result — Objective	Focusing on the underlying reasons for learners' behaviors during the simulation, this domain analyzes cognitive processes, decision-making, strategies used, and mental representations. It seeks to understand factors influencing learners' actions, such as their learning, reasoning, motivation, skill level, and learner profile.

Psycho-Pedagogical	Trainer — Learner — Objective	Centered on the interpersonal relationship between the trainer and the learner, this domain concerns how exchanges unfold and verbal interactions take place. It considers the level of facilitation, the degree of trainer involvement, support for understanding, and the creation of an atmosphere of trust and mutual respect. The psycho-pedagogical area fosters an environment conducive to learning, encourages active learner engagement, and supports their professional and personal development throughout the debriefing. It also encompasses the spatial organization and time management implemented by the trainer.

4. Introduction to the Verbal Intervention Analysis Grid for Trainer Debriefing (GD-12)

4.1. Key Words for Understanding How the GD-12 Grid Works

It is important to consider certain preliminary elements in order to fully understand how the GD-12 grid works: 1) verbal interventions, 2) notion of function, 3) definitions of implementation methods, 4) definition of object.

4.1.1. Verbal Intervention (Indicator to Consider)

There are many schemes for annotating and counting behaviours and thus minimising observer inference (Doabler et al., 2021). In GD-12 we are interested in the verbal debriefing interventions of the trainer. According to (Barrière-Boizumault, 2013), a verbal intervention refers to "all information that is exchanged verbally" (p.17).

4.1.2. Notion of Function (What?)

Verbal interventions in GD-12 are discussed according to their functions. Inspired by De Landsheere & Bayer (1974) and Beaugrand (1988, p. 285), cited by (Bocquillon et al., 2018), as well as Poggi (2003) (cited by Farouk et al. 2007) and Farouk et al. (2007), the notion of function refers to the presumed objective pursued by the trainer when he/she sets up a verbal intervention during the debriefing. This function-based approach highlights the intentional nature of the debriefing act, where the trainer's actions are categorised into well-defined functions and objectives (Maubant et al., 2005 cited by Bocquillon et al. 2018). In addition, analysis by function provides a better understanding of the interactions between trainers and learners during debriefing in simulation. Note that in GD-12, verbal debriefing interventions are not distinguished according to their preventive or restorative intent.

4.1.3. Methods of implementation (How?)

The intention to debrief can be expressed through a method of implementation. An implementation method refers to the way in which the trainer chooses to act or express himself in order to carry out a given intervention during the debriefing. We have favoured pre-reflective modalities, i.e. approaches that encourage in-depth reflection, especially in the context of debriefing, whenever possible.

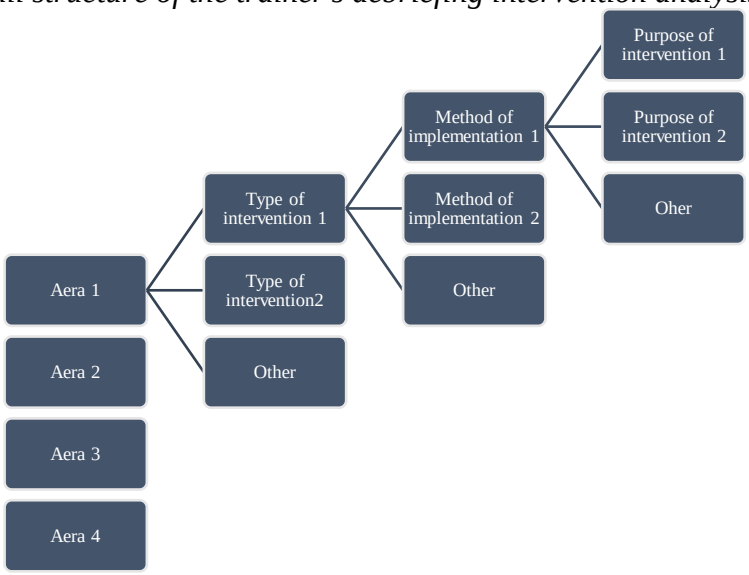
4.1.4. Object of Intervention (About What?)

The object of intervention refers to the specific areas to which the trainer's interventions during the debriefing refer. In other words, it is the subject or topic on which the trainer's intervention during the debriefing session is focused (Derobertmasure, 2012).

4.2. Structure of the GD-12

Figure 4 illustrates the overall structure of the GD-12. The grid is structured around the four poles of the PDM. It consists of 12 debriefing intervention functions (the "what"), which are subdivided into delivery methods (the "how") and the subject of the intervention (the "what"). Furthermore, in the process of coding verbal interventions, it is imperative that all semantic units are completely distinct and covered (principle of exclusivity) and that they are classified in a specific category (principle of exhaustiveness). In practice, this means that additional 'other' categories are included at each level[1].

Figure 4: Overall structure of the trainer's debriefing intervention analysis grid (GD-12)



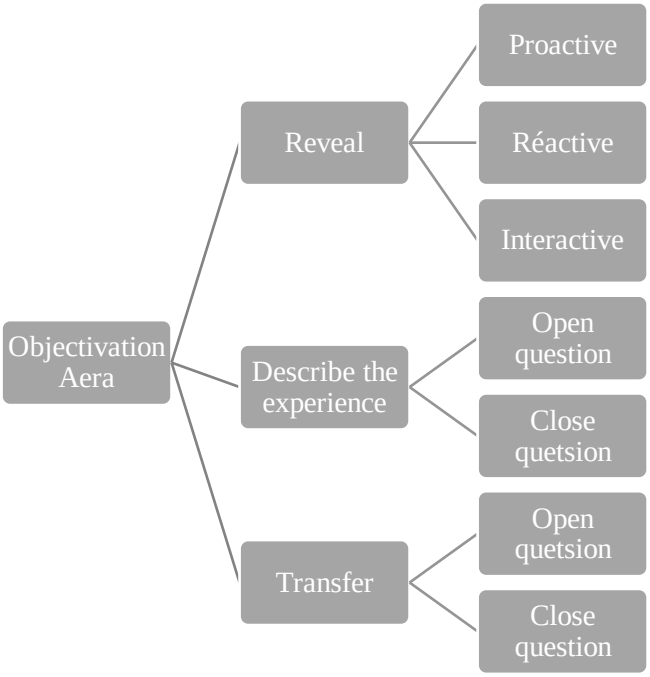
4.3. Presentation of the Types of Intervention and Their Implementation Methods by Aera

4.3.1. Objectification Aera

The objectification domain includes three types of intervention (Figure 5).

[1] For ease of reading, the "other" categories have not been included in the figures in 4.3.

Figure 5: Presentation of the types of intervention and their implementation methods for the objectification domain



In the '**reveal**' function, according to Dugal (2009)[2], the trainer plays an active role by revealing, pointing out and showing the learners something that they have not seen, heard or perceived that relates to either the simulation or the debriefing. The aim of the trainer's intervention is therefore to shed light on certain aspects of the simulation or debriefing activity that the learners may have missed during their experience. The trainer can highlight subtle elements, key interactions or significant behaviours that the learners may have missed. In GD-12, there are three types of strategies implemented for the 'Reveal' function that relate to the same object: proactive, reactive or interactive (adapted from Derobertmasure, 2012). A proactive intervention occurs when a teacher speaks alone. A reactive intervention occurs when a learner intervenes in response to the trainer's intervention. Interactive interventions include all other forms of intervention in which trainers and learners discuss and share.

In the "**describe the experience**" function, based on Guillemette (2012) and Stoloff et al. (2016), the trainer tries to create and share with all members of the debriefing, including himself, an accurate and factual mental representation of the situation experienced during the simulation (Secheresse, 2020). Interventions of the "describe the experience" type thus make it possible to ensure that all learners have a similar understanding of what happened during the simulation in terms of the tasks and functioning of the team (Klimoski & Mohammed, 1994). They are useful for debriefing as each learner may have a different perception of events depending on their focus on certain aspects of the scene and their base of prior knowledge and experience. The "describe the experience" function can be implemented using open and closed questions.

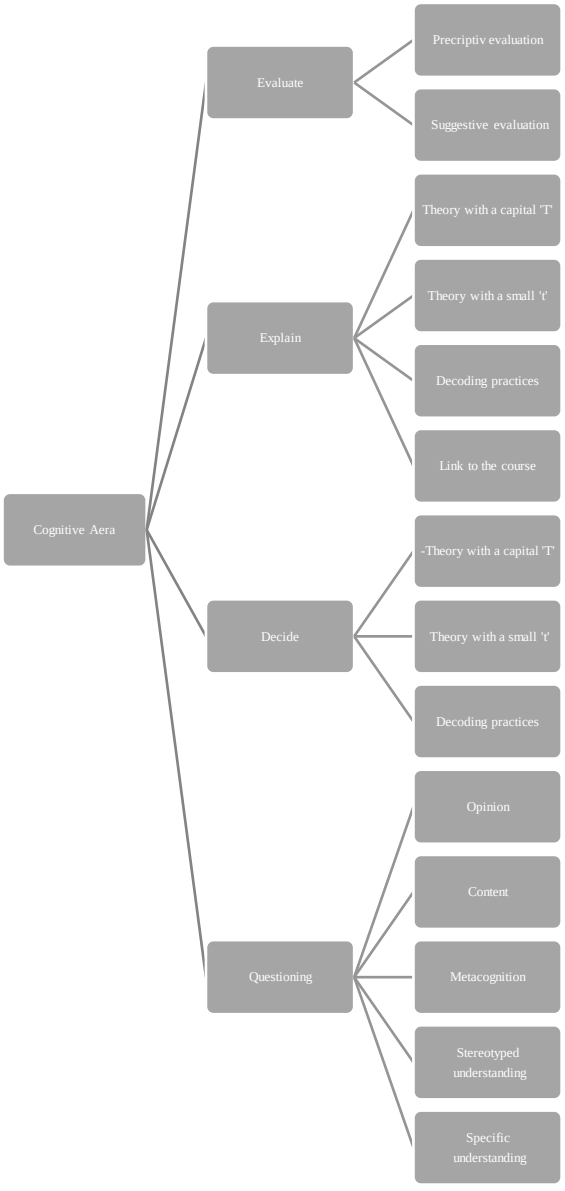
[2] Dugal's model (2009), developed for educational advisors, is used by Alonso Vilches et al., (2021) for debriefing, particularly post-event.

In the “**transfer**” function, the trainer's interventions aim to transfer the learning identified in the simulation and debriefing to the real work context (Oriot & Alinier, 2018). The aim is to get the learners to "make the link between the learning achieved during the training and a specific action plan in order to promote the transfer of learning (Tardif, 1999)” (Secheresse, 2020, p.66). Interventions of this kind are therefore forward-looking in the sense that they aim to change and improve future action by asking what could have been done and by making decisions aimed at planning future action. The 'describe experience' function can be implemented using open and closed questions. In line with Bastinai (2017), open questions offer greater freedom of response, while closed questions can be useful for eliciting specific information.

4.3.2. Cognitive Aera

The cognitive aera includes four types of intervention: assessing, explaining, deciding and questioning (Figure 6).

Figure 6: Representation of the types of interventions and their implementation for the cognitive domain



In the '**evaluate**' function, the trainer gives a judgement on the learner's actions or words, both during the simulation and during the debriefing. This evaluation can take different forms (Bastiani, 2017). With this approach, the trainer can make recommendations to improve the learner's performance (prescriptive evaluation) or offer advice or food for thought to raise the learner's awareness (suggestive evaluation).

According to Guillemette & Luckerhoff (2022), the '**explain**' function refers to the fact that the trainer establishes links between the simulated situation and theoretical knowledge by focusing on the logic underlying the sequence of actions (St-Arnaud, cited in (Guillemette & Luckerhoff, 2022). As described by Guillemette and Luckerhoff (2022), the trainer suggests "referring to previous learning that has played a more or less important role in the course and logic of the action (...) as well as to new knowledge, research findings and theoretical bases in order to compare ideas and theories with other knowledge, not with a view to evaluating the past but with a view to improving the future" (p.7). Table 3 shows the 4 methods used in this function (based on part of the Bocquillon et al. 2015 grid).

Table 3: Methods of implementation for the 'Explain' function

Methods of implementing the "Explain" function	Definition
Theory with a capital "T"	Expressing academic or theoretical knowledge, addressing a theoretical element, quoting an author, or establishing connections based on theoretical principles.
Theory with a lowercase "t"	Expressing in the form of practical advice or opinion without necessarily explicitly citing theoretical sources.
Decryption of practices	Expressing elements related to the analysis of practices and the situation.
Links to the course	Expressing a connection to the content of a course already given or upcoming.

According to Dugal (2009), the '**decide**' function refers to the trainer providing the answer to a problem. This approach aims to provide an immediate and clear solution to a given situation, giving the learner a definitive answer. When the trainer decides, he or she takes on the role of a directive guide, giving specific information or solutions to the learners. This type of intervention can be useful in certain situations where an immediate response is required, especially for novice learners (Secheresse, 2020). However, it can limit the opportunities for learners to explore and develop a reflective approach. The integration of the 'Decide' intervention into the GD-12 grid is all the more important as trainers tend to adopt a transmissive stance during debriefing (e.g. Bastiani, 2017; Policard, 2018; Savoldelli & Boet, 2013; Secheresse, 2020). Furthermore, the 'Decide' intervention is structured around three implementation modalities derived from the work of Bocquillon et al. (2017; 2019): theory with a capital 'T', theory with a small 't' and decoding practices (cf. Table 3).

According to Duval (2009), the '**questioning**' function implies that the teacher adopts an attitude of inquiry and curiosity by asking questions to deepen the understanding of what the learners are saying. This approach also allows the teacher to gather additional information about the learners' thinking and cognitive processes, which can be useful in identifying their strengths and weaknesses. Unlike Bastiani's (2017) approach, which assesses this dimension according to the type of question (open/closed), we have chosen a more specific approach

based on Bocquillon et al. (2019). According to the authors, the trainer can use five types of objectification (questions) to explore different aspects of learners' thinking and obtain additional information (Table 4).

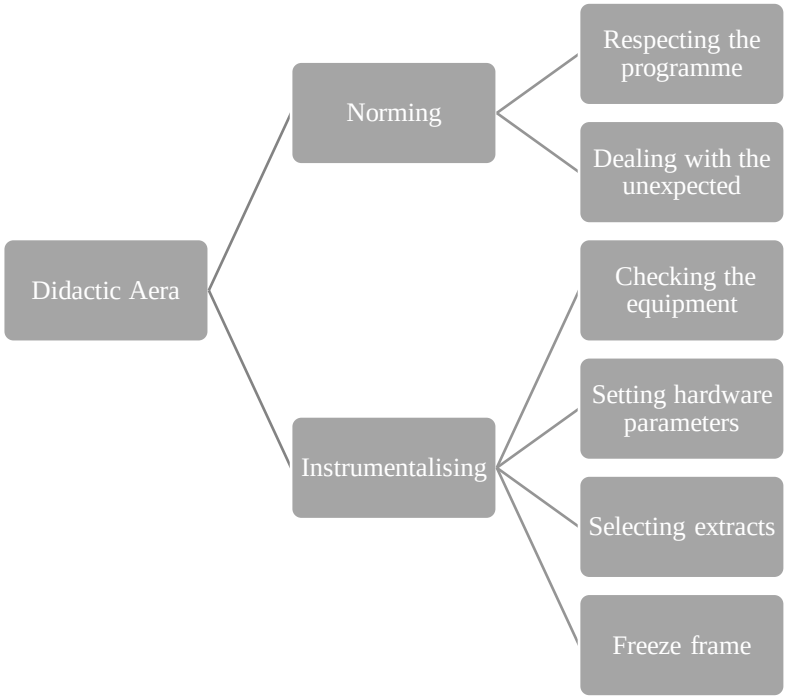
Table 4: Methods of implementing the "questioning" intervention

Methods of implementing the "Question" function	Definition
Stereotypical comprehension questions	These brief interventions ("Is that clear?", "Can we move on?") involve requests for comprehension that generally do not encourage learners to further express their level of understanding. They mainly aim to quickly verify if learners have understood without encouraging a real expression of their ideas or difficulties. In this sense, learners can respond positively even if they haven't fully grasped the content, limiting the accurate assessment of their true understanding.
Metacognition questions	These aim to encourage the manifestation of metacognition in learners. According to Bocquillon et al. (2019), metacognition can be defined as an awareness of one's own intellectual functioning (Raynal & Rieunier, 2012) or as the ability to reflect on one's own thinking (Gauthier, Bissonnette & Richard, 2013).
Specific comprehension questions	More elaborate, these questions require learners to develop their responses, allowing the trainer to obtain real information about what is understood ("Why did you choose this solution?").
Content-related questions	Content-related questions aim to "objectify the content. They mainly take the form of questions about the content (e.g., 'What is the capital of France?')" (Bocquillon et al. 2019, p.18).
Opinion questions	The trainer asks for the learners' opinions, particularly based on their personal or professional experiences ("How did you react to this emergency situation?").

4.3.3. Didactic Aera

The didactic area is structured around 2 intervention functions: normalising and instrumentalising (Figure 7).

Figure 7: Types of intervention and how they are implemented in the didactic area



The '**norming**' function has two objectives: a) to comply with the programme (Policard, 2018) and b) to deal with the unexpected and uncertainty. To achieve the first objective, the trainer implements interventions related to the parameters of space and environment, as well as interventions related to the parameters of time and rhythm (Delgoulet & Vidal-Gomel, 2013). To achieve the second objective, the trainer implements strategies to maintain a safe zone in the face of the unexpected and uncertainty, whether cognitive, behavioural, organisational (e.g. Policard, 2018 ; Krogh et al., 2016) or technological (Krogh et al. 2016).

In interventions with an "**instrumentalising**" function, according to Policard (2018), the trainer adopts a technicist logic. The "instrumental" function concerns the trainer's use of artefacts, i.e. training tools used to mediate between the learner and knowledge (Nijimbere, 2013; Rabardel, 1995a, 1995b). However, while Policard (2018) limits instrumental interventions to partial or high-fidelity simulators (e.g. mannequin), our research takes a broader view by considering any technological artefact, such as the use of video clips. Our choice makes sense in light of numerous authors who point to video debriefing as the 'gold standard' (e.g. Levett-Jones & Lapkin, 2014, p.62; Krogh et al. 2016; Sawyer et al. 2016). Based on our field observations and Krogh et al. (2016), instrumental interventions were grouped into four modalities of implementation (Table 5).

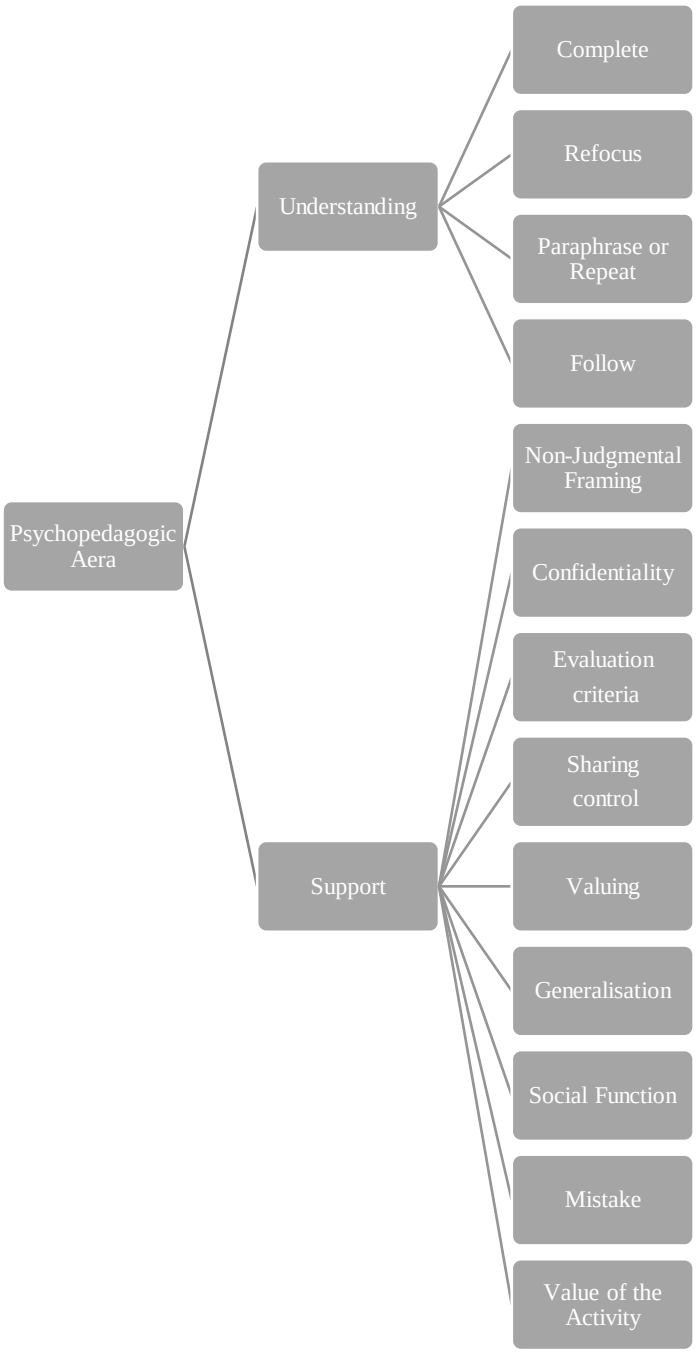
Table 5: Implementation modalities of the 'instrumentalise' function and definitions

Implementation Modalities of the "Instrumentalize" Function	Definition
Check Equipment	These interventions involve the trainer ensuring that all necessary simulation materials are ready and functioning properly. They may check technical equipment such as simulators, video recorders, audio devices, etc. This step aims to ensure that the simulation will proceed without technical issues.
Configure Equipment	In this modality, the trainer adjusts the settings of the equipment used during the simulation, such as sound, speed, brightness, etc. These adjustments can be made to replicate real conditions of the simulated situation or to adapt the environment to learners' needs.
Select Excerpts	The trainer may purposefully choose excerpts from video recordings captured during the simulation. These excerpts can be used to highlight specific moments of learners' activity or to illustrate certain key points to be debriefed later. This selection focuses learners' attention on crucial aspects of their performance.
Pause and Analyze	During the debriefing phase, the trainer can pause a specific video at a particular moment to analyze a situation or action in more detail. This approach allows for close examination of critical moments or specific interactions, providing opportunities for in-depth reflection and discussion with learners.

4.3.4. Psychopédagogic Aera

The psychoeducational area is made up of 2 types of intervention: understanding and support (Figure 8).

Figure 8: Types of intervention and how they are implemented in the psychopedagogical area



The "**Understanding**" function refers to interventions aimed at listening, reformulating or facilitating expression (based on Dugal, 2009). These interventions include listening attentively, reformulating what learners say and facilitating their expression (Dugal, 2009). Within GD-12, the "Understanding" function is broken down into four modalities (based on Bocquillon et al., 2015) (table 6).

Table 6: Implementation mode of the "Understand" function

Implementation Modality	Definition
Complete Learner's Statements	The trainer may complete learners' statements by finishing their sentences or inviting them to continue their reflection ("What do you mean?"). This strategy aims to encourage learners to develop their ideas and express their thoughts more comprehensively.
Refocus Learner's Statements	The trainer refocuses learner statements by revisiting essential elements of their input. This approach aims to clarify ideas addressed by learners and to keep the discussion centered on the debriefing objectives.
Paraphrase or Repeat Learner's Statements	The trainer paraphrases learners' statements by expressing them in their own words. This strategy verifies mutual understanding between the trainer and learners and promotes clear and precise communication within the group.
Follow the Conversation	The trainer uses interjections like "mmh," "ah," or "yes, that's right" to show attentiveness to the conversation and active engagement with learners' exchanges. This modality facilitates smooth transitions between topics discussed in the debriefing and encourages dynamic and interactive discussion

The '**supportive**' function refers to the trainer's actions to encourage and comfort learners (according to Dugal, 2009). This function has been highlighted as enabling an environment that is conducive to learner expression, giving learners the assurance that they can take risks and express their emotions safely (Spill & Gatin, 2019). We have identified several ways in which the support function can be implemented (Table 7).

Table 7: Ways of implementing the support function

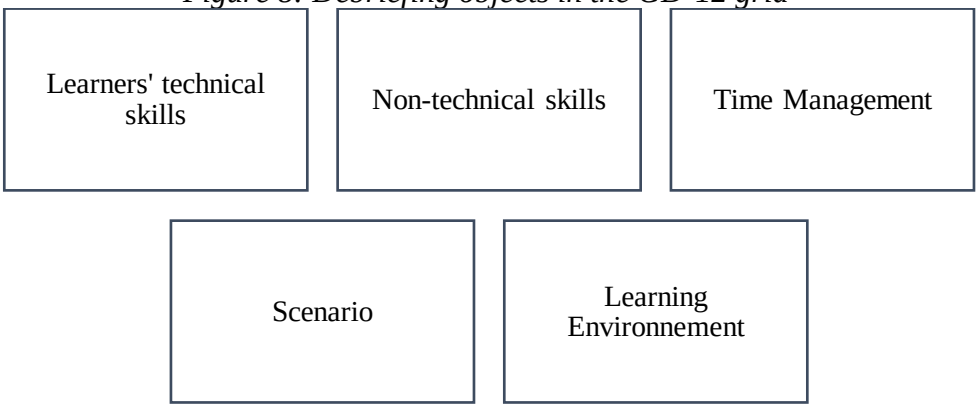
Method of Implementation and Reference Authors	Definition	References
Non-Judgmental Framing	Establishing a non-judgmental and non-critical environment that encourages learners to express themselves freely and feel safe.	Spill & Gatin, 2019; Rudolph et al. 2008; Oriot & Alinier, 2018
Confidentiality	Ensuring the confidentiality of exchanges and information shared during debriefing, creating a space of trust.	Rudolph et al. 2008; Savoldelli & Boet, 2013; Spill & Gatin, 2019; Horczik, 2014; Servotte et al., 2018
Transparency of Evaluation Criteria	Clearly communicating the evaluation criteria used during debriefing to assess learners' performance.	Viau & Louis, 1997 ; Oriot & Alinier, 2018
Sharing Control	Actively involving learners in the debriefing process and giving them a share of control over the content and conduct.	May et al., 2004

Valuing the Learner	Recognising and highlighting the efforts and progress made by learners during the simulation.	Spill & Gatin, 2019
Depersonalisation or Generalisation	Avoiding personalising individual errors or performances and generalising them to draw collective lessons.	Spill & Gatin, 2019
Social Function	Using reassuring and de-dramatising interventions to create a climate of trust and goodwill. Also using polite language and humour to create a friendly atmosphere.	Boquillon et al. 2015
Acknowledge Your Own Mistakes	Acknowledging and sharing your own mistakes as a trainer to create a learning climate that is open to questioning.	Spill & Gatin, 2019
Reinforce the Value of the Activity	Emphasising the educational value of the simulation activity and highlighting its limitations to optimise learning.	Spill & Gatin, 2019

4.4. Objects for Debriefing (About What?)

The trainer has a variety of objects on which to intervene in order to support learners in their reflection and learning process (Derobertmasure et al., 2016). These objects cover a wide range of skills and dimensions identified in our literature review. Importantly, the objects of intervention are not limited to what happened during the simulation but can also include the learning and reflections that emerge during the debriefing. We list 5 categories in the GD-12 grid (Figure 8).

Figure 8: Debriefing objects in the GD-12 grid



During the debriefing, the trainer intervenes in the different skills of the learners. Technical skills (or hard skills) "group together specific technical skills and gestures" (Couarraze, 2019, p.97). The trainer focuses on their level of mastery and execution. Soft skills are also important but difficult to capture (Bastiani, 2017; Couarraze, 2019). They include learners' interpersonal, attitudinal and communication skills (Courraze, 2019), such as communication, leadership, teamwork, stress management and certain cognitive skills, such as planning, decision making, task allocation and situational awareness (Chinara & Pellerin, 2014). The trainer can also debrief the learners on their time management during the simulation (e.g. Oriot & Alinier, 2018; Bastiani, 2017; Krogh et al. 2016). Another object of debriefing concerns the level of understanding of the simulation scenario (e.g. Oriot & Alinier, 2018; Sellberg, 2018), where the trainer checks the understanding of the contexts, the roles of the actors, the stakes and the specific objectives. Finally, the trainer pays particular attention to

the simulation environment, including the physical and contextual features that influence the learners' actions.

5. Conclusions, Limitations and Perspectives

The study of the trainer's activity in debriefing is a rapidly emerging area of research, which is crucial in the context of simulation-based training. Research, such as that of Wilhelm (1991), has highlighted the importance of the trainer's skills in determining the quality of the simulated experience perceived by the learner. Despite this recognition, the debriefing activity of trainers remains understudied (Bastiani, 2017; Policard, 2018). The PDM, which focuses on 'what the trainer does' during debriefing, offers an innovative perspective. It presents five equidistant poles associated with the key factors of debriefing according to the scientific literature. These poles define four different areas that characterise the trainer's activity. The GD-12 grid developed within this framework makes it possible to analyse the trainer's verbal interventions according to their function, the way they are carried out and the subject discussed. This approach opens up new avenues of study for understanding the specificities of trainers' activity in post-simulation debriefing, in particular by considering trainers with different field experiences and studying their impact on learners' level of reflexivity. However, this approach has its limitations. The model and grid were tested on specific devices and improvements could include other signals of trainer behaviour, such as communicative gestures.

In conclusion, studying the debriefing activity of trainers is a promising way of optimising debriefing sessions and improving learner learning in simulation. The PDM and the GD-12 grid are promising tools for this multidimensional research in educational science.

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