Subjective Evidence Based Ethnography: an alternative to debriefing for large-scale simulation-based training?

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1. **Problematics, limits of current approaches and research questions**

Professional training usually proceeds through a theoretical phase of instruction (in class, phase 1) (Bruner, 1968) followed by practice in more or less realistic exercises ("simulation"), with feed-back by a professional trainer (phase 2); and finally training in the field, usually under the supervision of an experienced peer (phase 3). The first phase provides structured rules, information on good practice and their rationale, based on capitalization of extensive benchmarking, to feed reflexivity. The second phase enables learning by doing. The learner faces a problem where s/he must use existing resources and/or develop new ones to solve

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professional problems in action. The third phase is systematic improvement over the "natural" learning in a community of practice (Wenger, 2000), by legitimate peripheral participation (Lave & Wenger, 1991) where the learner observes more experienced peers and is gradually granted autonomy of practice under supervision (Paradise & Rogoff, 2009; Rogoff, 2003). Throughout each phase , a combination of supervision and reflexivity enables the learner to go beyond simple imitation or slavish reproduction to acquire an in-depth understanding of the concepts and practice, aiming an improvement of the performances (Argyris & Schon, 1974; Bobillier Chaumon, Rouat, Laneyrie, & Cuvillier, 2018; Conein, 1990; Kolb, 1984; Schön, 1983). From an Activity point of view (in the ergonomics sense of the term), simulation-based training should allow the learner to develop a "constructive" dimension of her/his activity, that is to say to lead the learner to a transformation of her/him-self by constructing new resources through the encounter of a problematic situation (Pastré, 2005). To enhance this construction, debriefing following a training activity is an important moment in the simulation phase: "*we learn a lot by action, but we learn as much and even more by analyzing our actions. And we should add that we don't not learn the same thing*s" (Pastré, 2005).

Debriefings methods are extensively used in vocational adult education after exercises and simulations, notably in professional domains like nursing, healthcare, police, or emergency care professions (Lyons et al., 2015; Rossignol, 2017; Sawyer, Eppich, Brett-Fleegler, Grant, & Cheng, 2016; Sjöberg & Karp, 2012; Söderström, Karp, & Sjöberg, 2016; Ulmer et al., 2018). This is essential to link practice and theory, pointing out what was done well or less well, what could be done better, but also to engage the learner in reflexivity on his/her own actions. "*The concept of reflection on an event or activity and subsequent analysis is the cornerstone of the experiential learning experience.*" (Fanning & Gaba, 2007). Yet, while reflexivity in the simulation phase is recognized as an essential step of personal and professional development, tools and structured methods for conducting them lag behind in the literature; even more when comes the necessity to implement it in mass. *"There are surprisingly few papers in the peer-reviewed literature to illustrate how to debrief, how to teach or learn to debrief, what methods of debriefing exist and how effective they are at achieving learning objectives and goals.*"(Fanning & Gaba, 2007). Not only is it difficult to find generic guidelines for debriefing, but the fact reflexivity requires detailed, individualized analysis of practice means that it ideally must be adapted for each student and each performance. Often this is provided through individual feedback by an instructor, but this is time intensive and difficult to do on a large scale, for example for a whole class of students. So, the problem is the following: in a context of simulation-based training, how might we more efficiently conduct debriefings which enable effective reflection for learners and how to do this on a large scale?

In this paper, we propose to implement a psychological research method called SEBE - Subjective Evidence Based Ethnography (S. Lahlou, 2011; S. Lahlou, Le Bellu, & Boesen-Mariani, 2015) instead of the traditional debriefing within a simulation-based professional training and to investigate how appropriating it may lead to improvements to simulation training and reflexivity for professionals. The SEBE method is based on observation and structured analysis of the learner's own experience through the prism of Activity Theory. It combines a naturalistic capture of the actual sequences of actions (the subject's perspective), recording of the context, post-hoc "replay" interviews based on video tracks straight from the participant's perspective, and finally participants' own mediated memories of the recorded event. The specificity of the SEBE method for simulation training resides in the way researchers interview learners, and in its theoretical background. In contrast to similar post-hoc self-confrontation

techniques which are mostly non- directive, researchers conducting the SEBE replay interview often use, after a first phase where participants spontaneously comment upon their activity, a leading questioning where participants are encouraged to structure the comments of their activity based on the goals they pursue. In practice, at every moment of the tape where action changes (e.g. when the object of attention or action changes), subjects are asked to make explicit what are their goals at that moment. This includes positive and negative goals (what the subject wants to achieve, what the subject wants to avoid). Furthermore, participants are asked to point at what elements in the situation are contributing to their action: affordances of the context, embodied competences, social regulation (e.g. local rules).

This goal-oriented technique taking its roots in the framework of Russian activity theory (Leontiev, 1978; Lomov, 1982; Nosulenko, Barabanshikov, Brushlinsky, & Rabardel, 2005; Nosulenko & Samoylenko, 2009; Rubinstein, 1922) allows an efficient and informative segmentation of the activity into short chunks with a subgoal, as well as identification of the relevant elements for decision and activity support. Each of these chunks of activity can then be analysed to understand how the situation given is processed by the subject to produce decision and action. This functional analysis of goal-oriented behaviour is especially interesting for redesigning the activity because it points at the components of the installation (Lahlou, 2017: the system supporting and channelling the action that help or hinder the subject into reaching her subgoal). This can be used to redesign a better system (e.g. safer and fluid), but also to train participants (by making explicit what resources are needed and how they are mobilized) and identifying the gaps in their embodied competences. In the latter case, in training, the first-person perspective films used by the SEBE method provide a very relevant and situated perspective into real action, including the distribution of attention; it literally provides the learners with vicariant experience of actual situations by "putting them in the shoes" of a real actor.

Previous studies have indicated that SEBE could have some potential for professional education, based upon studies within the nuclear industry involving maintenance work activities and developing training for material design purposes (Le Bellu, 2016; Le Bellu, Lahlou, & Nosulenko, 2010; Le Bellu, Lahlou, Nosulenko, & Samoylenko, 2016). The application of SEBE has been further refined for vocational training and other domains (Everri, 2016; Everri, Heitmayer, Yamin-Slotkus, & Lahlou, 2020; Fauquet-Alekhine, 2016; S. Lahlou, 2011; Rieken, 2013). So far, applications of SEBE have been mostly in very technical contexts, and on rather small groups. But SEBE as applied to simulation training for non-technical skills, and on large-scale is new. The research question investigated here is therefore: could the SEBE research instrument be an alternative to the classical debriefing approaches used in simulation-based training? Is it implementable and robust enough for application to sizeable of students' cohorts undertaking simulation-based training?

This book chapter thus describes how we applied SEBE within an operative police training camp at the Norwegian Police University College. Realistic simulation-based training has been a key component of operative training to prepare Norwegian police officers to make quick and apt decisions during critical incidents. During these simulations which are realistic role-play (actors or instructors are specially recruited for this purpose), students are quickly debriefed by an instructor upon completion of each scenario relatively to the educational objective of the case. These debriefings last generally a few minutes based on the notes taken by the instructor observing the case. As an alternative to this type of debriefing, we implemented SEBE to 32

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voluntary police students organised by pair and belonging to the same cohort. The technique is illustrated for a simulated case where each pair must handle difficult social interactions with the public and prioritise in their decision-making during a critical incident. This specific simulated situation where several actors perform falls within a learning area aiming at helping learners conceptualize a new situation (Pastré, 2005) and to develop and/or put in action the rules and knowledge learned before during theoretical class-training or any other simulation or practical placement (Rasmussen, 1983).

In this section we presented the current state of the art and the research question.
In section 2 we present the activity theory and the SEBE method.
Section 3 describes the experiment using SEBE in police training.
Section 4 presents the results of the qualitative and quantitative analysis of this experiment.
Section 5 discusses the findings.
Section 6 presents limitations, conclusions and avenues for further research

2. Subjective Evidence Based Ethnography (SEBE): theoretical background and principles

2.1. The Russian Activity Theory

Before describing the SEBE method, it's necessary to provide an explanation of the theoretical background which founds the structuration we use in the analysis of the human activity.

In parallel to the French development of ergonomics centered on work activity (Leplat & Cuny, 1974; Ombredanne & Faverge, 1955), activity theories focused on the subject appeared in the USSR in the early twentieth century. Since then, many versions of activity theory have been developed worldwide (Bedny & Karwowski, 2004; Engeström, 2000; Nardi, 1996; Stetsenko, 2005; Von Cranach, Kalbermatten, Indermühle, & Gugler, 1982). Engeström's activity theory is particularly popular, having been developed to take into account organisational characteristics of the activity (such as the division of labour, tooling, and rules).

While theoretical work on Activity Theory is sophisticated, methodological approaches to its application in studying work activity lag behind. Our own research is based on the psychological structure of the activity developed by the Russian school of Activity Theory (Leontiev, 1978; S L Rubinstein, 1922, 1940) but makes little use of its philosophical aspects linked to personality, conscience, or emotions.

Activity Theory in the Russian tradition has been developed primarily by Leontiev (1978) and Rubinstein (1922, 1940), who elaborated two somewhat similar versions of the structure of human activity. Generally, Activity Theory aims to render explicit the relationships between the different components of an activity, namely, motives, goals, tasks, actions, and operations.

In Leontiev's version, motives, interpreted not as a kind of experience of need but as a material or ideal object of need, determine the whole activity, which is carried out by means of actions directed by conscious goals. The expected result of activity, which is the goal, defines the actions necessary to reach it. However, actions are ultimately determined by the motive of activity. Indeed, one activity can be completed by means of different actions, and one action can be a component of different activities. Operations are concrete ways to realise an action and

correspond to conditions of activity. Thus, in the Leontiev's theory, motives refer strictly to the whole activity, goals refer to actions and operations refer to concrete situations.

Rubinstein's conception of activity structure is similar to the one proposed by Leontiev in the sense that the same activity components are outlined. However, according to Rubinstein, there is no strict correspondence between the motive and activity or between the goal and action. Activity-related motives and goals, unlike action-related motives and goals, usually have an integral nature, express a subject's general orientation and, thus, are called initial motives and final goals. At different stages of activity, activity-related motives and goals generate different specific motives and goals, which characterise actions.

Both activity theories provide an efficient conceptual framework for investigating "human and environment" interactions, while Rubinstein's version is focused on the philosophical and theoretical developments of an activity linked to concepts of conscience, personality and the life of the subject.

Our previous research (Le Bellu et al., 2010), has stabilised and operationalised a version of activity theory developed in line with Lomov's engineering psychology at the Russian Academy of Sciences (Lomov, 1982; V. N. Nosulenko et al., 2005; V. Nosulenko & Samoylenko, 2009). In this version, activity theory considers activity as an oriented trajectory from a given state ("conditions given") to a consciously represented expected final state ("goal"), driven by internal motives (urge to reach some internal state of balance or satisfaction).

The trajectory of activity is thus considered as a succession of small problems to be solved ("tasks"), which can each be seen as reaching a local "subgoal" (intermediate stage in reaching the goal) in the conditions given by the environment (organisation, tools…). Activity is subject-centric: performed from the perspective of the subject, in the context of layers of affordances that shape action pathways. To these should be added actions/operations (behaviour) components which can be observed and recorded, while others, such as motives or goals, are invisible. These invisible components can be revealed and characterised only by means of techniques developed to analyze and evaluate subjective representations of individuals. The modes of investigation that we used to trace and mediate relationships between externally observable parameters of activity (behaviour) and their internal components (thoughts and so on) are presented below through the SEBE technique.

2.2. The SEBE method

Video ethnography is a naturalistic approach to collect and study the flow of activity during real-life practice in the field. Recently visual ethnographic methods and techniques have been expanding in the social sciences (sociology, anthropology, psychology, and ergonomics) to study human activity (Fleck & Fitzpatrick, 2009; Goldman, Pea, Barron, & Derry, 2007; Heath, Hindmarsh, & Luff, 2010; Lahlou, 1999; Mondada, 2003; Omodei, Wearing, & McLennan, 2002; Pink, 2007). As activity is distributed, professionals use not only their embodied competence but also a series of physical tools and instruments to transform material objects (Rabardel, 1997) and mediating structures to perform cognitive operations. Indeed, Hutchins, after Pea (Pea & Kurland, 1984), calls "mediating structures" the artefacts used by humans as information processors:

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"*Language, cultural knowledge, mental models, arithmetic procedures, and rules of logic are all mediating structures too. So are traffic lights, supermarkets layouts, and the contexts we arrange for one another's behavior. Mediating structures can be embodied in artifacts, in ideas, in systems of social interactions [...]*" (Hutchins, 1995a: 290-291)

Furthermore, action is situated and emerges in context (Lave, 1988; Suchman, 1987). Consequently, when we try to reconstruct the action and understand how professionals make decisions, we need to account for the contextual elements which contributed to the activity. These elements cannot be recovered easily from a participant's memory alone.

The SEBE method uses video recordings to bring the complete situation back to the participant at the time of recall, thus enabling the professionals to point to the relevant elements that supported their actions while they were happening. More specifically, SEBE (Lahlou, 2011) combines two video techniques: first-person perspective (FPP) video (Figure 1) and replay interview (RIW). We use a first-person perspective capture to reconstruct the situation as it was seen by the participants at the moment of action, because, in complex situations, what was relevant for immediate action is usually what the participants paid attention to. They then watch their own footage and comment upon in it in a specially structured *replay intervie*w *(RIW)* that aims to reconstitute the activity, with its goals, subgoals, and more generally mental states and decision-making processes in connection with the elements present in context.

During SEBE, FPP video-recording of an activity is first collected via subjective cameras (*subcams*: Figure 1) which are miniature wide-angle video cameras with a stereo microphone (Lahlou, 1999), also referred to as "body cameras" in recent literature from within the police domain (Drover & Ariel, 2015; Lum, Stoltz, Koper, & Scherer, 2019; Voigt et al., 2017). Subcams are worn at eye level by a participant on a pair of glasses or other apparatus (e.g. helmet, hat, or pocket) adapted to the activity. If in the 90's, researchers using (FPP) video were a few; since this time, body-worn video devices have been increasingly explored and adopted either by academic research in various domains (Cahour & Forzy, 2009; Drobnjak, 1997; Mackenzie & Kerr, 2012; Rix & Biache, 2004) or within professional settings.

Figure 1: A police student wearing the subcam (left); First-person perspective from the perspective of an actor playing member of the public in a case (right).

Wearable recording devices facilitate data collection in a number of ways. Situated activities may be captured on film even while the participants are moving and provide access to their focus of attention. Data are collected without the contribution of any outside observer and participants are free to organise their activity and movements. This combined with the

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relative unobtrusiveness of the body camera, results in a very natural activity. It is important to note that participants tend to forget they are wearing the device, because they focus on their activity but also because a very stringent ethics protocol guarantees that they have full control over the data, not only during recording but afterwards also. So, they do not have to worry about the recording, and can legitimately (in psychological terms) forget about it. Furthermore, there is not a researcher around carrying a video camera who would be a constant reminder of the recording.

In addition to the advantage of convenience, FPP footage provides memory cues and a more accurate representation (and soundscape) of the actual situation to participants. This representation is obtained in the second phase of SEBE, the Replay Interview (RIW). The RIW is a reflexivity exercise, which has interest per se for the professional or trainee as it makes explicit the implicit and raises awareness about actual practice (Fleck & Fitzpatrick, 2009; Gillespie, 2007; Schön, 1983; Suchman & Trigg, 1991). In the RIW the video recording is used to stimulate the participant's memory and to reconstruct the situation as it was experienced by the participants at the moment of action. The RIW technique is an adapted self-confrontation interview (Clot, Y., Leplat, 2005; Mario von Cranach, 1982; Ginsburg, Brenner, Cranach, Eiser, & Scherer, 1985; Pinsky & Theureau, 1987; Theureau, 2003) whose specificity resides in the way researchers interview the participants, and in its theoretical background (see section above on activity theory). As mentioned before, in contrast to similar post-hoc self-confrontation techniques which are mostly non- directive, researchers conducting the SEBE replay interview often use, after a first phase where participants spontaneously comment their activity, a leading questioning where participants are encouraged to structure the comments of their activity based on the goals they pursue. In practice, at every moment of the tape where action changes (e.g. when the object of attention or action changes), subjects are asked to make explicit what are their goals at that moment. This includes positive and negative goals (what the subject wants to achieve, what the subject wants to avoid). Furthermore, participants are asked to point at what elements in the situation are contributing to their action: affordances of the context, embodied competences, social regulation (e.g. local rules).

RIWs aim to allow as accurate a reconstruction of the participant's activity as possible given his/her willingness and ability to verbalize, the specific skill set of the interviewer, and the level of trust during the interview. RIWs are also video recorded themselves for further analysis step. Hence the FPP footage may empower participants to more precisely and accurately recall what they did, thought and felt during an activity. Thus, a key advantage of SEBE involves its power for triggering recall of lived experience. Another advantage is that it provides researchers with material allowing a detailed step-by-step understanding of the constituents of activity: goals, subgoals, determinants of actions, decision-making processes, and so on (see our example of analysis and result in section 4.1).

3. Material and Method: the SEBE intervention in the Norwegian police education

3.1. Simulation-based operative training in Norwegian police education

Before detailing the SEBE intervention, it is necessary to describe the operative training context in which we conducted our investigation. The present study was carried out within the

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operative training system developed by the Norwegian Police University College (PHS)[2]. At the time of data collection, all third-year police students at PHS had to complete five modules of operative training throughout their final year of study to obtain a bachelor's degree in policing (Politihøgskolen, 2014). Our intervention focused on one of these modules, SERT, which was an intensive three-week course designed and administered by police.

High ranking instructors employed by PHS have responsibility for weapons and tactical training and administer a larger team of lower-ranked instructors recruited from the police districts for each three-week course. Roughly 60 students participated at one of two camps for the three-week duration of the course. Students received basic classroom and scenario-based instruction in weapons and police tactics during the first two weeks. The final week comprised mostly scenario-based training as students had to complete six live-action simulations without the assistance of instructors. Our intervention focused on one of these six simulations, the so-called *Intoxicated man* scenario (Figure 2).

In this case, police students must handle difficult social interactions with the public and to prioritise between two cases. The public (a drunken man and a parent) are actors specifically recruited for this role-play and the simulation takes place outdoor in the police camp, in a place looking like a park. Thus, the simulation environment is built so that a maximum of conditions is met to have the most realistic simulations and to enable a good projection and immersion of the police students in the lived situation.

Figure 2: Picture of the *Intoxicated Man* scenario both from external (top row) and first-person (below row) perspectives.

More precisely, a student-pair receive a call from the operation central (OC) informing them to conduct a routine control-check on an intoxicated man who has created a public disturbance in a park. Midway through the case, a distressed parent unexpectedly approaches them to report a missing child. The patrol is expected to cope with the two cases at the same time, and to quickly prioritize the missing child. The educational objective of the case is to thus examine whether student-pairs are able to identify the critical information, to understand its meaning, and to adapt their activities to the new situation by adjusting their initial goal. This is because, as future police officers, the police students are expected to be able to quickly adapt their responses to a changing situation. Thus, the task to be solved in this simulation raises to this educational question: *are the police students able to adapt to a changing situation and to make the decision to prioritize the most critical(urgent) case?*

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[2] Politihøgskolen (http://www.phs.no/en/)

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The case is constructed so that the two police students become split up when the parent comes into the situation. Very often, as seen on figure 2, one of the police students keeps speaking with the intoxicated man while the second police officer becomes engaged with the parent. The actor playing the parent is instructed by the police instructors to exhibit signs of stress, and additionally demand immediate help from the police to locate their child. After a short time, the two police students begin to have a different situational awareness, as they are physically and mentally separated. Nevertheless, they must decide as a team: should they stick to their initial goal and remain focused on the first assigned mission (the intoxicated man), or should they reprioritize and try to save the child?

Throughout the case, one or two police instructors positioned near to the police students observe the simulation and take notes. The case is stopped by the instructors when they consider/understand that the students have made their decision for how to prioritize. Then, each student-pair receives a quick (approximatively 3 minutes) verbal debriefing by an instructor upon completion of the scenario. Ideally, the content of this debriefing focuses on questions aiming to activate a reflection process with the police students: *did they have a common situation awareness among themselves, but also together with the OC? Did they share information with each other, and did they report back to OC on their actions? Were they aware of the individual goals they were pursuing throughout the case? Did they try to solve both tasks at the same time, and what were the consequences of that (splitting up, losing information, and doing a bad job in both cases)?*

The PHS instructors created this now well-established simulation to challenge students on principal decision-making during operative work. At first sight the case could be considered as "poor", as it might seem obvious to find a missing child is more important than handling a drunk man. However, instructors suggested that there was a degree of variability to student behaviour and there was additionally a clear hierarchy in terms of changing priorities. That's why we selected[3] this simulation in accordance with the instructors for implementing the SEBE method instead of the traditional short debriefing.

3.2. Participants and ethics

The SEBE intervention was presented to a cohort of 60 final-year police students at the beginning of the final week of the SERT course. 32 students agreed to participate in the study (M_{age} = 24.3, Range 21 - 37 years-old, 31% women, 69% male). Most had no professional experience before entering the police education system as few reported prior experiences in operative training in the military (N=6) or criminal justice system (N=1). All students had one year of practical placement in the police.

As our SEBE intervention involved capturing potentially sensitive[4] audio-video data (Everri, Heitmayer, Yamin-Slotkus, & Lahlou, 2020), the research protocol was submitted and

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[3] We had to choose the most relevant simulation as a "pilote" usa-case well in advance of the actual research, in order to adapt to the operative training in agreement with local police instructors. This required an in-depth reading and understanding of educational material and making choices without having observed cases prior to the actual research.

[4] Audio-video data collected can be sensitive either from a private perspective for the participant, or from an institutional viewpoint, since this organisation trains the future police officers of the country to specific techniques.

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approved by two review boards: one research-ethics board within the two first author's institution, and a second data-protection committee in Norway[5].

3.3. Data collection protocol

The purpose of this stage was to collect data that will provide an approach to a subjective experience embodied in a cognitive activity of joint diagnostic and decision-making.
Based on the SEBE paradigm described above, each of the 32 police students participating in the SEBE experiment were equipped with a subcam right before starting the simulation (see Figure 3, left picture). As they acted during the case, a first-person perspective of their visual scope, soundscape (including speech), and manipulations was recorded. As participants were organised in pairs during the simulation, this means that we collected 2 subcam footages per simulation, each one corresponding to the attentional perspective of each police student. In total, we collected 32 subcam footages for 16 simulations. The duration of the simulation varied from 2 to 12 minutes (M length = 4 min) depending of the time student-pairs needed to make their decision.
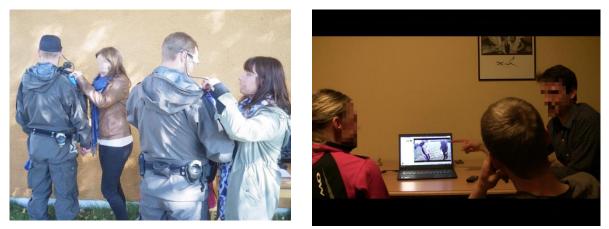

Figure 3: Each volunteer police-student of each pair is equipped with a subcam by the researchers (left picture) before starting the simulation (see Figure 2); then debriefed jointly by a researcher during a RIW session (right picture).

Subcam footages were then used for conducting the replay interviews with each student-pair (see Figure 3, right picture) to enable participants to get into reflexive mode and make them develop a joint understanding of how the patrol perceived the situation, made decisions and communicated during the case. The 15 replay interviews (one pair of police students did not participate) took place during the students' free time, conducted in the evening after the simulation so as not to impede the schedule of students/instructors. Interviews were conducted at the training camp by four researchers in parallel and based on a semi-structured interview guide following the theoretical principles of Activity Theory (goals and plans to reach the goals). The student-pairs were also encouraged to comment upon their situational awareness, decision-making, perception of risk and on communication between partners and with other protagonists of the scene.

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[5] Norwegian Centre for Research Data (https://nsd.no/nsd/english/index.html)

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Before starting, researchers provided the definitions of "goal" and "plan" to the participants: "*For us, a goal is a representation of a desired state; that means what situation you want to reach. The plan is how you intend to get there*". Participants reviewed their patrol's performance and practice by watching their FPP video recording. Practically, the interview started with the subcam footage of the police student who enters in contact with the intoxicated man first, then continued with the subcam footage of the second police student at the moment (s)he was contacted by the parent. It was also possible to switch from one subcam footage to another in case the police students would like to. The polices students were asked to identify, articulate and share the individual and/or common goals they pursued while they experienced the situation, and to describe the way they reached their goals (plans). For structuring and articulating the comments upon the activity, the subcam footage was systematically paused at 4 critical time periods[6]: T0: mission assignment; T1: arrival in the park; T2: first encounter with the parent; T3: decision-making(if this occurs). If the participant didn't spontaneously pause at these points, the researcher who conducted the interview did it. The length of the replay interviews lasted between 30 minutes and 1 hour (M length = 42 min).

Finally, twenty days upon completion of the SERT module, an evaluation survey related to learning outcomes was distributed electronically to the participants in the SEBE intervention and a comparison group to examine potential effects of the SEBE intervention (Phelps, Strype, Le Bellu, Lahlou and Aandal, 2018). This evaluation survey was completed by 29 of the 32 original participants in the SEBE intervention and by 34 police students who were debriefed according to the classical PHS method (comparison group). Questions included items measuring background information, police identity, learning preferences (e.g. *I often reflect on my actions to see whether I could have improved on what I did*), attitudes toward operative training (e.g. *Competence about operative training makes the police's work easier)*, learning outcomes related to the course (e.g. *I have identified mistakes that I used to think were correct during the training camp*), and qualitative items related to learning outcomes during specific role play exercises (e.g. *List up to 10 things you learned on this case*).

3.4. Analysis of qualitative data (FPP footages and RIWs)

Each RIW was transcribed. A systematic open coding scheme was then constructed by the first and second authors who independently coded each transcription and compiled a list of nine thematic categories: planification (goals and plans), risk perception, situation understanding, decision,, communication, eye contact, and self-learning. We only coded a category as present when both raters agreed upon its presence; when they disagreed, the category was deleted. Those categories of verbatims were put in relations with the timeline/course(s) of action of the student-pairs visible in the subcam footages, according to the four key times identified during the research design phase (T0: mission assignment; T1: arrival in the park; T2: first encounter with the parent; T3: decision-making).

4. Results

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[6] These key-times were identified during the research design phase, when reading the educational material.

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4.1. Qualitative results

While it might seem intuitive that the novice police students choose the missing child over the intoxicated man, our findings indicated that they faced a number of challenges in the live-action simulation. Indeed, none of the pairs were able to reach the expected outcomes. Only half of the student-pairs (7 out of the 15) succeeded by clearly prioritizing the second unforeseen mission, as expected by the instructors. Moreover 4 of the 7 of these "successful" pairs used an extended period of time to implement the decision to leave the intoxicated man and join their partner. Six pairs "failed" by maintaining their attention on several goals at the same time by splitting their activities between the different priorities, while the 2 remaining patrols stayed physically and cognitively involved in the first mission and prioritized the intoxicated man (N=2).

Combining FPP and RIWs for each pair allowed us to qualitatively analyse the cognitive paths underlying the joint activity of the PSs during all the situation. This activity analysis enabled us to investigate how the police students became projected in a novel learning setting involving ending up in a situation of multi-tasking. In an extremely short and challenging time frame, they passed from one unique and common goal to several individual goals and subgoals to be pursued in parallel (see example detailed below). This helps explain why the resulting reality was more nuanced and yielded diverse trajectories which diverged from the expectations of professional instructors regarding operational priorities.

We illustrate this finding by providing an extract of the analysis completed with the SEBE methodology. This extract highlights the situated and cognitive processes that occur when novice police officers must make joint decisions in such a case. We have used the labels PS1 (Police Student 1) and PS2 (Police Student 2) to represent the student-pairs who are jointly assigned by the OC (Operation Central) to control the intoxicated man in the park. PS1 is the student who engages with the intoxicated man while PS2 encounters the parent.

At T0 (mission assignment to the police patrol by the OC) and T1 (encounter with the intoxicated man mission), all pairs reported to have shared common goal and subgoals.

More precisely, just after having received the instructions by the OC (their principal goal is to control an intoxicated man), all pairs but one reported to have quickly elaborated and decided upon a plan (subgoals and tasks sharing) on their way to meet their principal goal. When discussing their perceptions of risk during the RIW, most pairs reported that this kind of mission was low risk and that they were used to dealing with public disturbances involving intoxicated people. They explained they had based their decision-making strategies on standard procedures learned during their theoretical training and on similar cases they had already experienced in practical placement.

> "*...that is a pretty ordinary mission so we made a plan that we had to hear what he had to say and get him away from the park so he won't disturb the others in the park anymore.*" RIW PS1, Pair 12

> "*This is like a routine for us, so we know what to do.*" RIW PS2, Pair 14

> "*I felt that this was a mission that would be a low threat, because it's a mission that we've just been out working for one year in a practical period...*" RIW PS1, Pair 6

> "*It's so basic. It's almost the first thing we learn in the first year of school about the 'Police Law' and what to do with intoxicated people and so on.*" RIW PS1, Pair 8

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> "*... today it was a normal situation that we could come into every day and it's like something I've done in the past here when I was in practice ...*" RIW PS1, Pair 11

Each pair applied their initial plan (the same one for each pair) by assigning PS1 to first communicate with the man and to evaluate his level of dangerousness for adapting their actions and decisions depending upon his state: to tell him to leave, to drive him to home, hospital, or the police station (subgoals ofPS1). In the meanwhile, PS2 remained in the background in charge of communicating with the OC by radio, having an overview of the setting, and thus maintaining security (subgoals of PS2).

However, at T2 (arrival of a new protagonist in the simulation), an unforeseen and sudden event occurs during the simulation. The introduction of the panicked parent and potential mission involves sudden changes in pace and goals dynamics. The underlying cognitive processes and strategies of the police patrol are led to change with the change of situation.

> Interviewer: "*So your goal is ...*"
>
> RIW PS1, Pair 1: "*To focus on [the intoxicated man] and maintain contact and finish the goal we had earlier: make contact and get a solution*"
>
> Interviewer to PS2: "*And I guess your goal has to change suddenly, correct?*"
>
> RIW PS2, Pair 1: "*Yeah, it does. My main goal is first to calm this woman down and then to let her speak and find out why she is so upset. So my focus on [the intoxicated man] is taken away.*"
>
> RIW PS1, Pair 1: *A change of pace.*
>
> RIW PS2, Pair 1: "*... and mix up between our goals. The main goal was first [the intoxicated man] and now it's changed to this woman for me so exactly at that point we didn't have a plan. First, I need to talk to this woman and find out why she's so upset. But ten seconds out I think we - or at least I have a plan after speaking with her.*"

As soon as the PSs were interrupted by the distressed parent running in their direction, a second common goal involving orienting toward the new protagonist appeared. In the RIWs, PSs reported that having to deal with a second case in parallel to the first one was perceived as novel and highly challenging. In a short period of time, they had to reconstruct a new situational awareness "*...as you can see in the video, it's a few seconds of chaos when she [the mum] is running almost at us and we're trying to figure out what's happening and if she's attacking us, or whatever.*" (RIW PS2, Pair 9); "*I think only the drunk guy would have been routine...but when they [the instructors] add the woman, it's not routine anymore.*" (RIW PS1, Pair 9). Only two PSs reported to have previously experienced two cases in parallel. This means that from T2, most of the PSs were situated in a new learning area.

At this turning point of within the simulation, each student-pairs met a "cognitive collision" of their goals as they were clearly confronted with two distinct attentional courses to prioritize: "the intoxicated man" or "the parent". These two attentional courses (two principal and parallel goals) thus created the emergence of new individual sub-goals for both PS1s and PS2s. PS1s stayed with the intoxicated man suddenly went from pursuing one to three goals: communication with the man, keep an eye on his/her partner (safety goal), and develop an understanding of the new situation.

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> *RIW PS1, Pair 6: "Try to look at her[my partner] in case the other woman [the mum], you never know, she may be sick, she may be violent, we never know, so I don't want to leave her alone with her if she's getting violent. At the same time, I try to talk to [the drunk man]."*
>
> *Interviewer: "Yes, you do a lot of this [31 gazes from PS1 to PS2 have been calculated]."*

As for PS2s, the parent added a new goal (to assess a new situation and make a decision) which competed with the first common one (controlling the intoxicated man). They had to understand and decide upon a course of action with the parent (T3); e.g. to collect further information, to report to the OC, to communicate with PS1 and/or to go in search of the child.

However, some PS2s met difficulties totally switching to the parent case. Our analyses indicated that some of them reported goals of keeping focusing on the intoxicated man or with their partner's safety (e.g. pair 9, 8, 15) in addition of the parent case. Indeed, ensuring partner safety was a tacit but omnipresent goal of all police students (either PS1 or PS2). This was especially apparent in our analysis of the subcam footages in which we observed that most student-pairs maintained eye contact with each other when they were separated. In fact, we measured 31 to 3 head movements in direction of the partner across each of the 15 simulations. In the RIWs, some participants such as Pair 6, explained that they used positioning strategies in order to facilitate this eye-contact (see extract above). The participants also reported that this tacit goal involving partner safety could come into conflict with other goals. Indeed, the PS2s who especially expressed the goal of their partner's safety also reported feelings of stress in the RIWs. These pairs faced communication difficulties either with their partner or with the parent. For example, see what Pair 4 reported.

> RIW PS2, Pair 4: "*I didn't hear him saying I should concentrate on the woman because I still wanted to be there for my partner because I know for a fact that some people can switch like that so I want to have an eye on him as well.*"
>
> Interviewer: "*Right so one of your goals is safety for your partner?*"
>
> RIW PS2, Pair 4: "*Safety for my partner and help her so I got many balls in the air.*"

Our analyses also indicated that all the PSs who experienced this cognitive multi-tasking situation encountered difficulties in the simulation. This feeling was due to the fact that the PSs tried to maintain the different goals they were following at the same level of priority. In other words, there were not able to prioritize their goals. They were physically involved in the new mission, but they were cognitively dispersed, which resulted in a dilemma between body and mind. Moreover, participants reported that the cognitive cost of such cognitive dispersal was high.

From a student perspective their participation in the SEBE intervention also seemed to offer an opportunity to evaluate their own performances beyond the short feedback normally provided by instructors. Each pair had the chance to return and evaluate potential misunderstandings or develop a better understanding of their performance. For example, pair 8 developed insights on how ineffective communication led to missing information. PS2 attempted to draw her partner's attention, but PS1 remained too focused on his own case. This discovery in the RIW led to the following exchange:

> *PS2, pair 8: "Now there, when she looked at me, I was asking her if she is okay and if I can go and look around the corner."*
> *PS1, pair 8: "Oh, I didn't hear that. Yes, I see it now"*

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Furthermore, the PSs self-reported during the RIWs to have learned about their participation in the SEBE intervention:
PS1, pair 8: "...thank you. I've learned from this [...]. I've never seen myself in a perspective like that."
PS1, pair 1: "I really enjoy it. It gets us thinking more and I feel that looking at what I do afterwards at least doubles what I learn. I see new things now that I didn't think about earlier. [...] For example, [...] I didn't even think about that I was looking that much. I knew I was looking a bit, but I looked a lot more over to my partner. Or how you handle and communicate to the person as well."

4.2. Quantitative results (survey study results)

The survey study and its results are reported in details in a separate publication (Phelps, et al., 2018). Therefore, this section focuses on the main findings. As mentioned above, we aimed to examine if our intervention may have led to different learning outcomes for the 29 students using SEBE by examining their responses on a course evaluation survey with a comparison group (N=34) of students who participated in the standard simulation-based training (non SEBE intervention).

Results indicated that no differences in police identity or learning preferences were found between the intervention and comparison groups. However, main findings indicated that students in the SEBE intervention self-reported more learning outcomes related to decision-making and communication and could identify their own mistakes to a greater degree. They also articulated more learning outcomes in qualitative measures related to describing what they learned from the training exercise and what they could improve upon in comparison to group receiving the standard training (see Phelps et al, 2018 for more details).

These quantitative results add support to the qualitative findings that police students in the SEBE intervention mentioned to be concerned about self-learning at the end of the RIWs (see previous section) and provide promising signs that the SEBE method may enhance experiential learning for police students..

5. Discussion, conclusion, and research avenues

The goal of this research was twofold. First, we investigated whether the SEBE research instrument could be an alternative to the classical debriefing approaches extensively used in professional training. Second, we examined whether SEBE would be implementable and robust enough for application to sizeable cohorts undertaking simulation-based training.

This chapter documents the first time in which SEBE was applied to a simulation case in operative training within Norwegian police education instead of a standard debriefing. On the basis of our analysis, findings (sections 4.1 and 4.2) indicate that the technique of goal oriented RIW offers a different and more in-depth type of reflexivity for trainees, compared to a standard debriefing. Participants could review the results of their action in a secured and structured space of discussion, and others could confront them with what they expected and what they had learned during the instruction phase. Hence, students could detail their rationale by articulating their individual and common goals, understand the source of both success and failure in their own performance in a different manner. The survey study conducted twenty days after the SEBE intervention aimed at quantitatively assessing the inputs of the method with a comparative group. Its findings also provide an indication that it created different outcomes than traditional debriefing. Students in the intervention group reported more and different

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learning outcomes related to what was discussed during the RIW, namely decision-making, communication, better identification and explanation of mistakes, and a higher degree of description of what the students learned and could improve. Therefore, these qualitative and quantitative results, although exploratory, provide a further that the method could add support and value to the positive feelings of self-learning reported by the participants at the end of the RIW and that this seems to move beyond what is to be expected by standard debriefing.

We suggest that future research considering SEBE as an alternative to classical debriefing should interestingly add a step of measure/assessment, coming in complement or as an alternative to the survey assessment and aiming to confront and compare the performance of both group of trainees (SEBE group and comparison group) confronted with an additional similar situation (simulated or real), after having participated to a first SEBE intervention. It would allow to observe practically on the field, to which extent the police students improved their performance, and conceptualized and appropriated new knowledge (cooperation, communication, handle multi-tasking, decision-making) – "operative genesis" process (Pastré, 2005; Rabardel, 2005).

Also, the in-depth and detailed example of qualitative analysis provided in 4.1 shows how the method enables researchers or instructors to finely cut and structure cognitive processes occurring during an activity involving non-technical skills. Particularly, the problem of decision-making presented in this simulation was analysed as a case of multitasking. From a theoretical perspective, the SEBE method could be further explored for research focusing on decision-making mechanisms and investigations of how tracking the actual and time-stamped chain of actions and decisions while they occur.

It was also the first time we applied SEBE on a large scale to sizeable cohorts. According to a very strict organization (see section 3), our team of 4 researchers was able to record the individual subjective perspectives of 32 trainees and to debrief them by conducting 15 qualitative joint replay interviews, all on the same day. To our knowledge, this is the first time a qualitative research method combining a high level of description of technical and/or cognitive processes and potential for professional learning has been deployed in a short time. This indicates that the SEBE intervention has the potential to enable professional educators to quickly train large cohorts during simulation exercises and offering an alternative to traditional debriefing thus providing a qualitatively different form of reflexivity to learners.

Nevertheless, it is important to note that the preparation work dealing with the organization and information flow prior to the fieldwork is essential to create good conditions for a successful implementation. The current intervention did indeed face a number of challenges. First, merging both training and research schedules became important because we had to ensure that our intervention did not overly impede upon the original educational program. We also had to ensure that we had enough time to reliably collect data during the simulation and at the same time avoid disrupting the actual training schedule which had little room for deviation. Moreover, in spite of detailed preparation and organization, we also experienced several technological malfunctions (e.g. empty batteries, full memory cards, damaged cable, broken camera) during the data collection phase. These issues are however almost inevitable when collecting large amounts of digital data with few devices (here, only 7 subcams for 32 participants).

A second challenge was the selection of the simulation case for this research well in advance before the fieldwork. For example, a case which would entail police patrols larger than a dyad, involve a dramatic increase in the number of possible trajectories a case could render. This greatly complicates the task of analysing and comparing performances due to the possible

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outcomes and differences in behaviour. In fact, we applied the SEBE intervention to two other simulations during the fieldwork and experienced this challenge during a simulation called "public stabbing" involving four police students. In this complex simulation, police students were asked by the instructors to search for and arrest an armed perpetrator in a mock city. Due to this increasing patrol size, the case resulted in a diversity of experiences and less control. Hence, we made the choice to narrow down this exploratory research to a case involving pairs, in which all patrols experienced more or less a similar situation involving clear-cut decision-making possibilities. Thus, potential behavioural trajectories were reduced and analysis of situated and distributed processes between people and also the comparison of performances became more manageable. We thus reserve the question of how more complicated simulations may be investigated using SEBE for future research.

Our current findings show that SEBE has a promising potential to stimulate reflection and learning within simulation training. They also provide valuable knowledge regarding how to characterize the simulated situation in a perspective of SEBE application.

We would also like to add that at an organizational level, the head police instructors were receptive to the present method because it seemed to provide a new perspective on student learning in addition to a new arena to improve feedback. The operative modules are at key times adjusted at PHS to mirror current practical issues in the police and societal problems. For example, after the events of July 22nd, 2011 (the Utøya massacre) additional case-based training was added to the curriculum. The operative instructors were also in the process of designing new measures to improve evaluation of students. The openness to the present technique was thus also in line with increased focus on knowledge-based policing in Norway in which the police are under pressure to continue systematizing and, learning from their own experiences (NOU, 2009) and designing innovative methods of education (Strategic plan, NOU, 2012, 2013). But, beyond the organisational and practical conditions discussed above, an organization or institution -whatever it is: training centre or industry - should reasonably raise the issue of the human resources and skills needed for implementing SEBE as a new educational tool. Because reflexivity is obtained through the individual or collective reviewing of the tape by participants, and because the questions used in the RIW are rather standard (what are the goals pursued, how they are achieved, which tools are used and specific themes related to the profession), we consider that, after a short training for becoming comfortable with the technique, the RIW does not need to be conducted by an expert of the activity. We consider it could be feasibly done by instructors, but it takes time to conduct such detailed individualized interviews and this time investment is not always possible or realistic in professional settings. Another option would be to make it by the students themselves, in turn, with each other (as an educational method of collective and self- marking). The latter option would allow students to benefit of such detailed qualitative debriefings even for large size of cohorts, without not too much impeding on the instructors' time, and while keeping enhancing the learning of students.

Eventually, the subfilms produced by SEBE for conducting the replay interviews could be reused by the instructors for producing new educational material and imagining new exercises. For example, a compilation of this significant series of video recordings could provide a video base where we can see the same case completed in different ways. This base of first-person perspective video could then be used for making the students identify, annotate, and discuss on a series of good and less good practice, but also to concretely illustrate theory during class-training, or to review before going on the field. All these new uses could contribute to enhance

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an autonomous learning of the students by providing them an access to such a base for viewing as many times as needed.

References

Argyris, C., & Schon, D. A. (1974). *Theory in practice: Increasing professional effectiveness.* Oxford, England: Jossey-Bas.

Bedny, G., & Karwowski, W. (2004). Activity theory as a basis for the study of work. *Ergonomics*, *47*(2), 134–153.

Bobillier Chaumon, M.-É., Rouat, S., Laneyrie, E., & Cuvillier, B. (2018). De l'activité DE simulation à l'activité EN simulation : simuler pour stimuler. *Activites*, *15*(1). https://doi.org/10.4000/activites.3136

Bruner, J. S. (1968). *Towards a Theory of Instruction (1st ed 1966).* Harvard: Harvard University Press.

Clot, Y., Leplat, J. (2005). La méthode clinique en ergonomie et en psychologie du travail. *Le Travail Humain*, *68*, 289–316.

Conein, B. (1990). Cognition située et coordination de l'action, la cuisine dans tous ses états. *Réseaux*, *8*(43), 99–110.

Cranach, M. von. (1982). Goal-directed action. In *European monographs in social psychology 30.* London: Academic Press in co-operation with European Association of Experimental Social Psychology.

Engeström, Y. (2000). Activity theory as a framework for analyzing and redesigning work. *Ergonomics*, *43*(7), 960–974.

Everri, M. (2016). *The Subjective Evidence Based Ethnography (SEBE) for the study of ICTs-parents-adolescents' everyday interactions*.

Everri, M., Heitmayer, M., Yamin-Slotkus, P., & Lahlou, S. (2020). Ethical challenges of using video for qualitative research and ethnography. In *Ethnography with a Twist. Methodological and Ethical Challenges and Solutions in Contemporary Research.* (Routledge). Milton Park.

Fanning, R. M., & Gaba, D. M. (2007). The Role of Debriefing in Simulation-Based Learning. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, *2*(2), 115–125. https://doi.org/10.1097/SIH.0b013e3180315539

Fauquet-Alekhine, P. (2016). Subjective ethnographic protocol for work activity analysis and occupational training improvement. British. *Journal of Applied Science and Technology*, *12*(5), 1-16-843.

Fleck, R., & Fitzpatrick, G. (2009). Teachers' and tutors' social reflection around SenseCam

Le Bellu, S., Lahlou, S., Phelps, J. M., & Aandal, J. (2022). Subjective Evidence Based Ethnography: an alternative to debriefing for large-scale simulation-based training? In Simon Flandin, Christine Vidal-Gomel & Raquel Becerril Ortega (Eds.), *Simulation Training through the Lens of Experience and Activity Analysis: Healthcare, Victim Rescue and Population Protection.* Springer.

images. *International Journal of Human-Computer Studies*, *67*(12), 1024–1036. https://doi.org/10.1016/j.ijhcs.2009.09.004

Gillespie, A. (2007). The social basis of self-reflection. In A. Rosa & J. Valsiner (Eds.), *The Cambridge handbook of sociocultural psychology*. Cambridge: Cambridge University Press.

Ginsburg, G. P., Brenner, M., Cranach, M. von, Eiser, R., & Scherer, K. (1985). *Discovery Strategies in the Psychology of Action* (pp. 19–61). pp. 19–61. London: Academic Press.

Hutchins, E. L. (1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.

Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development* (Prentice-H).

Lahlou, S. (2011). How can we capture the subject's perspective? An evidence-based approach for the social scientist. *Social Science Information*, *50*(3), 607–655. https://doi.org/10.1177/0539018411411033

Lahlou, S. (2017). Installation theory: The societal construction and regulation of behaviour. In *Installation Theory: The Societal Construction and Regulation of Behaviour*. https://doi.org/10.1017/9781316480922

Lahlou, S., Le Bellu, S., & Boesen-Mariani, S. (2015). Subjective evidence based ethnography: method and applications. *Integrative Psychological & Behavioral Science*, *49*(2), 216–238. https://doi.org/10.1007/s12124-014-9288-9

Lave, J., & Wenger, E. C. (1991). *Situated learning : legitimate peripheral participation*. Cambridge: Cambridge University Press.

Le Bellu, S. (2016). Learning the secrets of the craft through the real-time experience of experts: capturing and transferring professional expert tacit knowledge to novices. *Perspectives Interdisciplinaires Sur Le Travail et La Santé (PISTES)*, *18*(1). https://doi.org/10.4000/pistes.4685

Le Bellu, S., Lahlou, S., & Nosulenko, V. (2010). Capter et transférer le savoir incorporé dans un geste professionnel. *Social Science Information*, *49*(3), 371–413. https://doi.org/10.1177/0539018410372582

Le Bellu, S., Lahlou, S., Nosulenko, V., & Samoylenko, E. (2016). Studying Activity in Manual Work: A Framework for Analysis and Training. *Le Travail Humain*, *79*(1), 7–28. https://doi.org/10.3917/th.791.0007

Leontiev, A. N. (1978). *Activity, Consciousness, and Personality*. Englewood Cliffs, NJ: Prentice-Hall.

Leplat, J., Cuny, X. (1974). *Les accidents du travail.* Paris: PUF.

Lomov, B. F. (1982). The Problem of Activity in Psychology. *Soviet Psychology*, *21*, 55–91.

Lyons, R., Lazzara, E. H., Benishek, L. E., Zajac, S., Gregory, M., Sonesh, S. C., & Salas, E. (2015). Enhancing the effectiveness of team debriefings in medical simulation: More

Le Bellu, S., Lahlou, S., Phelps, J. M., & Aandal, J. (2022). Subjective Evidence Based Ethnography: an alternative to debriefing for large-scale simulation-based training? In Simon Flandin, Christine Vidal-Gomel & Raquel Becerril Ortega (Eds.), *Simulation Training through the Lens of Experience and Activity Analysis: Healthcare, Victim Rescue and Population Protection*. Springer.

best practices. *Joint Commission Journal on Quality and Patient Safety*, *41*(3), 115–125. https://doi.org/10.1016/S1553-7250(15)41016-5

Nardi, B. (1996). *Context and consciousness: Activity theory and Human Computer Interaction*. MIT Press.

Nosulenko, V. N., Barabanshikov, V. A., Brushlinsky, A. V, & Rabardel, P. (2005). Man–technology interaction: some of the Russian approaches. *Theoretical Issues in Ergonomics Science*, *6*(5), 359–383. https://doi.org/10.1080/14639220500070051

Nosulenko, V., & Samoylenko, E. (2009). Psychological Methods for the Study of Augmented Environments. In S. Lahlou (Ed.), *Designing User Friendly Augmented Work Environments. From Meeting Rooms to Digital Collaborative Spaces* (pp. 213–236). London: Springer.

Ombredanne, A., & Faverge, J.-M. (1955). *L'analyse du travail. Facteur d'économie humaine et de productivité*. Paris: PUF.

Paradise, R., & Rogoff, B. (2009). Side by Side : Learning by Observing and Pitching In Cultural Practices in Support of Learning. *Ethos*, *37*(1), 102–138. https://doi.org/10.1111/j.1548-1352.2009.01033.x.LEARNING

Pastré, P. (2005). *Apprendre par la simulation. De l'analyse du travail aux apprentissages professionnels*. Toulouse: Octares Editions.

Pea, R. D., & Kurland, D. M. (1984). On the Cognitive Effects of Learning Computer Programming. *New Ideas in Psychology*, *2*(2), 137–168.

Phelps, J. M., Strype, J., Le Bellu, S., Lahlou, S., & Aandal, J. (2016). Experiential learning and simulation-based training in Norwegian police education: examining body-worn video as a tool to encourage reflection. *Policing*, 1–15. https://doi.org/10.1093/police/paw014

Pinsky, L., & Theureau, J. (1987). Description of visual "action" in natural situations. In J. K. O'Regan & A. Levy-Schoen (Eds.), *Eye mouvements: from physiology to cognition, selected/edited proceedings of the 3rd European conference on eye movements. Dourdan, France*. Amsterdam: Elsevier.

Rabardel, P. (2005). 13. Instrument, activité et développement du pouvoir d'agir. In *Entre connaissance et organisation : l'activité collective* (pp. 251–265). https://doi.org/10.3917/dec.lorin.2005.01.0251

Rasmussen, J. (1983). Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models. *IEEE Transactions on Systems, Man, and Cybernetics*, *SMC-13*(3), 257–266. https://doi.org/10.1109/TSMC.1983.6313160

Rieken, J. C. (2013). *Making situated police practice visible: a study examining professional activity for the maintenance of social control with video data from the field*.

Rogoff, B. (2003). *The Cultural Nature of Human Development*. New Haven and London: Oxford University Press.

Le Bellu, S., Lahlou, S., Phelps, J. M., & Aandal, J. (2022). Subjective Evidence Based Ethnography: an alternative to debriefing for large-scale simulation-based training? In Simon Flandin, Christine Vidal-Gomel & Raquel Becerril Ortega (Eds.), *Simulation Training through the Lens of Experience and Activity Analysis: Healthcare, Victim Rescue and Population Protection.* Springer.

Rossignol, M. (2017). Effects of Video-Assisted Debriefing Compared with Standard Oral Debriefing. *Clinical Simulation in Nursing*, *13*(4), 145–153. https://doi.org/10.1016/j.ecns.2016.12.001

Rubinstein, S. L. (1922). Le principe de l'activité du sujet dans sa dimension créative. In P. Rabardel (Ed.), *Rubinstein aujourd'hui. Nouvelles figure de l'activité humaine.* (pp. 129–140). Toulouse - Paris: Octarès - Maison des sciences de l'homme.

Rubinstein, S. L. (1922). Le principe de l'activité du sujet dans sa dimension créative. In V. Nosulenko & P. Rabardel (Eds.), *Rubinstein aujourd'hui. Nouvelles figure de l'activité humaine.* (pp. 129–140). Toulouse - Paris: Octarès - Maison des sciences de l'homme.

Rubinstein, S. L. (1940). Osnovy obshej psikhologii (Foundations of General Psychology). In *Génie logiciel et système expert*. Moscou: Edition "Utchpedgiz."

Sawyer, T., Eppich, W., Brett-Fleegler, M., Grant, V., & Cheng, A. (2016, June 1). More Than One Way to Debrief: A Critical Review of Healthcare Simulation Debriefing Methods. *Simulation in Healthcare*, Vol. 11, pp. 209–217. https://doi.org/10.1097/SIH.0000000000000148

Schön, D. (1983). *The reflexive practitioner. How professional think in action.* Basic Books.

Sjöberg, D., & Karp, S. (2012). Video–based Debriefing Enhances Reflection, Motivation and Performance for Police Students in Realistic Scenario Training. *Procedia - Social and Behavioral Sciences*, *46*, 2816–2824. https://doi.org/10.1016/j.sbspro.2012.05.570

Söderström, T., Karp, S., & Sjöberg, D. (2016). Developing police students' professional knowing through scenario training: the impact of preparation, implementation and debriefing. *EDULEARN16 Proceedings*, *1*, 5930–5935. https://doi.org/10.21125/edulearn.2016.0258

Stetsenko, A. (2005). Activity as object-related: Resolving the dichotomy of individual and collective planes of activity. *Mind, Culture, and Activity*, *12*(1), 70–88.

Suchman, L., & Trigg, R. (1991). Understanding practice: Video as a medium for reflection and design. In J. Greenbaum & M. Kyng (Eds.), *Design at Work: Cooperative Design of Computer Systems.* (pp. 65–89). Hillsdale, NJ: Lawrence Erlbaum.

Theureau, J. (2003). Course-of-Action-Centered Design. In E. Hollnagel (Ed.), *Handbook of Cognitive Task Design* (pp. 55–81). CRC Press.

Ulmer, F. F., Sharara-Chami, R., Lakissian, Z., Stocker, M., Scott, E., & Dieckmann, P. (2018). Cultural Prototypes and Differences in Simulation Debriefing. *Simulation in Healthcare*, *13*(4), 239–246. https://doi.org/10.1097/SIH.0000000000000320

Von Cranach, M. (1982). *Goal-directed action*. London: Academic Press.

Wenger, E. C. (2000). Communities of practice and social learning systems. *Organization*, *7*(2), 225–246.