High Fidelity Simulation: From Simulation to Debrief, Assessing Leadership and Followership Management*

Lucien TISSERAND**

ABSTRACT: This paper deals with high fidelity simulation (HFS) in health care. A computerized mannequin plays the role of a patient, and this device allows medical teams to train for different scenarios. For the trainees, the pedagogical aim is to learn "teamwork" or "communication" skills. The purpose of the article is to present this device as the unfolding of a complex practice: the scenario being played, the simulation being observed, and finally the debriefing of the session. The corpus is constructed around the task of preparing for an intubation. We will detail the sequential achievement of this task in the simulation room, more specifically the practical problem of passing an object between two participants. We will then present how, in the meantime in the control room, trainers notice an issue. We will then see how this event is referred to during the debriefing phase. This analysis across these multiple settings involved helps us understand how practitioners make use of the HFS device in order to assess their organizational practices.
Keywords: high fidelity simulation, multimodality, multi-activity, leadership and followership management

1. INTRODUCTION

In the last twenty years, the principal means of teaching and training for *Non-Technical Skills* (*NTS*) in health care system has been the High-Fidelity Simulation (HFS) practice (see Cooper & Taqueti, 2004, for a brief history). Several governmental surveys (see for example Kohn, Corrigan & Donaldson, 2000, for a survey in the U.S.A) about adverse events recommended HFS as a solution for dealing with errors attributed to the "human factor":

> *Human factors is defined as the study of the interrelationships between humans, the tools*
> *they use, and the environment in which they live and work. (Kohn, Corrigan & Donaldson,*
> *2000, p.63)*

The aim of this paper is to investigate how such NTS notions are formulated by health care professionals in connection with how they can be accounted as mobilized in situ by the simulation trainees. For that purpose, instead of investigating an isolated phenomenon, we propose investigating a trajectory: the interrelation of three interactional episodes. Firstly, we provide a sequential and multimodal analysis of the passing of a tool during a pre-oxygenation procedure happening in the simulation room. We will show how contingencies in the distribution of tasks lead to an interactional disorder between two members of the team practicing. Secondly, we will look at an issue reported concurrently by the facilitators in the control room. Finally, we will present the debriefing phase of this simulation session where, referring to this task, accounts are formulated by the trainees themselves, using the *NTS* notions of *leadership* and *followership*. We will conclude with a reflexive discussion about these interrelations, questioning how much they are accomplished by the participants and/or the researcher. The intertwining of these episodes is central to the understanding of HFS as a reflection-based learning practice.

1.1. High Fidelity Simulation as a Continuously Monitored Practice

HFS practices involve the use of a simulator, which is a real size human mannequin. There are many types of mannequins designed either as an adult man or woman, a child, or a baby (see Figure 1 below).

** Doctoral student, Sorbonne Nouvelle Paris 3 University, EA 7345 CLESTHIA. Paris, France. e-mail: lucien.tisserand@sorbonne-nouvelle.fr (ORCID: 0000-0002-3891-687X)

Figure 1 - A baby high fidelity mannequin

These mannequins are technologically advanced devices that enable the execution of the most common care procedures. For example, a mannequin can be intubated, induced, and it can respond to a cardiac massage. The "high fidelity" is also rendered by the fact that real medical tools are used to perform almost every common medical procedure. Some vital signs like heart sound or pupillary dilation can be checked directly (e.g. the size of the pupil actually changes). However the information sought by a member of the medical team might not be directly detectable by the means of mechanical processes. Values can be determined by the software and displayed on the monitor, as if the tool used for measuring the value had actually measured it (e.g. the oxygen saturation in blood by the mean of pulsed light directly displayed). Of course, this requires that the mannequin be continuously monitored and piloted by the facilitators in the control room.

1.2. Non-Technical Skills, Leadership and Followership

HFS has been developed as a means to train for *Non-Technical Skills* (*NTS*). This *NTS* concept can be found in other industrial domains, for example aviation. Another *NTS* term taken from aviation is *Crew Resource Management,* that is, the distribution of human resources among the required tasks that emerge in action (see Nevile, 2004). The idea behind the development of this *NTS* designation is to shed light on skills that have always been mobilized, but which have not yet been taught or assessed in their own right. Entire frames of reference and toolkits are built for these skills. For example the Anaesthetists' Non-Technical Skills (ANTS) System, which was established by the collaboration of the University of Aberdeen and the Scottish Clinical Simulation Center (Fletcher et al., 2003). The following is the ANTS handbook definition of *NTS*:

> These non-technical skills can be defined as behaviours in the operating theatre environment not directly related to the use of medical expertise, drugs or equipment. They encompass both interpersonal skills e.g. communication, team working, leadership, and cognitive skills e.g. situation awareness, decision making. (ANTS Handbook v1.0, 2012, p.2)

According to this definition of the ANTS handbook, *NTS* are not technical because they would not rely directly on the specificity of medical knowledge. While we may perceive a separation between *technical skills* (*TS*) and *NTS*, medical research is also aware of their intertwining. Studies have drawn statistical correlations from *TS* and *NTS* checklists completed by experts (Riem, Boet, Bould, Tavares & Naik, 2012).

In this paper, we will see how the HFS can be the locus where professionals, by the means of reflexive discussions and assessments, can be trained in *NTS*. In our fieldwork, facilitators insist on the fact that the debriefing is where learning happens. Their motto is that "The simulation is a pretext for debriefing". The idea is that this debriefing practice, learned during HFS, can be transferred to the real professional environment (Fanning & Gaba, 2007, p.123). Also, we will show the real-time and interactional mobilization of such skills, as embodied achievements.

We will be especially interested here in the notions of "leadership and followership management". A first reason is that these categories are overwhelmingly verbalized by the participants during the debriefings of the sessions we observed. Moreover, those are well-known categories, widely used by practitioners and researchers to discuss *Crew Resource Management*. The idea behind this *leadership* notion is that the team is organized around one member who is the team-leader, responsible, overseeing the situation, summoning, giving orders, and distributing the team-followers tasks. Usually, in hospital units, the team-leader is the team member who is known to be the most experienced doctor. Medical research explore the idea that leadership and followership positions are "emergent", constructed in relationship and adapted "moment-by-moment" (see for example Gordon, Rees, Ker & Cleland, 2015).

Frames of reference, obviously, provide prescriptive definitions of such roles (see figure 2 below, extracted from the ANTS Handbook).

Using authority and assertiveness – leading the team and/or the task (as required), accepting a non-leading role when appropriate; adopting a suitably forceful manner to make a point, and adapting this for the team and/or situation.	
Behavioural markers for good practice	Behavioural markers for poor practice
• makes requirements known with necessary level of assertiveness	• does not challenge senior colleagues or consultants
• takes over task leadership as required	• does not allow others to put forward their case
• gives clear orders to team members	• fails to attempt to resolve conflicts
• states cases and provides justification	• does not advocate position when required

Figure 2 - Excerpt from the ANTS Handbook v1.0 (2012, p.10)

Here, "Using authority and assertiveness" is a component of the section "Team working". As we can see, the behavioural marker system might inform us on what a team-leader or a team-follower should or should not do. But even if an experienced facilitator knows how to use these markers, we do not know how he perceives them (for example, what is the "necessary level of assertiveness" ?). Most of all, one might wonder how the trainees accomplish these roles in real time, contingent upon the unfolding of interactions within the simulation room, as in real situations.

We will see that, for the practical purpose of the courses of action, participants are engaged in different participation frameworks (Goodwin & Goodwin, 2004) that can be accounted for being relevant to such roles (a team-leader as "supervisor", as "intubator", as "activity owner"...). These participation frameworks are accomplished as embodied practices using all types of resources. The bodies of the participants are delineating a work area vs a supervisor spot, they are managing visual access to the monitor, body contact can be treated as an interactional problem...

1.3. Conversation Analysis, Multimodality and Health Care

The relationship between Conversation Analysis (CA) and health care services is historical (see Teas Gill & Roberts, 2013, for an overview). CA originated with Harvey Sacks studying telephone conversations in a suicide prevention call center. "Medical CA" is part of the broader "Institutional CA" stream of studies, which "is concerned with how these institutional realities are evoked, manipulated, and even transformed in interaction" (Heritage, 2004, p. 223).

While a major part of medical CA has been investigating doctor-patient interactions in various settings (Pilnick, Hindmarsh & Teas Gill, 2009, p.787), there is a also a growing corpus of studies of interactions between practitioners. Doctor-patient consultations had been analyzed with a strong focus on verbal resources (see for example Heritage & Maynard (Eds.), 2006). The coming of multimodality is certainly a major factor that contributed to the development of medical teamwork interactions. The complex organization of teamwork couldn't be analyzed without accounting for multimodal practices. See for example the work of Mondada (2014a) on surgery and Hindmarsh & Pilnick (2002; 2007) on anesthetics. Simulation in health care is still in an early stage with some notable exceptions. See Rystedt & Sjöblom (2012) on virtual simulation and HFS, Johansson, Lindwall & Rystedt (2017) on post-simulation debriefings, and Hindmarsh, Hyland & Banerjee (2014) on dental simulators.

Also, CA's interest in multiactivity is another crucial component of the analysis of medical teamwork (see for example Mondada, 2014a and Depperman, 2014). Especially here, the notions of *resource coordination, intrapersonal* and *interpersonal coordination* and activity *ownership* (see Haddington,

Keisanen, Mondada and Nevile, 2014, pp.17-18 for the introduction of these notions) will be useful for the understanding of the organization of parallel and fast succeeding activities and tasks that are developed among the team members in the course of their operations.

HFS learning practices constitute a perspicuous setting for a multimodal CA approach concerned with the "emic" perspective of members on their own practices. It is a setting where we see participants 1) displaying their working routines in the simulation room, and at the same time, 2) mobilizing formulating practices (Garfinkel & Sacks, 1970) "live" in the control room, but also 3) after the simulation during the debriefing. We thus observe three different achievements of a practical reasoning. Analyzing HFS as a learning practice is then the work of understanding the process by which participants "connect" these three moments. In other words, if "Simulation is a pretext for debriefing" (cf. section 1.2 above), how does that happen ?

2. DATA

2.1. Data Collection in a Simulation Department

The data presented within this article are drawn from a fieldwork we are conducting in a medical simulation department based in an university based in Paris. This simulation department offers HFS courses to a public situated both inside (students) and outside the university (hospitals, associations, which is the case here). Trainings are proposed as both initial and continuing education for students, interns, or, as it is the case here, junior and senior practitioners. The data shown here come from a day-long seminar. It starts with an opening lecture, followed by a general briefing on the use of the simulator, and then sessions are performed consecutively by small groups of trainees. In this paper, data come from the first simulation session of the seminar.

You will see excerpts of multimodal transcriptions (see Appendix section for the transcription conventions) of the events that occurred in the simulation room. However, transcriptions of the debriefing do not focus on gestural resources. Firstly, because much of the business gets done through verbal turns in such a conference setting. Secondly, as a matter of fact, the camera angle does not allow us to precisely account for gestures. You may see Mondada (2014b) for an interest in how the researcher's taping choices and manipulations are already a proto-analysis of the participants concerns.

2.2 Setting

The organization of a simulation session is accomplished through three different spaces constituting the settings for the interactions: the meeting room, the simulation room and the control room.

The "meeting room" is used for the briefings and debriefings. It is a conference room where trainees sit around a large table. A projector is used for the streaming of the simulation occurring, thanks to the webcams installed in the simulation room (top left corner of Figure 3 below).

Figure 3 - The meeting room during a simulation session

The "simulation room" is where the simulation takes place. It is furnished in order to be used and occupied like a regular hospital room by the participants. A door and a large one-way mirror are present in the wall located at the opposite side of the entrance.

Figure 4 - The simulation room, view from the entrance. The control room is behind the back wall where we can see the door and the one-way mirror.

The "control room" is situated behind this wall and this door. Facilitators have a direct visual access to the simulation happening. In this room they can change the behaviour of the mannequin or the information given by the monitor.

Figure 5 - The control room during a simulation session, the one-way mirror is on the left

2.3 The Organization of One Session

The simulation practice "as a whole session" involves more than the simulation itself. There is a continuity between the briefing (where details of the case are already given), the simulation (during which trainees are on their own and facilitators decide when it stops) and the debriefing of it (where every participant, trainees and facilitators, participate, based on the fact that everyone viewed the simulation).

In general terms, facilitators are responsible for the management of the course. They provide their expertise for conducting the simulation, for the debriefing to be insightful and highlighting possible simulation biases. However, facilitators and trainees adopt different roles during a single session.

The facilitators adopt the roles of 1) the pilot, using the software to control the mannequin state or the values displayed by the monitor during the simulation; 2) an actor, playing a role in order to start the simulation, to greet the team and introduce the case to them; 3) an observer, present in the control room, sharing his observations; 4) a debriefer, conducting the debriefing.

The trainees adopt the roles of 1) a member of the practicing team; 2) a spectator, as the other trainees watch their colleagues practice; 3) a debriefer, as every trainee can contribute to the debriefing. They have different statuses (doctors, nurses, etc...). They perform their own statuses within the team.

2.4 Participants and Activity Involved in the Present Data

We will focus on a single-case study. This is the first session of a one-day course. The participants are:

- ANE who is an anaesthetist doctor

- EME who is an emergency room doctor

- NUR who is a nurse

During the debriefing, ANE and NUR will claim having assumed the roles of team-follower and EME the role of team-leader. EME and ANE will say that they verbally assigned these roles in the corridor just before entering the simulation room. ANE and EME did not know each other prior to this simulation course, but EME and NUR work together. Two facilitators (FAC and FOR) will be involved in the data. FAC is also the actor who introduced the case. The mannequin is Antoine, an 8-months-old baby who has been brought to the hospital after falling from a changing table.

The activity occurring in this excerpt is an intubation procedure, which is a common procedure in anesthesia. Here, we will focus on the pre-oxygenation that occurs just before the moment when the tube is inserted. The goal of pre-oxygenation is to ensure oxygen saturation (which means Sp02 value nearly 100% on the monitor) in the blood to anticipate the apnea moment during the intubation procedure. This step is also the moment when the required anesthetic drugs are induced. The anesthetized patient is paralyzed, and he can't breathe by himself. The airway of an intubated patient is accomplished mechanically by the machine to which the tube is connected to. Thus, a high concentration mask is used before that the endotracheal tube is being inserted into the patient's trachea, and before that this machine is being set up.

3. FINDINGS

What we propose in this paper is a trajectory from the "accomplishment" to the "assessment" of this intubation procedure along three analyses. The first analysis (3.1) will be the sequential analysis of three episodes that occurred in the simulation room. We will present them in chronological order. The team is preparing the intubation of the baby mannequin. In the first episode we analyze how the intubation activity is introduced (section 3.1.1, see "Intubation announced" in figure 6 below). The second episode starts seventeen seconds after the first one. During the preparation of the intubation, ANE will ask EME to hold the mask (section 3.1.2, see "Asking to hold the mask" in figure 6 below). Finally, the last episode will show what happened immediately after. ANE is trying to get back the mask from EME and he experiences some failures while accomplishing this (section 3.1.3, see "Getting the mask back" in figure 6 below). During this procedure, NUR is known to be busy with an other task. She takes care of the mannitol, a solute used to reduce intracranial pressure (the baby has been diagnosed with a head trauma).

The second analysis will account for three pointing gestures associated to three comments in the control room (section 3.2, see "Trouble noticing" in figure 6 below). These comments start when the facilitators see ANE trying to get the mask back from EME. What is "connecting" the sequential analysis in the simulation room and the one in the control room is the fact that the events in the former become a resource for the latter. However, as we will see, this does not mean that every step of the accomplishment of the practical reasonings from the perspective of the trainees is accountable to the facilitators.

The last analysis (3.3) will present the very start of the debriefing in the meeting room, where trainees are invited to report personal first impressions and feelings. The reason for bringing up this third analysis is the fact that ANE and EME will be referring to the intubation procedure. The issue will be discussed in relation to the distribution of the tasks. We will see how the trainees are able to recount the previously accomplished conducts, using *NTS* notions and proposing rules of conduct.
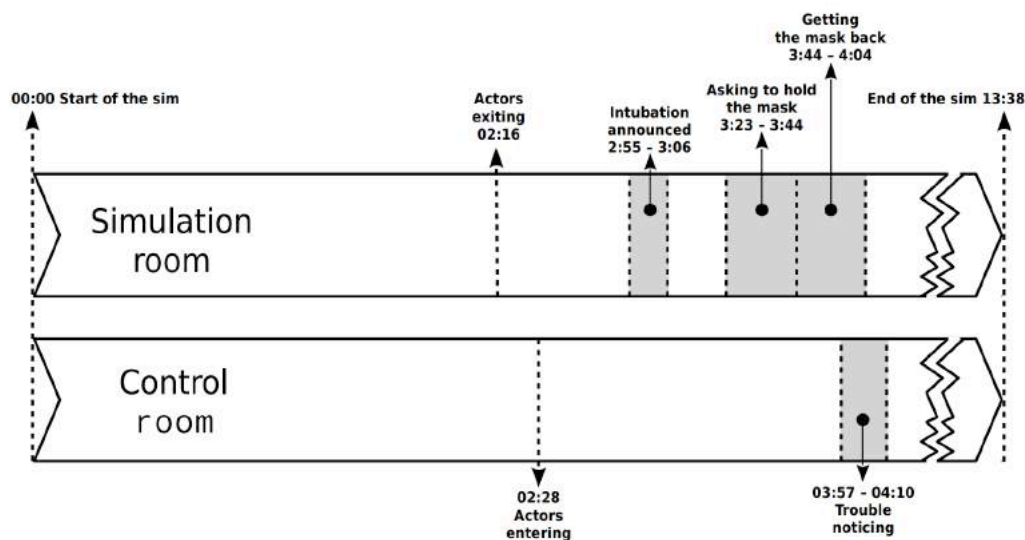
Figure 6 - Schematic positioning of the interactional episodes that will be analyzed (grayed out)

3.1. Simulation Room Analysis

The analysis will first show what occurred in the simulation room, an event that I will separate into three excerpts. As the activity occurring during this simulation episode is an intubation procedure, and because the allocation of tasks is crucial for the understanding of the team organization and conducts, we will first see how the need for intubation is introduced in the course of actions (section 3.1.1).

3.1.1. Intubation Announced

We are in the simulation room, and the simulation has now been running for 2 minutes and 55 seconds. The actors exited the simulation room by the main door 40 seconds ago, and ANE and EME are now diagnosing the baby simulator Antoine. The first transcript below shows how the need for intubation is announced. It starts at the middle of a task of checking (checking eye pupils) as part of a broader diagnosing sequence, after having checked respectively the skin colour, the heart rate, and the oxygen saturation in the blood.

Transcription 1 - Intubation announced - Simulation room - 2:55 - 3:06

```
>>-ANE is listening to heart sound with stethoscope->14
01 EME +mydriase/ (.) à gauche\
        mydriasis/ (.) on the left\
        +checking left eye pupil #capt.1----->04
02      donc ça veut dire/ (0.5)
        so that means/
03      qu'il est possible/ (0.4)
        that's it's possible/
04      +avec la bradycardie/+
        with the bradycardia/
        +...points monitor,,,+
05      qu'il soit en train d'engager\
        that he is being life-threatened\
```


#capt.1

Line 1 is the result of the task "checking eye pupils". The baby mannequin has a mydriasis on the left which means that the left pupil is dilated and the right one is not. In line 2, EME extends his turn by introducing the next TCU with "donc" ("so"). Lines 2-5 are the development of the outcome of the diagnosis. EME recalls the previously checked heart rate in line 4 ("bradycardia" means a slow heart rate) as relevant. In French, "être en train d'engager" (line 5, translated as "being life threatened") means that the vital prognosis is not good and that the patient might eventually die from his injuries. This extension of the turn is maintained as a single action (outcome of the diagnosis) by the use of the same raising intonation pattern in lines 2, 3 and 4. In line 5, the fall in tone announces the completion of this action.

```
06 EME donc on va commencer à prévoir (.)
        so we will start to provide for
07      $de quoi l'intuber/
         what to intubate/
   nur $walks towards drug shelf-->
08      <(0.7) one step backward>
09      il faut l'intuber/ (0.7)$
        he should be intubated/
   nur >------------,,,,,,,,,,,$
10      $eh: (0.4) eh::    $
   nur $comes back to baby$
11      +et préparer surtout l'mannitol\+
        and primarily prepare the mannitol\
        +....points drug shelf,,,,,,,,,,+
12      $donc le mannitol/
        so the mannitol/
   nur $walks towards drug shelf-->
```

In line 6, by the use of "donc", again, the turn is extended with a new action. Lines 6-13 are the announcement of the medical procedures that need to be accomplished, and thus need to be allocated to team members. NUR shows that she has anticipated what comes next. After that the EME announces that something has to be "provided" ("prévoir") in line 6, she walks towards the drugs shelf line 7 when the "intubation" is announced. In line 9, the need for intubation is intensified: "il <u>faut</u>" ("he <u>should be</u>"). The TCU line 9 uses the same intonation pattern as line 7. As we saw previously in lines 2-5, this resource is used to maintain the ongoing action along adjacent TCUs, the completion being displayed by a fall in tone. Therefore the TCU line 9 announces a following TCU. This is confirmed line 10 when EME produces verbal fillers ("eh") and when NUR stops and comes back next to the baby in front of EME. In line 11, the mannitol is requested by EME with a fall in tone, pointing the drug shelf. Again, as a response, NUR, line 12, walks towards the drugs shelf. At this point the "mannitol" task is allocated to NUR without using any verbal resource. The mannitol is not requested to a specific addressee, but as Depperman (2014,pp.260-261) points out, this is pervasive in such professional organization that "professionals produce announcements, information, noticings and other verbal actions which describe states of affairs, but which do not require specific responses from specific addressees. Instead, descriptions are monitored by team members in order to be interpreted and responded to according to professional logics of situated relevancies for next actions."

```
12      $donc le mannitol/
        so the mannitol/
   nur $walks towards drug shelf-->
13      $on lui fait/ et on lui prépare/=
        we do/ and we prepare/=
14 ANE =%le son est clair c'est symétrique/  % les deux [côtés/    ]
           the sound is clear   it's symmetrical/      both sides/
        %pull out the stethoscope around neck%
15 EME                                          [très bien/]
                                                 very well/
16      on va regarder le reste de l'examen neuro/
        we will have a look at the rest of the neuro examination/
```

In line 12, a new turn extension by EME is announced by the use of "donc". This will likely be the dosing of the mannitol. Again, the two TCUs line 12 and 13 make use of the same raising intonation pattern ("so the mannitol/", "we do/" and "we prepare/") to build a new action in the new extension of the same turn. This will likely be the dosing of the mannitol. However, this new action development is interrupted in line 14 when ANE announces the result of the heart sound checking. The diagnosing tasks will start again. Within the next seventeen seconds until excerpt 2, EME, in an extended turn, will first announce a neurological examination, then recall the respiratory examination result, and will finally ask for the blood pressure examination as he does not see it on the monitor.

Here, we have three occurrences of "donc" (lines 2, 6 and 12) that seem to have the same function in the turn construction of EME. In French-spoken conversations, Oloff (2008, p.777-778) identified the use of

"donc" at the initial position of a turn extension as a "continuity indicator" (CI) device after that the turn has previously reached a syntactic and pragmatic completion. It orients to a strong claim for the right for the next turn projected, with a retrospective scope. Here, we can see a quite similar use of this device by EME who keeps the verbal turn while accomplishing and completing different actions (outcome of the diagnosis, tasks announcement, mannitol dosing) consecutively in a single turn. In the data presented here, we can see other occurrences of "donc" as CI by EME lines 8, 21, 30, 32 and 35 in transcripts 2 and 3. But "donc" is not the only French linguistic resource for a CI. "Alors" (translated as "so") is also used, but mainly by ANE (see occurrences in lines 19, 29 and 37 in the transcripts 2 and 3).

The purpose of studying this first excerpt is to show that the intubation has not initially been allocated to anyone in particular yet. The mannitol task has been allocated to NUR but without the dosage. However, contrary to the preparation of the mannitol, the intubation requires the collaboration of two team members, thus more sub-tasks to allocate, as we will see in the next two excerpts (3.1.2 and 3.1.3).

3.1.2 Asking to Hold the Mask

We will now analyze the second transcript where ANE asks EME to hold the mask. The allocation of tasks will be crucial for the understanding of this episode. We return to the transcript after the end of the second part of the diagnosing activity (which started during line 14 of the previous excerpt).

Transcription 2 - Asking to hold the mask - Simulation room - 3:23 - 3:44

```
01 ANE   %t- tu prépares le mannitol/
           y- you prepare the mannitol/
    ane   %points nurse----------------------------->03
            #capt. 1
02         $(0.4) c'est ça/
              that's right/
    nur   $move towards drug shelf-------------------->
03         tu prépares l' mannitol/%
           you prepare the mannitol/
    ane   circular move,,,,,,,,,,,%
04         %est-ce que tu veux qu' j' prépare ton intuba%tion/
            do you want me to prepare your intubation/
    Ane   %.........--------points EME---------------%,,,,,>05
                      #capt. 2
05         %et [les prods]% pour [l'intu]ber/
           and the drugs for intubating him/
    ane   >,circular move%
    ane   %walks towards artificial respirator------->09

06 EME      [ alors  ]        [voilà\]
              so                right\
```

#capt. 1

#capt. 2

In line 1, ANE asks NUR for confirmation that she is taking care of the mannitol procedure. He selects her with a pointing gesture (capt.1). In line 2, as a response, NUR starts moving towards the drug shelf like she did with EME in the previous excerpt (line 12). This response is verbally ratified as understood by ANE with "c'est ça" ("that's right") after four tenths of a second after the start of NUR's move. In line 3, the verbal TCU repeats the whole syntactical structure of the TCU line 1, while the pointing withdrawal is exhibited with a circular movement.

In line 4, ANE extends his turn. He is now pointing at EME (capt.2). Here again, the pointing gesture withdrawal is exhibited in line 5 with a circular movement. Within this next turn action, ANE is again resolving the issue of the allocation of tasks, but this time about the intubation. In line 4, ANE proposes a task allocation to EME. We can note how the syntax is different from lines 1 and 3 as ANE is not asking for confirmation but proposing: "est-ce que tu veux que j'prépare ton intubation/" ("do you want me to prepare your intubation/"). By the use of the possessive determinant "your", there is now a possibility for the allocation of the intubation task. The use of possessive determinants and pronouns is a useful resource for allocating tasks to team members. However a task can be "possessed" (by virtue of the possessive determinant) by a team member but performed by an other. It might be seen as a lexical resource where the lexical "possessor" is the team-leader. This first proposal line 4 is not immediately ratified by EME.

In line 6, "alors" ("so") projects a completion. ANE is maintaining his turn, by maintaining his pointing gesture and the raising intonation pattern previously used. As a matter of fact, while ANE and EME are both orienting to their right for the turn, overlap occurs. In line 5, the turn extension by ANE seems to change EME's trajectory. After "the drugs" is pronounced by ANE with the same circular move as line 3, EME ratifies the proposal with "voilà" ("right").

To explain why ANE's proposal for the allocation of the intubation task is ratified by EME after "the drugs" are added to its description, we shall review how an intubation is regularly performed. Intubation is what health care professionals refer to as a "four-handed" procedure, which means that two persons are required. To put it broadly, one person is putting the mask on the face of the patient during the first "pre-oxygenation" phase and inserting the laryngoscope and the tube in the trachea during the second "laryngoscopy" phase. We may call this person the "intubator". The other person assists the first person by bringing the drugs and inducing them and then bringing the laryngoscope and tube. This organization is designed for the possibility that one person, that is not entitled to perform the laryngoscopy, can participate as an assistant. This situation typically involves a nurse and a doctor. Here, we have two doctors, both entitled to intubate. When specifying that he will prepare the drugs, ANE can thereby be understood by EME as allocating himself this role of assistant in the participation framework previously outlined.

In lines 2-5, as in transcript 1, we have another example of the construction of extending turns composed of multiple consecutive actions. In lines 1-5, the five TCUs by ANE are all verbalized with the same raising intonation pattern. What is distinguishing the two actions accomplished by ANE here is the exhibited withdrawal of the pointing gesture. In the previous excerpt, EME, was segmenting his extended turn-at-talk using a fall in tone followed by the CI "donc" ("so"). What is interesting here is that the intonation pattern is reproduced along the two allocation-related actions. This suggests that prosody is a resource for achieving continuity along the turn (that is, allocation of tasks) and that at the same time, pointing gestures (line 3) are resources for segmenting the turn (that is, a first allocation followed by a second one).

Here are now the next turns:


```
07 EME  +on a de quoi préparer (.) à l'intuber/
        we have stuff to prepare (.) for intubating him/
   eme  +walks towards supervisor spot------------------->08
                              #capt.1
08      %il me faut (0.3)+[donc]
         I need     (0.3)   so
   eme  >---------------+

09 ANE                    [hop] hop hop%
   ane  %...puts mask near baby's head %set oxygene mixer->11

10 EME  de (.) euh la kétamine/ (.)
        some (.) uh ketamine / (.)

11      de la+célocurine/ %(1.2)+%
        some celocurine /
   eme        +one step  backward+
   ane  >---------------%,,,,,,%
```

#capt.1

Supervisor spot

In line 7, a place exchange occurs. EME leaves what we could call the "working area" towards a "supervisor spot" (capt.1). Line 5, ANE was already walking towards the artificial respirator that is needed for pulsing oxygen in the mask. Delineating the space is an other useful resource to organize the work and to indexicalize one role that we could call the "supervisor" role. EME gives space to the team in order to proceed while keeping an eye on the situation, including the monitor in front of him. At line 8, EME has now stabilized his position on the supervisor spot. Again the continuity indicator "donc" is used after a 0.3 second pause, preventing its transformation into a gap. We see that after this silence, overlap occurs at line 9. ANE is giving a verbal presence of his actions being executed.

In lines 10-11, EME is enumerating the required drugs. This list was introduced by "il me faut" ("I need") in line 8. The participation framework where ANE is the assistant and EME the "intubator" is maintained. The audience (facilitators and the other trainees) is also a recipient for this turn, as participants were asked to announced the drugs and their dosage aloud.

Now we come to what will be crucial concerning the rest of the episode:

```
12 ANE   %on va pré-oxy+géner/          (0.5)        %          #capt.1
           we will pre-oxygenate/
     ane  %R.hand puts mask on baby's face           %
     eme  +one step forward approaches left hand+
                                        #capt.1

13 EME   +voilà=
           right
14 ANE          =thomas/  t- t-       +
     eme  +puts L.hand on the mask+

15       %tu peux [     juste tenir le masque    ] %
           would you just hold the mask/
     ane  %        withdraws right hand from the mask    %

16 EME          +[tu peux m'les prendre s'il-te-plait/]+
                   you can take those please/
     eme         +     puts right hand on the mask    +

17 ANE   %j'vais prendr' [les médicaments] et puis j'vais l'faire/
           I will take the meds and then I will do it/
     ane  %goes to the drugs shelf----------------------------->21

18 EME                  [   d'accord\   ]
                            alright\

19 ANE   alors célocurine et kétamine/
           so celocurine and ketamine /
20       ça ça va augmenter sa pression artérielle/=
           this will increase his arterial pressure/
```

In line 11, the 1.2 second silence at the end of EME's turn has provided a TRP. In line 12, as in line 9, ANE verbalizes now with an utterance his actions, which is preparing the pre-oxygenation. ANE uses the pronoun "on" ("we") as the subject executing the pre-oxygenation. In line 12, EME is already making a step forward, orienting himself to "holding the mask". According to the participation framework maintained so far, he is the "intubator", he should hold the mask. In lines 13-15, he orients to it even before ANE requests EME's help in holding it.

What ANE is requesting in line 15 is that EME should "<u>just</u>" hold the mask. In line 16, EME, in overlap, recalls ANE to take the meds, to "take those". This "those" is indexing the list of the drugs enumerated lines in 10-11. However, interpreting ANE's "just" requires the extension of his turn, at line 17. This extension is again performed using the same raising intonation pattern. In line 17, the first information is that EME that he should "just" hold the mask while ANE is getting the drugs. The next information is that ANE "will do it" (j'vais l'faire). At this moment, it is not clear what "doing it" means. But what we might surmise is the fact that ANE wants to get the mask back after that he takes the meds. ANE having proposed that, EME is already holding the mask, and has already ratified the proposal line 18 with "d'accord" ("alright") in overlap. However, the understanding of the last part of the plan, ANE "doing it", is neither explicitly ratified nor accounted for by EME. As we saw, EME participates as the "intubator", and that is the reason that he is holding the mask.

In lines 19-20, ANE is looking for the drugs on the shelf and verbalizing their names and effects. This process is quite difficult to understand. EME had requested these drugs in lines 10-11 but their effects do not need explanation for the purpose of the intubation activity itself. A hypothesis would be that the addressee may be the audience. ANE, using verbal resources, is also maintaining the accountability of the ongoing accomplishment of his task (getting the meds).

3.1.3. Getting the Mask Back

The ensuing interactions bring us to the moment when the facilitator, FAC, noticed an issue in the control room. We can see below the end of the excerpt. ANE will now get the mask back from EME. We will divide the transcript into the 6 attempts made by ANE to get it back.

Transcription 3 - ANE getting the mask back - Simulation room - 3:44 - 4:04

```
21 EME donc là je suis en oxygène
           so here I got oxygene
    ane >-comes back and puts drugs in front of EME--->22

22 ANE  okay/%
    ane >-,,,,%
           #capt.1

23 EME  %il a un (.) masque hyper concentration/ %
           he's got a (.) high concentration mask/
    ane  %     approaches upper-body towards mask  %
                                      #capt.2
```


#capt.1   #capt.2

As previously highlighted, ANE was verbally exhibiting the ongoing completion of the task "getting the drugs". In lines 21-22, he now returns and exhibits the very completion of his task by putting the meds in front of EME (capt.1). It should be noted that their position (in front of the baby's head) is not the position intended for their injection (on the left, near the catheter). This completion is also verbally indexed with "okay". Having here provided a good transition point, he now prepares, in line 23, to receive the mask (capt.2). At line 21, EME is describing what he is doing, as ANE was doing previously (ll.19-20). An incident causes the failure of this first attempt. The mask suddenly disassembles and one piece (the balloon) falls off.

```
((mask disassembles and fall off))

24 ANE  %okay/                    %
    ane  %puts his hand on EME's hand%
           #capt.3

25 EME  %hop là\      %
    ane  %withdraw hand%

26 ANE  %il désature/       %
           he's desaturating
    ane  %small step backward%
           #capt.4
```


#capt.3   #capt.4

In line 24, the anaesthetist transforms this incident into an opportunity to at least show his engagement towards "holding the mask". In the process of putting his hand on the mask, ANE puts his hand on EME's hand (capt.3). This hand contact is treated as a problem to repair, as it is repaired with a withdrawal of the hand and the body lines 25-26 (capt.4). This withdrawal gives retrospectively an interpretation of a "helping hand" instead of a "getting the mask" attempt. In line 26, ANE contributes verbally to the turns-at-talk maintaining the activity in which EME is engaged. EME is monitoring Sp02 on the monitor. With the use of the mask, Sp02 should be saturating, not desaturating. The last time ANE checked the monitor, line 22 (see capt.1), Sp02 value was 92%, and it should be above 95%, nearly 100% in normal conditions.

```
27 ANE  %douc'ment malgré l'oxygé%nation/      %
           slowly   despite   oxygenation/
    ane  %   approaches his hand  %withdraws hand%
    eme  +   reassembles the mask  + grab balloon +
               #capt.5              #capt6
```


#capt.5   #capt.6

In line 27, ANE extends his turn about the desaturation observation. An unexpected value might lead to a diagnosis reconsideration. In this simulation setting, it might also raise the issue of the proper functioning of the device (for example, is the value calculated automatically or changed manually?). ANE presents his hand, while EME reassembles the mask (capt.5). The moment when the mask is fixed could be a good transition point for ANE to retrieve it. The emergency doctor grabs the balloon with the other hand, and ANE withdraws his hand (capt.6). He avoids hand contact again, previously treated as a problem.

```
28 EME  +ouais donc+ça [veut dire +qu'il faut qu'on se dé]pêche/
            yeah/  so that   means  we   have  to  hurry/
    eme  +look mask +look  monitor +look at the mask----------->

29 ANE  %            [alors j've%rrai quand j'fais/   ]%
            so I will see  when I  do /
    ane  % approaches body and hand%  withdraws body & hand%
                #capt.7                  #capt.8
```


#capt.7   #capt.8

In lines 28-29, ANE presents his hand while EME is responding to ANE's previous comment about desaturation despite the oxygenation. But ANE, who has approached his body, is now blocking EME's visual access to the monitor (capt.7). Once again as a repair, ANE withdraws his body (capt.8). In overlap, EME (introducing with "donc") and ANE (introducing with "alors") are both proposing a conduct based on the desaturation issue that has been publicly addressed. ANE (l.29) proposes that it will be his job to check saturation since <u>he</u> will "do" it.

```
30 EME  %donc là maint'nant  %faut préparer/ (1.5)%
            so now we got to prepare/
    ane  %......approaches----%rearranges the meds %
                        #capt.9

31 ANE  %okay (.) ça va (.) ça [s'met/]        %
            okay   that's good (.) that fits/
    ane  %look at the monitor and then straighten%
32 EME                        [alors]
                                so
```


#capt.9

In line 30, as with the first attempt, ANE tries to show EME that he has brought the meds by exhibiting them, barely rearranging them (capt.9). EME uses the same word "prepare" for describing the forthcoming project. EME does not account for the presence of the meds. In line 31, ANE withdraws his body and orients to the monitor which indicates a value of 97%. He now states that the saturation has risen, thereby resolving the saturation issue.

```
33 EME  %on va l'oxygéner pendant trois% euh:: %
            we will oxygenate him for three eh::
    ane  %......approaches his hand-----%suspend%
                                    #capt.10
34 EME  %deux trois minutes
            two three minutes
    ane  %continues his approach-------------------->36

35 EME  [rapid'ment donc là tu vas l'oxygéner/]
            quickly so you here will oxygenate/
36 ANE  [   j' vais prendre ça  si tu veux/   ]%
            I'll  take  that if  you  want/
    ane  >-------puts his right hand on the mask %

37 ANE  %alors il faut le=%
            so we need the=
    ane  % puts left hand %
    eme  +orients towards intubation shelf----------->>
                #capt.11
38 EME  =j'vais prendr' une sonde d'intubation/
            I will take an intubation probe/
```


#capt.10

#capt.11

The saturation issue has now been resolved. In lines 32-34, EME introduces the forthcoming project, which is the period of time for the pre-oxygenation. In line 33, ANE approaches his hand, but suspends this approach (capt.10) when the emergency doctor suspends his turn completion ("eh::"). He carefully respects the projected announcement of the duration. After that announcement, a TRP is provided line 34. This time, ANE verbalizes what he intents line 36, and now assumes hand contact with EME (capt.11). In overlap, EME extends his turn, and since ANE's hand is now on the mask, he ratifies ANE's project of holding the mask ("you will oxygenate") in the second part of this extension. Hand transfer finally occurs.

3.1.4 Summary of the Simulation Room Analysis

We may now summarize what we analyzed along the unfolding of these three episodes. Firstly (3.1.1), we showed that the projected intubation activity had been announced altogether with the mannitol task at a moment where EME was accomplishing an anticipated diagnosis outcome. Contrary to the task of the mannitol, the distribution of the required tasks for the intubation is delayed from this announcement, as the diagnosis, which was not completely finished, was resumed by ANE. By doing this, the dosing of the mannitol was not provided to NUR. It is worth mentioning here that this will have consequences for the rest of the simulation. She is not entitled to decide the dosing herself. NUR will take the initiative to prepare the mannitol, but the material for inducing is dependent from the dosing, and she will be reproached during the debriefing for not having prepared it properly during the simulation.

Secondly, we showed that when the distribution of the intubation tasks occurred (3.1.2), there was an issue with the clear and intersubjective ratification of this distribution. Intubation requires several tasks. Below is a condensed list for the purpose of the analysis (for a more fine-grained description of all the actions involved, see Hindmarsh and Pilnick 2007, pp.1402-1404).

a) holding the oxygenation mask while checking the monitor

b) getting the anesthetic drugs

c) inducing the drugs prior to inserting the tube

d) getting the right sized intubation probe and the laryngoscope for inserting it

e) inserting the tube

As we showed in the first part of the allocation of these tasks, ANE proposes doing task b) and EME ratifies while already positioned to do task a). This is because, as we explained, the usual participation framework for the intubation is that the "intubator" does a) and e) while the "assistant" does b), c) and d). However, in the second part of the allocation of these tasks, as we have shown, ANE proposes doing b) and a). EME anticipates the ratification of this task allocation, before that, ANE explains that after task b) he will do a) (that he will hold the mask after getting the drugs).

In the last analysis (3.1.3), we then show how EME and ANE both act as the legitimate task owners of the task a). ANE acts as if his proposal were clearly understood by EME. A high degree of multiactivity inside the simulation room during the intubation is shown through the ways in which ANE tries to get back the mask while EME tries to efficiently perform the task of holding the mask. It is interesting to see how it is organized from the point of view of the resources, the hierarchy, and the ownership of each task and activity.

In 3.1.1, EME announces the need for the mannitol and NUR shows her engagement by the orientation of her body, which preserves the verbal resources for EME who continues the extension of his turn. In 3.1.3, ANE will try to use the exhibition of the completion of b) as a resource for proposing a *transition-relevant slot* (Sutinen, 2014) for orienting to a) (see first and fifth attempts). But at the same time, the issue of the saturation value has emerged. This problem is resolved using speech and the monitor as resources. ANE will verbally be engaged in the saturation issue, using the monitor but preserving its visual access to EME (see the fourth attempt). At the same time, while preserving all these resources used for the tasks of "holding the mask" and "checking saturation", ANE is trying to get the mask back with the remaining resources at his disposal: a small space where the drugs are exhibited and where he presents his hand. This lack of resources seems to cause a lack of accountability, and in the end, failed attempts. At this moment, ANE is engaged in an *intrapersonal coordination* (Depperman, 2014, p.252). What will unblock the situation is the resolution of the primary "saturation" issue between the fifth and sixth attempts. In the sixth attempt, ANE will use the verbal resources in order to account for "getting back the mask and holding it". ANE and EME, sharing the verbal resources, are then *interpersonally* coordinating the *transition-relevant slot* for passing the mask.

However, this "small" interactional problem (the ratified but misunderstood distribution of the tasks) will have more consequences later (not shown in the transcript). After the passing of the mask, EME will engage in tasks d) and e). He will grab the laryngoscope and the tube and will perform the laryngoscopy. By doing this, the problem is that no one is engaged in task c). ANE will request NUR to do it and will position the drugs on the left. She will suspend her ongoing task. Also, in terms of *Crew Resource Management,* that means that three persons are required instead of two for the intubation activity.

3.2. Trouble Noticing in the Control Room

Now that we have shown the complex organization of the passing of the mask in the simulation room, we will analyze what happened at this moment in the control room. In this simulation department, the control room is a particular setting which provides some constraints on how the observers focus on the simulation taking place. They have direct visual access through the one-way mirror. But the sound, coming from the computer loudspeakers, has an approximately 2 second delay. The computer displays the same video stream as the one broadcasted in the meeting room.

Figure 7 - View from the control room, the area of the computer and its loudspeakers is white-drawn

Different ways of coping with this delay issue are mobilized by the facilitators: 1) prioritizing the direct visual access, dealing with the fact that they will hear a delayed sound; 2) looking at the computer screen only; 3) looking away, exhibiting the fact that observers should focus on the sound only. For example, one wants to hear a dosage.

In this case we are in the first configuration, which is the more common. For that reason, you will see a transcription that will synchronize the direct visual access with what is occurring in the control room. FAC is the only one producing turns at talk at this moment. However, he is requesting FOR's attention. He was watching silently in a passive position, and suddenly, he starts pointing at events through the one-way mirror. This setting is comparable with what has been designated as a "continuing state of incipient talk" in a car where Goodwin & Goodwin (2012, p.274) describe the "ongoing constitution of joint attention to a common visible referent" using summons and deictics.

Transcription 4 - Noticing - Control room - 3:57 - 4:10

On the multi-linear transcription above, you will see two scaled timelines. The first one above represents what is happening in the simulation room, segmented into the attempts previously outlined. The second one below represents what is happening in the simulation room, segmented according to FAC's turns-at-talk. The screenshots are taken when FAC is pointing. This occurs three times.

First, it occurred on the first half of the fifth attempt, when ANE is rearranging the meds (line 30 of transcription 3). His comment is "how they steal each other's place". At this moment, as we previously saw, ANE is trying the method (showing that the meds have been brought) mobilized in the first place. This redundancy and (in)utility is accountable to FAC. In the medical French vernacular, the exhibition of this "useless" or "hesitant" conduct even has a name: "piétiner" ("trampling"). "Stealing each other's place" might be in line with what we described above, the fact that ANE and EME are both orienting to the same task a) at this moment.

The second comment occurs concurrently with the passing of the mask. Passing the mask while the intubation procedure is already ongoing is quite reportable because it is unusual. As explained in 3.1.4, if someone holds the mask, he holds it for the duration of the procedure. The comment is partly inaudible due to overlaps with the sound coming from the computer's loudspeakers. But we see that after the pointing gesture and the summons "look" (addressed to FOR), FAC is describing the situation according to task distribution. But as a response to the summons, FOR looks at FAC, she does not look at the simulation room.

The third comment occurs when ANE and EME are both seeking the right-sized tube (out of the data previously analyzed). After the second summons "tu vois" ("you see"), FOR now looks at the simulation room. At this moment, they are engaged in an F-formation (Kendon, 1990) oriented towards the intubation shelf. The "both doing the same thing" comment is thus mobilizing the member's knowledge of everyday ordinary interaction. But Facilitators, due to their expertise and training in *Crew Resource Management*, are sensitive to the number of persons engaged in a task that could be accomplished by one person only.

3.3. The "first impressions" Part of this Simulation Debriefing

When the facilitators decide to stop the simulation, trainees are urged to come back to the meeting room for the debriefing. The reason for this eagerness is that the trainers traditionally first ask the trainees about their first impressions. That interaction will be presented here. This time, however, FAC proposes to account for some "little confusions", "maybe", on "who was doing what" (off the record but written down, at that time the camera was being positioned). This proposal is quite unusual unless something really prominent happened. The first speaker is EME. Please note that the start of the excerpt is not the very start of his turn (off the record). The original transcript is on the right, and the translated transcript is on the left.

Transcription 5 - Debriefing - Meeting room - 00:00 - 2:04

01 **EME** I don't think we stepped on each other/		01 **EME** j'pense pas qu'on s'soit marché dessus/
02	even if at one point/	02	même si à un moment/
03	it's true that on the medical aspect/ (.)	03	c'est vrai qu'sur l' plan médical/ (.)
04	we were doing airway together/ we were doing but (.)	04	on faisait du respiratoire ensemble/ on faisait mais (.)
05	globally there is: we got along eh :	05	globalement y'en a: on s'est entendu euh:
06	and then well	06	et puis bah
07	I found it went rather complementary/ (.)	07	j'ai trouvé que ça a été assez complémentaire/ (.)
08	eh: (3.0)	08	euh: (3.0)
09	after that it's true/ that (.)	09	après c'est vrai/ que: (.)
10	eh: there are things we could come back to/	10	euh: ya des choses sur lesquelles on doit pouvoir revenir/
11	((25 seconds omitted, EME points at other problems))	11	((25 secondes omises, EME pointe d'autres problèmes))
12	right then johnny :/	12	voilà donc johnny:/
13	this is there is certainly other things also	13	c'est y a certainement autre chose aussi

In line 1, EME proposes a possible frame through which one might assess the simulation ("stepping on each other"), and disaffiliate simultaneously ("I don't think") with this possible assessment. In line 2, certainly as a response to FAC's proposal, he then identifies a particular moment, introduced in line 3 with the "medical aspect", and then further described in line 4 as "faire du respiratoire ensemble" (translated as "doing airway together"). This "medical aspect" is counterbalanced by the "global aspect" line 5 which receives positive assessments lines 5 and 7. Then EME talks about different issues (notably the mannitol preparation by NUR), and closes his turn by allocating the next turn to ANE using his name as an address term in line 12. The following is the start of ANE's turn.

```
14 ANE eeh well I do find that right/              14 ANE euh: fiou moi j'trouve que voilà/
15      we thought about a lot of things/          15      on a pensé à plein d'choses/
16      but it's true that we should have been     16      mais c'est vrai qu'on aurait pu être plus systématique/
        more systematic/
17      and that at one point eeeeh                 17      et qu'à un moment euh:
18      eh while I was at the head preoxygenating   18      euh moi j'étais à la tête en train d'le préoxygéner/
        him/
19      you did want to eeh intubate him/           19      toi t'as voulu euh: l'intuber/
20      although [I think    ]                      20      alors [que j'pense]
21 EME          [yeah that's]                       21 EME      [ouais c'est  ]
22 ANE as a- well if team-leader you you=           22 ANE en tant qu- 'fin si teamleader/ tu:=
23 EME =that happens/=                              23 EME =ça arrive/=
24 ANE = you should do nothing/                     24 ANE =il faut rien faire/
```

In lines 14-16, ANE gives general assessments. In line 17, he also identifies a particular moment, using the same words as EME in line 2: "à un moment" ("at one point"). This word repetition may helps him point the same moment as described by EME in line 4. In lines 18-19, he provides a more detailed description. Just after the "although" conjunction in line 20, EME shows that he can anticipate, that he knows ("yeah") what moment the anaesthetist is pointing at, and projects his own assessment ("that's") in overlap. In line 22, ANE proposes to use the notion of the team-leader role as a frame for assessing what happened. In line 23, EME's interruption proposes the frame of experience in order to assess.

```
25      If you're (.) except if I get into trouble  25      si t'es (.) sauf si j'ai un pépin j't'appelle/ (.)
        I call you/ (.)
26 EME eh                                           26 EME euh
27 ANE otherwise I could have carri:ed eh I         27 ANE sinon j'aurai pu continuer: euh j'pense cette cette voie-là/
        think this this way/
28      and and you maybe then think about what     28      et et toi peut-être alors déjà penser à la suite/
        comes next/
29      and not focus on the intubation/            29      et pas t'focaliser sur l'intubation/
30      cause I could have done it/ (.)             30      parc'que j'aurais pu l'faire/ (.)
31      and (.) because well you the team leader    31      et (.) parce que 'fin toi le teamleader normalement
        normally
32      that's him who have to gather (.)           32      c'est lui qui doit rassembler (.)
33      all all the infos/ and already/ (.)         33      tout- toutes les infos/ et déjà (.)
34      maybe/ while I was intubating him/ eh (.)   34      peut-être/ pendant qu' j' l' intubais/ euh (.)
35      foresee what comes next/ and: [eh:]         35      prévoir la suite/ et [euh:]
36 EME                              [yeah]          36 URG                   [ouais]
37 ANE so that's why/ I think/                      37      donc c'est pour ça/ qu'j'pense/
38      that's important the teamleader if/ (.)     38      qu'c'est important l'teamleader si/ (.)
39      i::f we do not ask for help/                39      s::i on d'mande pas son aide/
40      he has to stay away/                        40      il faut qu'il reste en dehors/
41      to not touch then\ (0.4)                    41      qu'il qu'il touche pas quoi\ (0.4)
42      eh:=                                        42      euh:=
43 EME     =yeah=                                   43 URG      =ouais=
44 ANE     =to be truly/                            44 ANE      =qu'il soit vraiment/
45      the: the guarantor of the guideline/       45      le: le garant d'la ligne de conduite/
```

Then, from line 22 and until line 45, ANE's turn is designed as the following: 1) giving a general rule for the team-leader and 2) applying it to the case. In lines 22-25 the rule is "doing nothing unless there is an exception". In lines 27-30, ANE is applying it to the session, speculating what could have happened if EME had not performed the intubation. In lines 31-33, an other definition of the team-leader is settled ("gathering all the info"). In lines 34-35, this rule is applied to the case; "gathering all the information" allows to "foresee". In line 36, EME ratifies this analysis provided by ANE, who then continues.

The last TCUs, lines 37-41, change subtly the turn-design. ANE had previously switched between "he" and "you" pronouns in order to indexicalize the boundaries between the rule ("he" the team-leader and "we" ("on") the team-followers) and its application ("you" and "I"). The use of this virtual "team-leader" person is now used as the subject in utterances that refer to events such as those that occurred in the simulation room. A previously settled rule is re-applied. In line 39, "if we do not ask for help" is referring to "except if I get into trouble I call you" line 25. This mixing technique between "he" and "you" is used by ANE as a means to upgrade the restriction. In line 41, "to not touch", is referring to the rule already given line 24 ("do nothing"). After a 0.4 second silence (line 41) which leads to a turn continuation by ANE (line 42), this rule is ratified by EME (line 43). Thus, this alignment is displayed as dis-preferred (Pomerantz, 1984). It suggests that this escalation seems quite tense, and that the design of ANE's end of turn is almost interpreted as a reproach. In lines 44-45, there is another use of this "virtual" team-leader person. This time it is not the application of a rule, but the definition of the role.

45	the: the guarantor of the guideline/	45	le: le garant d'la ligne de conduite/
46	eh [X X X]	46	euh [XX]
47 EME	[I stepped] on you there then\	47 URG	[j't'ai] marché d'ssus en fait là\
48 ANE	((inhales for 1,5 seconds)) no/	48 ANE	((inspire pendant 1,5 secondes)) non/
49	well that went well/	49	'fin ça a été/
50	we did what what [we had to/]	50	on a on a fait c'qui c'qui [f:allait/]
51 EME	[no no /]	51 URG	[non non/]
52 ANE	[but it's true that I do tell myself that if we had to]	52 ANE	[mais c'est vrai qu'j'me dis si on d'vait]
53 EME	[but still a littl:e\ ]	53 URG	[mais bon un ptit peu:]
54 ANE	take advantage of something/	54 ANE	gagner quelque chose/
55	maybe there it was not necessary/	54	peut-être que là c'était pas nécessaire/

In line 47, in overlap, EME once again proposes "stepping on each other" as a possible assessment for this specific case. Line 48, ANE aligns, but in a clearly dis-preferred turn design given his exhibited inhalation which mitigates his affiliation (Lindström & Sorjonen, 2013). In lines 49-50, ANE is affiliating on EME's global assessment which received a positive assessment ("that went well", line 49), and then is subtly downgraded line 50 ("we did what we had to"). The mitigated affiliation (line 48) of ANE with EME (having not stepped on him) is accounted for in lines 51 and 53. EME again proposes that ANE might assess EME's conduct as stepping on him "a little". EME and ANE are both trying to affiliate with each other's assessment, but at the same time these assessments are reformulated. This causes issues with the turn-taking machinery (overlaps). In lines 52-55, ANE transforms what had previously been recounted as a potential reproach (EME should have "not touched" anything) into a suggestion for improvement ("if we had to take advantage of something").

4. DISCUSSION AND RESULTS

The question of authenticity is an important theoretical issue in simulation studies (as for Stokoe, 2013). Here, we did not address this question. First of all, what we showed here is the fact that during HFS practices, the *human factors*, what health care practitioners were looking for, can be reproduced. These can be observed and discussed as if they had occurred in a "real" environment, assessing "real" skills. Non-Technical Skills, contrary to their designation, are highly technical embodied accomplishments indexing knowledge and know-how specific to the profession. They are *methodical*, as long as we can identify a parallel interest between what health care professionals are looking for with *NTS*, and what the analyst calls *ethnomethods*, which are practices "deployed by members of the society in coming to know, and making sense out of, the everyday world of talk and action" (Suchman, 2007, p.76). Such *ethnomethods* are therefore the techniques that are mobilized by each "competent collectivity member" (Garfinkel, 1967, p.57) of a medical team.

4.1. From the Simulation to the Debriefing

What we showed in the simulation room is the real-time, step-by-step organization of the team that accounted for an interactional disorder. EME acted as if ANE and he were mobilizing the usual participation framework for the intubation procedure, and that is a property of intersubjective background knowledge of not being explicitly formulated (Garfinkel 1967, p.73 on the *et cetera clause*). A multimodal sequential analysis of the simulation room episodes has shown what could be the emic vision of the trainees inside the simulation room. It also guided us in understanding the emic vision of the facilitators in the control room. They assess trainees' conducts drawing from their background knowledge. However their background knowledge is not only the health care professional knowledge that they share with the trainees. It is also the knowledge that they developed as facilitators during simulation sessions. As every formulating practice has to be understood in its ecological (sequential) environment, what the facilitators see (for the purpose of the course) is not what the trainees actually do. It is inexact to assume that what has just happened in the simulation room constitutes singularly the source of the issue reported in the control room.

What is indexed in the simulation room is an event that is "reportable" enough for proposing a comment or an assessment. This event is used as proof for the assessment. This is what Garfinkel (1967, pp.76-103) identified as "the documentary method of interpretation". Here, anterior to pointing, there might have been other accountable events, although not "reportable" enough ones, for formulating "stealing each other's place". For example, ANE had previously mobilized the interactional features of a team-leader (see 4.2). He built multi-unit turns in order to accomplish tasks relevant to the team-leader role. Also, ANE asks

confirmation to NUR that she takes care of the mannitol (which would be doing being "gathering all the infos").

Simulation monitoring is a central piece in the progress of one session. In that case, an issue that was not accounted for by EME (ANE "trampling" while trying to get the mask bask) is noticed by FAC. Observations are a means to build the debrief agenda. The debrief shows that participants are able to refer to precise moments of the simulation. Their assessments, using *NTS* notions, are understandable given the conducts observed in the simulation room. This is what we will develop in section 4.3.

4.2 The Multiplicity of Leadership and Followership Interactional Accomplishments.

In this paper, we proposed identifying several embodied practices that achieve the organization of the interactions. These could be relevant for the roles of team-leader and team-follower conceptualized by the practitioners. "Team-leading" and "team-following" is not a participation framework itself. It is a notion that encompasses a whole set of several different participation frameworks and interactive achievements. At least six achievements seem relevant:

1) a participation framework where the team-leader is standing at a supervisor spot (3.1.2)

2) an "intubator-assistant" participation framework (3.1.2 and 3.1.3)

3) the construction of multi-unit turns, using intonation patterns and continuity indicators (CI) as resources. Furthermore, in this whole session, EME pronounced 45 occurrences of "donc" and 34 of them are used as CIs. ANE used 4 occurrences of "donc" as CIs out of 18 and NUR 0 out of 3. ANE used 8 occurrences of "alors" out of 8 as CIs. EME used 2 occurrences out of 3 and NUR used 1 occurrence out of 1. (3.1.1, 3.1.2)

4) the respect for the resources mobilized by the activity in which the team-leader is engaged, here the verbal resources and the visual access for "holding the mask and checking the monitor values" (3.1.3)

5) the use of possessive determinants and pronouns where the lexical "possessor" is the team-leader (3.1.2)

6) the decision regarding the distribution of the tasks. ANE proposes an allocation to EME, and his ratification has to be provided (3.1.2)

4.3 The Analyst and the Professionals

Members, for the practical purpose of assessing, teaching and learning, look for proof in order to assess *NTS* notions. These notions are their resources for a *documentary method of interpretation*. The now classic issue that results is for the analyst to carefully identify possible differences between his methods and the members' methods. An interesting way to understand members' methods and notions is to compare the rules and reports-of-conduct formulated during the debriefing by trainees and facilitators with the interactional achievements outlined in the sequential analysis of the simulation.

The first and third achievements previously outlined appear relevant with the team-leader's rule of conduct "gathering all the info" outlined by ANE in lines 32-33 of the debriefing. The first, third and sixth achievements appear relevant for the rule of conduct "foresee what comes next" in line 35 of the debriefing. The fifth and sixth achievements appear relevant with what a facilitator will provide as an other rule during this same debrief seven minutes later: "it is the team-leader who decides but the team-follower can propose". The first and third achievements appear relevant for the "do nothing", "stay away" and "not touch" rules given by ANE in lines 24, 40 and 41 of the debrief.

Obviously, we will not always observe a situation where a member's notion or rule confirms a finding. That would restrict the search for less discussed non-technical skills. Furthermore, this would restrict the possibility for identifying ethnomethods which are not formulated as *NTS* notions, but interesting all the same for the health care professionals. For example, an intermediary role between leadership and followership. We saw that ANE can have the "intubator" position when EME is a "supervisor". ANE also builds multi-unit verbal turns but with a different linguistic item ("alors" vs "donc", both translated "so", see point 3 in section 4.2).

Finally, this would restrict the possibility for accounting for the interactional achievement of leadership and followership during the debriefing itself. This path, which connects the role with the identity

of the team-leader, seems interesting. We showed how, during the debriefing, EME brings up the "experience" frame in order to assess the organization ("that happens", line 23). We also showed an asymmetry between ANE and EME's regarding the respect for each other's turns at talk, and numerous overlaps resulting. Also, we showed a final affiliation on EME's assessment.

We should not be surprised to see ANE reproaching EME for having wanted to intubate the mannequin (Transcript 5, line 19), while we saw ANE proposing that EME intubate the mannequin (Transcript 2, lines 4-5). This is an artefact of the analyst revealing all the contingencies that can't be recounted. The debriefing is a formulated account using the learning environment as a resource. Trainees try to find a solution so that the issue will eventually not happen again.

Obviously, the ethnomethods cover a larger set of techniques and skills mobilized by a competent member of a medical team than what *NTS* frames of reference describe. But the ethnomethods that account for the use of non-technical skills notions by the members themselves are certainly the more crucial ones to identify, discuss, assess, and learn. If it were not the case, simulation would only be a semi-ecological, semi-experimental encounter for the researcher, and not a "pretext for debriefing" for the professionals.

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6. APPENDIX

Appendix 1: Transcription Conventions

Transcriptions are using a monospace font in order to align symbols for synchronization purpose. These are provided as screen grab in order to ensure the respect of the layout. Conventions for speech transcription are adapted from Gail Jefferson (2004). Conventions for non-verbal actions transcription are adapted from Mondada (2008). When verbal and non-verbal are synchronized, the verbal transcription line is the only one having a line number and there is only one increment.

Symbols used

[ ]	speech overlap boundaries
=	no break nor gap between two verbal turns
/	rising intonation
\	fall in tone
(.)	short silence =<0.2 seconds
(1.2)	1.2 seconds of silence
(( ))	event or commentary
#capt.1	video capture aligned with the position of its occurrence
XXX	used when transcription was not possible, one X per syllable
< >	boundaries if the commentary applies to a portion of a line
PAR	UPPERCASE initials indicates that the line is a verbal transcription
par	lowercase initials indicate a non-verbal transcription. The whole line is grayed out.

-> indicates that the action continues until a subsequent line. Eventually, this subsequent line number might be written.

->>	indicates that the action continues after the end of the transcript
>-	indicates that the action started previously
>>-	indicates that the action started before the start of the transcript

Non-verbal actions synchronization boundaries

Each participant has its own symbol in order to indicate the synchronisation of their actions.

% = ane   + = eme   **$** = nur