Designing a training course for animal handlers taking account of the diversity and variability of the work and the people trained.

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This study concerns the design of training sequences intended for animal handlers in a research center (RC), based on an ergonomic analysis of the work activity (EAWA). EAWA was conducted before the training course in order to help guide its design. In this phase, it must answer a series of questions (how to train? which training to provide?), integrate the potential diversity and variability of the trainees and of their work, and enlighten the RC on organisational changes, and their consequences. The analysis conducted on trainees’ activity is also used to identify what was potentially learned during the training during. In line with the objectives of “constructive ergonomics”, EAWA is therefore called on as a tool used by researchers for designing and assessing a training course, a training object and tool for operators and finally a tool used to shed light on the on-going transformations in the RC.

Keywords: ergonomic analysis of the work activity, training design, animal handlers

1 Introduction

The study I am presenting concerns the design of training sequences intended for animal handlers – operators responsible for animal care and animal testing – in a research centre (RC) based on an ergonomic analysis of the activity.

The ergonomic analysis of the activity can be a means of designing training courses intended not only to modify operators’ behaviours and attitudes to the needs of a work system but also to help them develop resources to cope with changes in their work with the aim of guaranteeing health, safety and development while ensuring the reliability and performance of this work system (Falzon, 2014). In this case, the analysis is initially conducted prior to the training in order to guide its design (Montmollin, 1974). It helps identify difficulties faced by operators or to adjust to changes in their work while bearing in mind that these difficulties may also require work situations to be transformed and skills to be identified, which have remained relatively unknown in the organisation but which may require training actions to be introduced (Lacomblez et al., 2007; Delgoulet et al., 2009). In light of the results of this analysis, training situations are proposed with a view to ensuring coherence between the training and the real work situation while protecting the health and safety of the operators (Lacomblez et al., 2007; Delgoulet et al., 2009). Within the framework of these researches, the population to be trained is well-defined and known. The activity analysis therefore serves to identify the training needs of a specific population. However, in the study that I present, it is difficult for the population to be clearly identified in advance and the prime objective is to provide training in performing a specific task. The population to be trained will be those operators who voluntarily register for a 3-day training session. The upstream activity analysis and the training course designed must be able to incorporate the potential diversity of the population to be trained, the related experiences and the skills acquired.

Further to the above, when we were asked to intervene, a steering group (SG) had already been appointed and had held meetings for an entire year1. Decisions had already been taken by this SG and the content of the training had, in part, already been established: we were asked to design training workshops during which a blood sample was to be taken by the animal handlers, not all of whom would perform the task satisfactorily. Furthermore, 2 members of the SG suggested calling on a veterinarian to train the animal handlers in taking blood samples. They believed that the veterinarian should demonstrate the operation and that the animal handlers should then reproduce the operation under his/her control. Finally, 1 member of the SG felt that the animal handlers should be required to perform the operation on several species. This person echoed a point of view stated in the RC that

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1 Two academics and a master student.

2 It currently consists of 3 trainers (1 reports to the national training service RC and the other 2 to a local research centre), 2 researchers attached to the local research centre, 1 technician attached to the local research centre who interact with the animal handlers and researchers.
animal handlers are too often single-species specialists; in the future, they should work on several
types of animal.

A second difficulty of the analysis to be conducted involved understanding which of these
decisions could be productive both for the training and for the work organisation and its future
development (for example, shift from a single-species approach to a multi-species approach).

The aim of the activity analysis conducted upstream of the training was to identify “what to teach”,
based on the blood sample operation, and “how to teach” taking account of the variety and diversity of
the potential beneficiaries and the possible development of the organisation in light of the health,
occupational safety and system productivity objectives and with the constructive ergonomics
standpoint (Falzon, 2014).

In this situation, the ergonomist is part of a design process to which she/he contributes calling on
activity analysis. In particular, she/he is required to clarify which activity shall be adopted in the training
situation defined with a view to promoting the development of both the operators and the organisation.
She/He must guarantee the social construction of the project offering scope for a diversity of rationales
(St Vincent et al., 2000; Garrigou, et al., 2001).

To conduct the activity analysis and design the training, two main theoretical frameworks were
called on: the double regulation of activity model and the professional didactics.

The double regulation of activity model highlights the relations between (Leplat, 1997; Daniellou,
2005):

- the determinants of the activity: characteristics of the operators (including their experience and
  the skills acquired) and the characteristics of the situations (including the work organisation,
  the work resources and the tasks to be completed),
- the activity (placing particular emphasis on the cognitive dimensions)
- the effects of the activity concerning both the operator (including the guarantee of his health
  and the development of his skills) and production (production of goods, services, etc.).

Understanding the relationships between these different entities is a means of understanding the
difficulties faced by the operators and the adjustments necessary to cope with the variability and
diversity of the situations (Daniellou, 2005).

We also used professional didactical frameworks which provide an approach to the cognitive
development of the adult and a framework for defining the training situations (Gamurçay, 2000;
Rogalski, 2004; Tourmen, 2009; Pastrè, 2011). Particularly, to design the training situations, we
consider that developing and transmitting skills means taking human, symbolic and instrumental
mediations into account (Vygotski, 1962; Rabardel, 1999; Kaptelinin & Nardi, 2006).

2 Method

The first phase of our research-action involved developing the social conditions of our intervention
(Garrigou, et al., 2001; Vincent et al., 2000; Hignett, et al. 2005). Unable to include the animal
handlers in the SC which continued to meet at least once every two months (table 1), we asked for a
monitoring group (MG) to be created incorporating the animal handlers.

Table 1: The implementation of the training design and assessment procedure(period and number of days).

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We consider that their participation is advantageous to the successful completion of this design
project (St Vincent et al., 2000; Hignett, et al., 2005). This group could therefore benefit from the
operators’ knowledge of their own work and profession while relying on the comparison of work
representations from the animal handlers’ within the group based on the activity analyses we will
submit to them. The MG met three times during the first phase of our work (Table 1). On this same
basis, we asked for a work group devoted to the design of the training to meet at least twice (DG).
Despite our requests, this group would not contain any animal handlers. Following this negotiation, the
study began in 2012 (table 1). The activity analysis phase prior to the training consisting of 15 days of
interviews and observations over a period of 3 months (Table 1) conducted by 2 assistants professors
assisted by a “master 2” student.
2.1 Data collection prior to the training

In the RC, the animal handlers’ daily work is similar to the work conducted in a laboratory (in vitro) or work similar to breeding (in vivo). The work that might be carried out can demonstrate considerable variability and diversity so that conducting activity analyses on a representative sample was impossible. We therefore opted for the following analysis of contrasting situations:

- similar to breeding conditions for cattle, goat and sheep (site 1, S1), with research on the effects of food and,
- experimental situations in a confined area examining animal diseases which can be transmitted to people and can therefore have serious consequences (confinement levels A23 and A3), conducted on several animal species (Site 2, S2).

Our aim was to improve and complete the data gathered in our work with the MG.

The initial exploratory survey was conducted to understand the work and the difficulties encountered in the daily work. It involved interviews with 15 animal handlers of different levels boasting different types of experience and “opened observations” (Guérin et al., 1991). I will emphasise the data available with regard to single- and multi-species work.

At the same time, blood sample operations were filmed and we conducted self-confrontation interviews with the operators (Mollo & Falzon, 2004) which were also filmed4.

For S1 we observed a blood sample being taken on a veal (see veal BS below). This was taken from the veal's jugular vein. We conducted individual self-confrontations with the two operators (the one who takes the blood and the one who restrains the calf).

In light of the confinement constraints of S2 we were not authorised to take the observations or make the films ourselves. An operator filmed 2 blood samples taken from a group of ewes5 via the animal's jugular vein. Individual self-confrontations were conducted with each operator as before.

Characteristics of the operators taking the blood sample and restraining the animals are:

- Veal BS (S1): the operator restraining the animal had 20 years’ experience as an animal handler but less than one year in his current post (he previously worked with sheep); the operator taking the blood sample had 16 years’ experience as an animal handler and in his post. He only works with cows and,
- Ewe BS (S2): the operator restraining the animal had 2 years’ experience as an animal handler and in a confined zone; the operator taking the blood sample had 9 years’ experience as an animal handler and in a confined zone.

The films and self-confrontations were transcribed. All of our analyses were submitted to the operators concerned and to the MG.

2.2 Data collection during the training

Thirty animal handlers participated in the training6. They were divided into 3 categories according to their level of experience: 10 animal handlers had experience ranging from 6 months to 5 years; another 10 had between 5 and 10 years’ experience (of which 3 had between 3 and 5 years in their post) and 10 had between 10 and 35 years’ experience (of which 4 had between 11 and 15 years in their post). Furthermore, 37% of the animal handlers declared themselves to be primarily “single-species” operators (cattle, sheep or goats), 30% multi-species operators for at least 2 species (cattle, sheep or goats) and 33% multi-species operators for cattle, sheep or goats and others (pigs, horses).

The “blood sample” workshops (BS workshops) set up were filmed by those being trained. Some agreed to share their films with us7. We also noted as precisely as possible the comments of the participants in the collective debriefing held once the BS workshops were complete. We do not, therefore, have access to complete data concerning all the workshops organised, except for one operator who will be at the centre of our analyses. He is experienced (more than 10 years),

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3 A2: “can cause an illness and represent a danger to the workers (salmonella)”; A3: “can cause a serious illness and represent a serious danger (brucella - HIV)”; A4 concerns contaminations potentially fatal to humans such as the ebola virus (livret de l’animalier, 2009, p. 11).

4 A written agreement informing the voluntary operators of the objectives of the study, the conditions of conservation and use of the data and films (anonymity, research and training objectives) was submitted to the volunteer operators who ratified it.

5 The group consists of 20 cows or ewes but the films only shows 2 blood sample operators.

6 The data available to use concerning the training population were collected by the RC. To maintain the anonymity of the operators, by mutual agreement, it was not deemed desirable for them to be linked to the films recorded during the training.

7 As before, a written agreement was submitted to them.
specialised in working with sheep and does not work with several species. We will complete this case study using data extracted from the other films.

3 Results

I present three types of result: 1) the diversity and variability of the work and the animal handlers; 2) the BS workshops designed; 3) what was learned by the operators during the training.

3.1 Diversity and variability of the work and the animal handlers

3.1.1 Elements relating to the context and multi-species work

A report from the scientific division of the RC specifies that the work must be carried out with constant means or even diminishing means with regard to human resources. We therefore understand the advantage of generalising multi-species work. This cannot, however, be taken for granted. Within the RC, the status of animal handler covers a wide range of diversified tasks which do not all involve contact with the animals, be it for the purposes of care or testing. An animal handler with 30 years’ experience explained that: “Crops […], haymaking, lawn maintenance, weeding and then animal handling is included […] I mainly deal with digestibility⁶ […] so I will do that for 3 months and then I will be moved to assembly, making fences for the most part until spring, until summer.” In this case, the work in contact with the animals is of secondary importance. Furthermore, many of the animal handlers interviewed more often than not work with a single species. They explain the advantage of genuine expertise in performing their daily work, managing the risks in their interactions with the animal – understanding it and predicting its behaviour – and providing care for the animals: “To be a good animal handler you need at least 10 years’ experience in the field […] Experience is really important, […] without experience it’s difficult because you don’t know how to deal with the animal or how it will react, […] we know our animals […] with sheep, I don’t know, […] if you aren’t familiar with a species, you might be less careful […] and that can be serious for the animal if you don’t see things in time,” (animal handler with 15 years’ experience). Another handler highlighted the demanding nature of the work with certain species and his refusal to work with certain animals: “No, I’m not interested in working with sheep […] it has never been my thing, I don’t mind horses but not sheep or goats […] no it’s too demanding, too small, you always have to move them, push them – it’s a pain,” (animal handler with 20 years’ experience).

Another element of the context must be emphasised. In light of the on-going reorganisation and the reduction in the number of fixed positions, operators are only in their positions temporarily. Their colleagues are thus required to train them, serving as a tutor.

However, activity S2 presented a different picture. All the animal handlers responsible for this activity see themselves as specialists for a particular species who can work on other types of animal with the help of one of their specialist colleagues. This point of view is taken into account by the local management team which ensures that a non-specialist works in tandem with a specialist. Furthermore, working on this activity and in these conditions is voluntary and the jobs are all stable.

3.1.2 Taking blood samples (BS)

The analysis of taking blood samples also highlights the diversity of operator experience. Taking a BS is a technical operation which is, in principle, standard for an animal handler. Nevertheless, performing these operations depends on the tests to be carried out on the animals and the researchers’ requests. For certain animal handlers, these may be exceptional. A single BS was taken during the 3 months of our observations for S1, which we filmed. On the other hand, it is a routine task for animal handlers working on S2.

Taking a BS requires the animal to be contained. For a cow or calf, containment requires a mechanism which blocks the animal’s neck and prevents it from moving its head backwards (feeding grilles, Photo 1). This mechanism does not prevent lateral movements so the animal handler responsible for containment uses a halter forcing the animal to move its neck up and to the right or left then holding it there. The jugular vein is thus exposed to the handler taking the sample.

⁶ Type of testing examining the impacts of feed on animal growth
With a sheep, the containment procedure is different: the animal handler is astride the sheep leaning towards it and turning the animal’s head to the other handler responsible for taking the blood sample who is crouching at the animal’s neck height for the entire operation. In the situations observed, the animals had been sheared to facilitate taking the blood sample. The animal handler taking the sample must create a pressure point in the vein then insert the needle. When the tube connected to the needle is full, it is either changed or the operation is complete and the handler must remove the needle. In both cases, the handler must remove the pressure from the vein then create another pressure point to stop the bleeding.

The trajectory of the vein is an important point that must be identified. This requires anatomical knowledge of the animal to determine where to compress the vein and where to look to identify the needle insertion point. As well as visual indicators (when a pressure point is created, the vein swells) and tactile indicators (by tapping on the vein, it rolls and moves): “It is just to make it swell and move because that lets you see… if the blood is circulating inside and you are sure that you are really in the vein […] it’s an extra, you can see that it is the vein but it is a bit of a security mechanism […] it rolls a little, it moves, you can see that… I don’t know, it’s a question of fining,” (operator responsible for sheep BS).

The differences between species concern the method of inserting the needle: “with a cow, you must not hesitate”; with a sheep, “you have to insert the needle straight but not too far, not too deep,” otherwise you go through the vein an operator explained to us. In both cases, once the needle is inserted, it needs to be aligned with the trajectory of the vein. The notion of the trajectory of the vein allows to identify where to create the pressure point and thus where to insert the needle. It can be useful to a beginner or an operator serving as a tutor to a colleague. Precise remarks were much more difficult to obtain concerning containment, which seems to be highly incorporates. An other important aspect is the “bodily feeling”: with veal, sheep and calves in particular, surrounding them with the handler’s body calms and reassures the animal while allowing the handler to feel the tension and tightening of the muscles while anticipating the animal’s movements.

3.2 The “blood sample” workshop designed

At the end of these analyses, we adopted a certain number of principles to design the blood sample workshops. They are follows:

- The situations proposed must enable both inexperienced and experienced operators to learn. This raises an important question: how to teach anything to operators who already perform the operation correctly and to whom it has become routine? Let us note that creating a situation which does not allow for routines could be a solution.
- We do not believe that the suggestion of using veterinarians to train the animal handles is relevant. While they are specialists in the task to be carried out, they work in different conditions. However, the animal handlers are familiar with their conditions (time pressure due to high workload, the need to take blood samples from a group rather than a single animal, for example) and some of them have developed cautionary know-how (Ouellet & Vézina, 2009) in dealing with this. Peer mediation can serve as an important lever to facilitate the dissemination of this know-how in the training (Ouellet & Vézina, 2009).
- The training situation could also provide an opportunity for the operators to work on tutoring a peer, an increasingly common situation within the RC. In particular, we want to enable the operators to discover that with experience, skills are tacit, incorporated and difficult to express (Leplat, 1990; Meyer & Davids, 1993) and possibly to facilitate their awareness of these skills and the means of expressing them with a view to sharing them (Six & Falzon, 2014).
- Finally, the training can represent an interesting multi-species work opportunity for operators who could experiment, but also for the RC itself insofar as its difficulties can be updated.

Based on these principles, we have suggested organising the training in the following way: prior to the workshops, a familiarisation session for the activity analysis is scheduled using two BS films (veal BS and sheep BS). It is a matter of drawing attention to the variability, the diversity but also the vein trajectory and the bodily feeling, which were presented as useful principles of reasoning to
interact, explain and demonstrate. We then proposed BS workshops concerning the 3 species (cattle, goat and sheep), forming groups of 3 or 4 operators including a specialist for at least each of the species. In each of the 3 workshops, the specialist explains and shows a non-specialist how to constrain the animal and perform the BS and, if necessary, helps. The specialist is thus in the position of tutor (Wood, Bruner & Ross, 1976). The non-specialist performs the BS. A third operator films the entire process. By changing workshop and thus species, the operators’ roles are altered accordingly. The films are then analysed by the operators within each of the groups with the instruction to re-use the indications given upstream and then to select one or more films or moments they want to show in the plenary session during a collective debriefing.

These suggestions were presented in the design group which approved them. The work within this group also led to the reintroduction of veterinarians in the training mechanism. A veterinarian present in each workshop will be responsible for safety, intervening quickly in the event of any difficulty encountered with an animal. Their presence is also intended to reassure the animal handlers. Other objectives were added to these sequences: asking the animal handlers to take the animals to the location where the BS is to be taken with a view to working on their manner of approaching the animals or taking a blood sample in a cow’s tail, a frequent operation in the RC which we were unable to observe during the first phase.

Our proposal calls on several types of mediations (Vygotski, 1962; Rabardel, 1999; Kaptelinin & Nardi, 2006): human and symbolic calling on peers and language; and instrumental calling on video, a task which involves very particular characteristics (Mollo & Fazlon, 2004). In particular, it represents an objective record of the activity, enabling the operator to take a detailed look at his/her action after the fact, whereas they may be differences between what is said about the action and the action itself (Cuny, 1979), both for social and physiological reasons (Davezies, 2012). Collectively analysing a video of one of the group members (collective self-confrontation, Mollo & Fazlon, 2004) promotes awareness and allows members to discover the procedures of other operators (op. cit.). Furthermore, we will assume another key form of mediation for learning in this situation: that of the animal species. We believe that taking a blood sample on a species which is not an operator’s speciality or which is little known or completely unknown, prevents the operator calling on routine procedures. As Piaget (1937) states, there should be no possibility of assimilation as the subject should be in a destabilisation phase before a process of accommodation occurs.

3.3 What was learned during the training

3.3.1 A case study

I will initially focused on an animal handler who is an expert with sheep and for whom we had access to all available data.

The process of taking a blood sample from a sheep requires very little time (37 seconds). The animal handler holds the sheep between his legs with his feet on the ground level with the front feet, both hands placed loosely on the animal's neck. He strokes the animal while he waits for his colleague to give him the syringe, thereby keeping the animal as calm as possible and facilitating the operation. He takes the syringe in his right hand, leans towards the animal from the left, pushes the animal's head to the right and holds the head up against his ribs using his left arm. With his left hand, he creates a pressure point. He removes the cap from the syringe, blocks it in his right hand using his fingers, feels the sheep's neck with his thumb and index finger then inserts the syringe, pushing the needle upwards, and presses the tube. Blood appears in the tube. Once full, he removes the tube and simultaneously removes the pressure, keeping his hand on the animal's neck. He removes the needle and recreates a pressure point with his left hand to stop the bleeding. He then stands up.

In the same workshop devoted to sheep, this operator shows how to contain the animal and take the BS alone, standing rather than squatting, which is a costly posture. The veterinarian present explains the benefits of this to the group: “You have the position which enables you to hold the animal without placing too much strain on the back, but you need food thigh muscles when the animals move [show a lateral movement] because your lumbar vertebrae bear the full brunt afterwards [...]; another benefit is that you surround the sheep, which reassures it [later during the workshop] you need to bend your knees properly, even if this means pressing on the animal.” We observed previously that operators take the BS in pairs and the sheep is always contained by the operator standing astride it. In contrast with this situation, here, the operator’s postures enables him to contain the animal and at the same time to protect himself. His postures are less costly. It should also be noted that the animal’s neck had not been sheared in contrast to what we observed prior to the training.

In another workshop, the same operator has to take a blood sample from a cow’s jugular. The operation lasts 2 minutes and 19 seconds and is unsuccessful. The operator fails in his task, despite the guidance provide by a peer with experience of this animal. He abandons. The task position here is
different: he is squatting opposite the cow for the entire operation at the level of its neck which is held high by means of a halter. The operator cannot identify the location where the needle should be inserted: he creates a pressure point and feels the cow’s neck 19 times. He visually identifies a point then tries to confirm this by feeling the location (the criterion taken into consideration here is that he moves his fingers). The fact that he changes location from the location felt indicates the difficulty encountered in identifying the correct location. On 3 occasions, he approaches the needle to insert it and then stops: he believes he has identified the correct location, begins the movement and then interrupts it either because the cow moves (twice) or because his is unsure of the point identified (once). The fact that the cow moves when it begins to feel the syringe approaching is also doubtless the result of the operator’s injection technique: it is important to do it straight and without hesitation, not like with a sheep, as another animal handler explains. Once the cow moves, he loses his reference point and must begin the operation again.

This operator fails in his task despite the assistance provided by his colleague specialising in cows who guides him using different techniques: he explains and shows how to create a pressure point; he deals with the animal so that it stays still and remains calm; he indicates the trajectory of the jugular; he creates a pressure point to show where to insert the needle; he explains the trajectory in words to identify the jugular and shows where to insert the needle (“when you press, it roles, it moves there”); and he explains how to insert the needle (“don’t hesitate”). This guidance is not sufficient.

An explanatory hypothesis can be put forward: the operator who offers guidance only provides visual references. He always asks to “see”: “watch when you press on it, you can see that it roles”, “watch there, there”, “there, it sticks out”, “there it is”. While the non-specialist operator looks for the tactile indicators: 4 times when he is asked to “see”, he touches and answers: “no, I can’t feel it”. Once during the same sequence, just before giving up, he answers “yes, I see” and just afterwards “I can’t feel it”. This interpretation is reinforced by his words during the collective debriefing: “My eyes are on the end of my fingers,” or in other words his reference points are essentially tactile. And in this situation, the reference points defined and integrated previously prove to be non-discriminatory. He must reconstruct tactile sensations and/or define visual references to identify where to insert the needle. Furthermore, the training situation alters his spatial reference points and his bodily references points in space: “it’s like driving in Ireland” he explains during the debriefing.

For this operator, the training situation defined promoted awareness of his indicators (essentially tactile) and the importance of his spatial reference points. Working on several species also enabled him to acquire an awareness of himself and his relationship with animals: “for me it’s sheep”, “I don’t understand cows, I can’t predict what they’re going to do.”

In these data we find indications of the two Key points: surrounding the sheep to reassure it is a bodily feeling element; it is combined here with a less costly posture adopted by the operator. It is a question of cautionary know-how (Ouellet & Vézina, 2009). The trajectory of the vein is clearly present, both to create the pressure point and to identify the injection point, and is combined with visual and tactile reference points (the vein roles, it can be felt at the end of the fingers). These data also confirm our hypothesis of potential destabilisation of the operators’ routines with a view to promoting awareness. The data also provide a good example of the difficulties of tutoring: gestures cannot be transmitted (Clot, 2008), they are always an individual appropriation which can be costly and time-consuming.

3.3.2 Other potential contributions of the training and the limitations of the mechanism in place

The data at our disposal concerning the BS workshops illustrate the transmission and dissemination of know-how within the groups. There are numerous dialogues: two operators discuss the use of elasticated sleeves on their work clothes – they use them to hold the tubes required for the BS as these are then easily accessible. Other discussions relate to the ways of approaching an animal: in the goats workshop, an operator approaches some goats to try to catch one and they all run to the other end of the enclosure, and so on. The specialist intervenes and tells the operator to wait without moving. The goats will come to see him and it will be easier to catch one. After that, they generally show little resistance. Everything happened as predicted. The veterinarians can also intervene to guide a non-specialist operator when his colleagues’ explanations are insufficient; for example, when placing a halter on a cow, the animal must be taken by the side of the jaw where it cannot bite. It is then easier to move its head to slip the halter over it.

During the collective debriefing, some dialogues focused on diversity and variability, particularly according to work conditions. For example, the problem, as the operators stress, is not taking 1 BS but taking 20 or 30 consecutively. The posture is therefore repeated and the muscles become tired and painful. The solution adopted by some operators, including small operators, is not to lift the tail at arms’ length but firmly so that it is less tiring. Others place a bale of hay behind the animal to avoid the animal kicking and move it from cow to cow. This example underlines the importance of taking
account of the real conditions in which the work is carried out and not only the task to be carried out. In this case, the discussions between the operators lead to knowledge being shared, some of which is cautionary know-how (Ouellet & Vézina, 2009).

Other discussions concerned tutoring situations and in particular some “surprises” of a specialist who in a tutoring situation were not able to express exactly how and why he succeeded, and how and why the non-specialist he was guiding failed. This case provided an opportunity for collective debates and explanations on our part concerning tacit skills and and the difficulties of tutoring.

The collective debriefing also provided an opportunity to identify the limitations of the workshops available. In particular, certain animal handlers reported their fear during the cattle workshops and we noted that two of them refused to take BS on the cows. Safety was ensured by means of barriers and containment cages and finally by calling on the veterinarian present who had the means of anaesthetising an animal quickly. In principle, there was no risk during the workshop, but certain cows were very nervous and charged the barriers, which was impressive. They were in an unusual situation for them: on a normal day, they would not be taken to containment cages, there were lots of people present in the workshop and they were being handled by non-specialists – all conditions where could increase their stress levels. The participation of animal handlers in the training design group would doubtless have helped avoid this type of error.

4 Discussion and conclusion

In this paper, I have considered the design of training courses both based on approaches aimed at providing training (Lacomblez et al., 2007; Delgoulet et al., 2009) and from the standpoint of conducting a design project (St Vincent et al., 2000; Garrigou et al., 2001; Hignett, Wilson, Morris, 2005). The ergonomic activity analysis was used as a tool and as an object (Lacomblez et al., 2007). It was a tool for designing and assessing a training course to be used by researchers, a training object and tool for operators and finally a tool used to shed light on the on-going transformations in the research centre which commissioned this training. I will explore these 3 aspects in greater detail below.

It was used as a tool for designing the training in a situation where it was impossible to obtain precise information concerning the target audience of the training or to obtain sufficient data concerning the work situations. As in other types of design (St Vincent et al., 2000; Garrigou et al., 2001; Hignett, Wilson, Morris, 2005), we endeavoured to identify the variability and diversity of the future training audience and work situations calling on both our own analyses and the contributions of the monitoring group. Another of our aims was to take account of the on-going transformations in the research centre including the increase in tutoring situations and the desire to generalise the animal-handlers’ multi-species work.

The activity analysis was also called on to assess the training. We focused on what the operators had learned in the training mechanism designed. The lessons learned relate to the awareness of tacit, routine activities, operating modes and cautionary know-how shared among the group. The training situations proposed also provided the operators with an opportunity to experiment with multi-species work, to acquire meta-knowledge concerning their own difficulties in this context and to experiment with their peers playing the role of the tutor and the associated difficulties. The data at our disposal do not enable us specify what an operator has acquired from this process, but merely that these acquisitions were possible.

To satisfy the objectives set, we also used the activity analysis as a tool and an object of the operator training. We scheduled initiation sequences concerning the activity analysis followed by in-situ guidance so that the operators collectively analyse the films of them taking blood samples from the 3 species. While the films were indeed collectively analysed by the operators, our contributions were reduced and nothing indicates that they were used in the analyses that the operators conducted. Our data are insufficient on this point.

Finally, the activity analysis served as a tool to shed light on the on-going transformations in the research centre. Our results have been presented to different entities, emphasising the difficulty of multi-species work. We have various proof of this, such as the fear felt by the animal holders in the cattle workshop, the non-understanding of certain animal behaviours and thus the difficulty in anticipating the risks when working with the animal or the need to transformer the incorporated know-how. The implementation of multi-species work is not a matter of course; it requires operators to be both willing and accompanied. We were also able to highlight the difficulties of tutoring and in this case, we also emphasised the importance of the willingness and accompaniment of the tutors.

All these objectives are in line with the constructive ergonomics project of designing situations conducive to the development of individuals as well as to that of groups and organisations (Falzon, 2014). When designing a training course as the one we have just presented, it is more a question of
creating the conditions for the possible training development which could be continued at work in certain conditions.

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References