

EXPERIENCES FROM TACTICAL TRAINING OF OPERATION CONTROL CENTRE PERSONNEL IN EMERGENCY SITUATIONS.

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ABSTRACT

This paper presents the experiences from two tactical training courses aimed at emergency situations for staff in the operation control centre for city trains. The design of each course is presented, followed by a discussion in which the consequences of the two designs are compared. The comparison gives several indications as to the need for performing a task analysis as part of the design process, and for the need to include in the design a training method aimed at experts/professionals.

INTRODUCTION

In this paper experiences from two tactical training courses conducted in the Danish Railways are presented. The courses were directed at personnel in the operation control centre for city trains. In both courses the general purpose was to improve the operators' skills for handling emergency situations. Identical design principles were used to develop the courses, but the actual designs differed in several ways. It is the purpose of this paper to outline and discuss the consequences of these differences. The paper describes the results of a pilot-study carried out in relation to the MUSTER-project¹. The intention was to examine what kind of experiences the Danish Railways had so far with tactical training for in order to the MUSTER-system to benefit from this knowledge.

Method

The two courses were compared on six different issues central in a design process: 1. Training purpose. 2. Trainees. 3. Physical design. 4. Development of scenarios. 5. Choice of assistants, and 6. Training and evaluation method. The comparison is based on various inputs. This includes the course books from the training sessions (DSB, 1992; DSB, 1993) and the evaluation schemes filled in by the participants. Three interviews with the designers primarily responsible for the training programs have been conducted. The interviews were carried out as qualitative research interview (Kvale, 1983) and lasted in average two and a half hour. The primary purpose with the interviews was to identify the rationale behind the design process, which was not clarified in the course books. All designers had participated in at least one course as assistant. Accordingly, the interviews also focused on how this experience had influenced their reflections regarding the effectiveness of their design.

General remarks about the courses

The simulator used comprised two rooms. In one room the control centre was simulated. In the other room facilities needed to control the games were installed. Three types of participants were involved in the games: Trainees, instructors and assistants. The trainees were all experienced operators. Each trainee participated in two games. A chief instructor lead the games, supported by various assistants. Some assistants played the role of different people whom the trainees might wish to contact during a game. Others sup-

¹ CEC Environment Program, proj. PL 910675.

ported the instructor in different ways (this included the designers). Each course lasted for two days.

The training design of the first course

Course number one, was the first tactical training course ever held in the Danish Railways. It was seen by the designers as a pilot experiment. The *purpose* of the course was to improve: 1. Ways of collaboration. 2. Communication both inside the control centre and between the control centre and external partners, e.g., the police, and 3. Systems and procedures.

The training aimed at all team members in the operation control centre, and thus all team members were *trainees*.

During the design process the designers assumed that the most important issue was to make the sessions as realistic as possible -- given the practical and economical constraints. Accordingly the *physical construction* of the simulated control centre was set up to mimic the actual control centre. It turned out to be difficult to simulate the large control panel used by the operators to monitor the movements of the trains.

To make sure that the *scenarios* would seem realistic to the trainees the designers followed at least two principles; 1. Not to include "too many" incidents in each scenario, and 2. To situate the incidents on specific locations on the tracks imbedding the constraints of the chosen spot in the scenario. The designers feared that the trainees would see the games as unrealistic if the incidents included exceeded a certain number (the specific number was not specified). They also feared that the trainees would not accept the scenarios as realistic if they could or should act differently towards an incident in the game compared to what their tasks would be in a real situation. The designers found that all minor emergencies could be used as incidents in the scenarios, because they all would create a need for co-operation. The scenarios were designed to cover only the first twenty minutes of a game. The designers felt that after twenty minutes (with maybe nine different incidents) the training situation which the trainees met would be sufficiently complex to keep the trainees busy for a long period of time. The participating *assistants* were to a large extent people whom in reality held the same position as the one they played during the games.

The *training method* used was straightforward. The games began with introducing the incidents specified in the scenario and went on until the normal traffic flow was reestablished. During the games the instructor stayed in the background. If the trainees made any errors, he noticed it, but he seldom intervened. This implied that the trainees would meet the exact

consequences of their actions as the game developed. After each game an evaluation session was held. Here the instructor commented on any faults he had noticed during the game. The trainees were encouraged to state their own opinions as to what had happened, and thus the evaluation took form of a discussion between operators and instructor.

RESULTS

The effect of the course was judged to be very positive by all involved. The trainees felt that the sessions offered an excellent opportunity both for practising emergency procedures and for discussing how a concrete emergency had been handled. To some surprise for the designers the assistants also benefitted from the training. The assistants stated that their participation had given them new insight concerning the situation in the control centre during an emergency. This insight implied that they would react differently towards the control centre personnel in cases of future emergencies compared to what they did previously. E.g., reduce the amount of "unnecessary" calls to the control centre.

The training design of the second course

In the second course the focus of the sessions had changed from the team as such to the role of the duty officer. The designers felt that the authority of the duty officer in situations of emergency should be established more explicitly. The *purpose* of the session was specified to be: 1. To focus on the decision making process, and 2. To give the duty officer an understanding of the emergency procedures. Though the focus was on the duty officer all team members were conceived of as *trainees*.

The sessions were developed following the same principles as in the first course. The construction of the simulated control centre was changed a little to make it more realistic due to feedback from the trainees in the first course.

The *training method* used differed significantly from the one applied in the first course. In the second course the instructor played a much more active role during the games. When the duty officer made a mistake or sat up a strategy which the instructor did not find adequate, he would interrupt the game. Often this would lead to a debate including only the duty officer and the instructor. In these situations other participants could do nothing but wait. Occasionally the instructor chose to repeat a sequence of the scenario (to set the time back) to give the duty officer a change for correcting his actions. This implied, that the other participants also had to repeat the sequence. The games in the second course were ended shortly after the consequences of the duty officers strategy began

to appear. Thus, the duty officer never experienced the full consequences of the chosen strategy. As in the first course all participants were present during the evaluation sessions, but this time the instructor controlled the sessions more rigorously. The evaluation focused on the performance of the duty officer. The instructor stated where the duty officer had made inadequate decisions and how he could do better. Neither the duty officer nor other team members had much opportunity for discussing the situations that had occurred during the game.

RESULTS

The result of the second course was judged rather negatively by the participants. One of the team members stated that he felt the duty officer had been publicly "slaughtered". The team members complained about the waiting time during the games and were annoyed by the frequent interruption which they did not always understand the reason for. Furthermore some team members felt confused as to their role in the game. Also the assistants complained about the waiting time and found the games somewhat boring. Only few of them commented on gaining new insight into the work of the control centre personnel.

DISCUSSION

The courses presented above were designed according to the same general principles. They were alike except for three of the issues examined: purpose of the course, trainees, and training and evaluation method.

In literature on training the need to perform a task analysis as foundation for a design process is stressed (e.g., Patrick, 1992; Briggs & Wager, 1981). Through the analysis the exact purpose of the session should be specified and criteria for evaluating performance established.

In neither of the courses presented here a task analysis was carried out as part of the design process. The designers, who were all familiar with the domain, found it easy to identify the purpose of the sessions and felt no need for a detailed analysis. After specifying the training purpose in somewhat broad terms (as described above), the designers turned their attention to the creation of the "content" of the games -- the scenarios. As noted previously the designers wished to devise a realistic training environment. The rationale was that if a realistic environment was created the trainees would be able to act as if the situation was real. It was assumed, that if the trainees would act realistically they would surely benefit from the sessions. It wasn't specified how the skills of the trainees were expected to improve as a result of the sessions. The

reason for this was, that the designers felt, that the actions of the trainees could be evaluated in the same way as if the emergency had been real - and that such an evaluation would suffice.

These design principles turned out to have different consequences in the two courses.

Focusing the purpose of the sessions on the duty officer (as in the second course) had implications for the rest of the team members which were not foreseen by the designers. Even though the tactical trainer was seen as a mean suited for training of teams, the duty officer was in fact the only trainee in this course. Only his actions were in constant focus of the instructor. The actions of the other team members were only debated if they negatively influenced the task performance of the duty officer. Thus, the rest of the team were as such assistants. If the consequences of the training purpose had been foreseen, the roles of the rest of the team could have been made clear to them in advance. The team members dissatisfaction with the waiting time, confusion as to their roles etc. might then have been overcome.

The training and evaluation method used in the two courses differed on several points. The ending of a game shortly after the consequences of the chosen strategy appeared (in the second course), had an overall negative effect on the motivation of the trainees. The reason for this could be that such a strategy denies the team members the opportunity to experience the success of reestablishing a normal traffic flow.

The instructors' interruptions and redirections of a game in situations where he found the strategy developed by the duty officer was inadequate (in the second course), also had a potential demotivating effect on the trainee. This risk is obvious in situations where a duty officer feels that his own strategy would have succeeded if only it had been given a change.

The lack of explicit criteria for evaluation was not immediately obvious in the first course. Actually the trainees did most of the evaluation themselves. The trainees felt no need for criteria, because they could discuss the situations in the game, as they would or at least could have done if the situation had been real. In the second course the lack of explicit criteria was more noticeable. From time to time the instructor found it difficult to support his statements, e.g., in situations where the style of communication or the potential use of a given strategy were addressed. In these situations he had to resort to say that such and such was his impression. The trainees tended to reject such an argumentation. They often felt more able to speculate about the cause of the problems, than the instructor. As the trainees only to a minor ex-

tent were allowed to state their own opinions, they generally experienced the evaluation sessions to be quite frustrating.

CONCLUSION

The experiences from the two tactical training courses underline the need to perform a task analysis as an integrated part of the design process. The analysis would secure 1. That tasks which cause problems to the team members are explicitly addressed, and 2. That a set of criteria for evaluating performance is established. The establishing of criteria is a prerequisite if the instructor is to give effective feedback to the trainees. The identification of criteria is also necessary to demonstrate a training effect. The criteria will enable the designers to point at specific skills which have been improved in the sessions. The two courses described here were experienced very differently by the trainees. Still, because criteria for the evaluation performance wasn't explicitly stated, it is impossible to say if the purpose in either course was accomplished.

Tactical training as used in the Danish Railways must be seen primarily as a tool for training of teams. Accordingly, the Danish Railways will consider to use another training media if the need for training a single team member should arise again (as in the second course). This would be a less costly solution than to involve the whole team in a training session.

The experiences from the two courses also point towards a need for establishing a training and evaluation method aimed at expert trainees. The experienced team member can be expected to act according to a reasonably well thought out plan - even though this may not be immediately evident for the instructor. Accordingly the instructor should be careful not to interrupt a game unwarranted. It seems preferable in most cases simply to allow the expert trainee to experience the full consequences of the strategy he has developed. If it turns out that the strategy isn't optimal after all, the instructor can point out the reasons for this during the evaluation session. In such a situations the expert trainee is likely to listen more carefully to corrections from the instructor, than in situations were he feels, that his own strategy would have succeed after all.

It seems preferable to let expert trainees participate actively during the evaluation sessions. The expert trainees are sufficiently experienced to discuss an instructors' observations and corrections in a qualified way. Of cause they won't be experts in evaluation of performance or, like the instructor, be able to compare their own actions to that of other trainees. Still, a discussion in the team, would make all team members

reflect about their own tasks and needs in an emergency situation. If the evaluation is carried out primarily by an instructor this type of reflections might not occur.

The Danish Railways' experiences with tactical training have so far been very instructive, as the two courses have given many indications regarding the consequences of different design options. The Danish Railway's see tactical training as a very powerful tool for training of teams, because it allows a team to practice together on a common goal. As such tactical training is seen as a potential tool for many training purposes in the organization.

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