Interactive practices in air traffic control training

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Analyzing training practices

- Describes and compares the ways in which trainer interventions are organized during two different phases of ATC training:
  - simulation based training
  - on-the-job-training

- Bases on conversation analysis, ethnomethodology, and ethnographic field work

- Develops a perspective from which to investigate training as production and achievement of aviation safety
Data

- The video-taped data collected from
  - the aerodrome control simulator (12 h)
  - on-the-job-training phase (26 h)

- The analysis of video recordings combines the study of oral interaction and visually observable physical actions
Air traffic control work

- Coordinated team work
  - Highly complex
  - Physically distributed
  - Time critical

- Air traffic control tasks
  - Guiding the aircraft through the air
  - Separating them safely from other aircrafts
  - Handling them over to colleagues charged with controlling traffic in adjacent sectors
Air traffic control system

Approaches

Area Control

Departures

Terminal control

Tower

Airport

Halverson 1995
Coordinated team work in socio-technical system

1. Socio-technical system
2. Division of labour
3. Communication (verbal and bodily)
4. “Back-up” capacity
Training practices

- **Instructional training practices**
  - strategies for directing trainee’s attention to situational relevant activities and for guiding the trainee in designing subsequent work activities

- **Corrective training practices**
  - strategies for pointing or repairing an error/problem occurred in trainee’s previous activities

- **Evaluative training practices**
  - strategies for giving feedback on trainee’s previous activities and for mediating preferred working practices
Intervention forms in training practices

- **Instructional training practices**
  - Order
  - Test question
  - Instruction
  - Addition
  - Information delivery

- **Corrective training practices**
  - Order
  - Test question
  - Instruction

- **Evaluative training practices**
  - Instruction
  - Information delivery
Trainer intervention in Simulator: Order

1  TE: and was it– it was visual.
2   (.)
3  APP: visual?
4  (0.6)
5
6  TR: write down there base one
two or ((VL)) one two.
7
8  TE:               [yeah.
Trainer intervention in Simulator: Instruction

01  TR: And there, when it’s landing over there, here, it’s
02    better if you stretch

03  the descending point a little
04    so it’s
05  TE: [Yeah.
06    (0.6)
Trainer intervention in Simulator: Instruction

07  TR: Otherwise it is going to stop there.
08 (0.6)

09  TR: And it takes a hell of a long time normally when
10   it la[nds,
11  TE:  [Alfa Zero One, vacate runway zero five via
12      zulu one.
13 (1.5)

14  A01: Vacate runway zero five, via zulu one. Alfa Zero One.
15 (0.8)

16  TE: Tower?
Trainer intervention on OJT: Information delivery

1 CAT-1: Cat one ready to go.

2 TR: Ready to go (.) Well you know (.) for information

3 that (.) rifle range and pistol range
4 are active so it has to be given
5 'cause if there emerges
6 some exceptional situation and it
7 tsu—(.) about so to [profile

8 TE: [Oh yeah.
Trainer intervention in Simulator: Test question

01  TE:  Juliet three six, observe opposite
02          traffic Cessna one seven two just departed
03          toward Sanka.
04          (1.4)
05  J36:  We'll observe traffic. Juliet three six.
06          (0.8)
07  TE:  Tower?
08  TR:  [And to whom will you speak next?
09          (2.4)
10  TE:  Mmm-mm?
11          (3.6)
12  TE:  Oskar Charlie (.). Charlie, (.). wind three
13          two zero degrees five knots runway three zero
14          (0.8)  <cleared> to land.
15          (0.8)
16  OCC:  Cleared to land runway three zero (0.8)
17          <Oskar> Charlie Charlie.
Trainer intervention in Simulator: Addition

1  TE: Homer one (1.2) cleared to (0.2) Kuopio. (0.4)
2  flight one five zero. (0.8) Tango eight one.
3  (1.2)
4  TE: aa (0.2) after departure (0.2)
5  TR: fly
6  TE: fly heading zero niner niner zero until flight level six
7  zero. squawk (.) three one three one.
Trainer intervention on OJT: Instruction 1/2

14 TE: Charlie four two. Kuopio tower stand by.
15 (1.2)
16 TE: Yeah,
17 ((communicates with the APP via interphone))
18 C42: [Charlie four two.
19 (3.2)
20 TE: Westbird(s) two five two kilo,
21 (1.1)
22 TE: Yeah one five right turn ready to go.
23 When airborne ((contact) to radar, yeah bye.
24 ((communicates with the APP via interphone))
25 (9.3)
Trainer intervention on OJT: Instruction 2/2

41 TR: And now that we are playing in airspace class C
42 so er that Westbird two five two kilo so
43 ssss that the separation is maintained, the
44 other ((C42)) is ((in)) western holding the other
45 ((WBA252K)) takes off from one five so e:r of
46 course it’s no use to put ((that)) directly with
47 right turn

48 TR but with runway heading ((until)) passing two
49 thousand and hundred, right.
Discussion

- In the air traffic control training the central development is the transfer from procedural to local knowledge.

- The repertoire of intervention forms within different training practices provides a practical instrument for mediating tacit knowledge, skills and know-how of air traffic control work.

- The intervention forms within different training practices is an applicable instrument for organizing, assessing and developing air traffic control training.
Dilemma in air traffic control training

- Learning from a model - learning from error
  - Instructing and controlling trainee’s performance in designing work activities
  - Supporting trainee’s self-directness in designing and accomplishing work activities