

## Index

---

- Accounting practices, analysis of, 311  
 Actions, interpretation of, 18–19. *See also* Situated action  
 Activity theory, 130  
   application to interactionism and information-systems research, 296–315  
   definition of, 313–314  
   and expert/novice differences, 177–196  
   in prototyping situations, 137  
 Actor network theory, 239  
 Addiction to drugs, factors affecting, 300–301  
 Affordances, 296, 297, 329  
 Airline cockpit crew system, 6–7, 15–34  
   access to information in, 21  
   artifact as form of memory in, 28–29  
   autonomous actions in, 20, 29  
   duplicate computer interfaces in, 26  
   duplicate flight instruments in, 25–26  
   expectations in  
     formation of, 21–22, 28, 30  
     violations of, 22  
   information storage in, 25, 30  
   intersubjectivity in, 22–25, 30  
   labor distribution in, 19–20, 27–28  
   memory as source of information in, 27, 28, 29  
   method of analysis, 17–19  
   planning in, 20  
   propagation of representational state in, 26–27, 29, 32  
   redundant error checking in, 25  
   shared understandings in, 24, 31  
   trajectories of information in, 21, 32  
 Airline operations room activities, 7, 35–60, 71–77, 88–89  
   allocation of actions in, 45–47, 57  
   boundaries in, 38, 47  
   common focussed gathering in, 53–55, 57  
   complex board in, 79  
   complex sheet in, 63  
   division of labor in, 38, 53  
   documents used in, 90  
   evidential devices used in, 75–76  
   mobilization of resources in, 48–53, 57  
   multiple domains of expertise in, 84–86  
   problem dissolution in, 55–56, 57  
   problem reformulation in, 86–87  
   radio close-outs in, 66  
   space arrangements in, 38  
   spatial-orientational positioning in, 41–45, 56  
   tool selection in, 71–72, 89  
   transactional segments in, 42  
   and worksite as situational territory, 37–38, 56  
 Airline workers looking at airplanes, 7–8, 61–92  
   focus of attention in, 88  
   and information supplied by labels, 65–68  
   and plane seen as organizational entity, 62–69  
   and reading of scenes as social processes, 79–87  
   and relationship between talk and tool-mediated seeing, 70–77  
   affecting modification of utterances, 77  
   relevant perspectives in, 86–87  
   seeable trouble in, 80–83  
   interpretation of, 83  
   and seeing absent events, 77–79  
   and seeing status of activities, 69  
   shared competence in, 79  
   and use of supporting tools, 63–65, 78  
 Antideterminism, 302–304  
 Apprenticeships, skill formation in, 285–286, 293  
 Argumentation, social, in team practice, 236  
 Artifacts. *See* Tools or artifacts  
 Artificial intelligence  
   distributed, 296, 297, 304  
   definition of, 314  
   traditional, concept of plans and goals in, 304, 311

- Automobile factories in Mexico, 11–12, 279–294
- Autonomy  
 in airline cockpit crew, 20, 29  
 in communities of practice, 333  
 of musicians, 299, 300
- “Banana Time” story, 301–302, 303
- Black box syndrome, 310
- Career success  
 analysis of, 308  
 owed to support personnel, 265–267  
 and pressures for musicians, 300
- Change in work practices, 5
- Chief scientists  
 as administrators, 273  
 as construct of group process, 258  
 as cultural types, 260  
 dependence on younger colleagues, 273–274  
 frontstage performances of, 272  
 success owed to support personnel, 265–267  
 work attributed to, 260
- Child development, theories of, 308
- Cockpit crew, 6–7, 15–34
- Cognition as social phenomenon. *See* Distributed cognition
- Collective construction of scientific genius, 257–278
- Collective memory  
 mediation of, 307  
 and skill formation, 280, 285, 288, 291
- Collectivity in teamwork, 233–253
- Communication  
 intersubjectivity in, 22–25, 30  
 in scientific practice, 261
- Communities of practice  
 autonomy in, 333  
 talk by team members in, 233–253
- Complex boards used by airlines, 79, 91
- Complex sheets used by airlines, 63, 91
- Computer science, multivoiced approach to, 313
- Computer system development activities, 8–9, 130–157  
 activity theory in, 130, 137  
 breakdowns in, 132, 136–137, 139  
 bugs in, 150, 155  
 contradictions in, 138–139  
 design process in, 133–136  
 designer interventions in, 150–151, 154  
 evaluation of prototypes in, 136  
 focus on current work practices in, 148–149, 153–154  
 focus shifts in, 136–137, 148  
 causes of, 149–151  
 frame tasks in, 135  
 talk-through of, 147–148  
 future work actions in, 136, 137  
 simulation of, 140–144, 152–153  
 hypertext use in, 146–147, 153  
 idea generation in, 145, 153  
 lack of tool support in, 149–150  
 mock-up simulations in, 153  
 modification of prototypes in, 136, 144–147  
 mutual activity of users and designers in, 138  
 number of participants in, 154  
 openings for learning in, 137, 139, 152  
 play-like situations in, 143–144  
 preparation of prototyping sessions in, 151–155  
 primary and secondary designers in, 135  
 storyboards in, 154–155  
 theoretical framework in, 137–140  
 workshops in, 135
- Computer-supported cooperative work, 3, 98, 125–126, 296, 297, 312, 313  
 definition of, 314
- Conflicts  
 in management of system disturbances, 169  
 in musicians and audiences, 304  
 in personal and company needs, 190–191
- Consensus created through argumentation, 236
- Contingencies becoming conditions, and mediation of action, 304–307
- Continuity in work practices, 5
- Contradictions  
 in computer system development, 138–139  
 in disturbances during court hearings, 227–230  
 in interconnected systems, 309  
 in multiprofessional teamwork, 237
- Convergent activities in London Underground, 96–128
- Conversation analysis, 2  
 context and interactions in, 70  
 design and modification of utterances in, 77, 110, 121  
 and interactions with artifacts, 70–77  
 textual and graphic representations with, 5
- Coordination in shared workspaces, 35–60
- Court hearings, 10, 199–230  
 in California court, 204–207  
 contradictions behind disturbances in, 227–229, 230  
 disturbances in, 222–227  
 division of labor in, 202, 205, 228–229, 230  
 DUI hearing in, 209–213  
 multiple dialects of judge in, 214–217  
 plea bargaining in, 205  
 standard actions of judge in, 219–220  
 standardized sentences in, 206  
 in Finnish court, 202–204  
 contradictions behind disturbances in, 227, 229–230  
 disturbances in, 220–222

## Index

343

- DUI hearing in, 207–209
- multiple dialects of judge in, 213–214, 217
- standard actions of judge in, 217–219
- standardized sentences in, 203
- learning process in, 225–226, 227
- power relations in, 200
- rationalization of, 202, 217
- sources of discord in, 201–202
- teamwork in, 202, 230
- voice of legal authority in, 201
- work of judges in, 199–230. *See also* Judges in municipal courts
- Cultural anthropology, theories of, 319–320
- Culturally mediated work practices, 3–4
  - for jazz musicians, 299–301
  - meaningless informal interactions in, 301–302, 306, 309
  - collective mediation of, 307
  - in scientific work, 259–260, 264
- Dairy-plant workers, expert/novice differences in, 179
- Data sources for studies, 5
- Design activity
  - inadequate models of, 159
  - interactions between designers and users in, 159–160
  - operation-oriented, 160
  - user participation in, 138, 148–149, 153, 160, 169, 172, 175
- Design-oriented operation, 160, 171–172
- Development, potential levels of, 308
- Dialogical expertise in teamwork, 234
- Distributed action patterns, elements in, 330–331
- Distributed artificial intelligence, 296, 297, 304
  - definition of, 314
- Distributed cognition, 17, 297, 308
  - and access to information, 25
  - in airline cockpit crew, 19–20
  - in London Underground control room, 122, 126
  - in navigation team, 328
  - in scientific practice, 267, 269–270
- Disturbances
  - in court hearings, 220–227
  - in system functions, 9, 159–175
- Division of labor
  - in airline cockpit crew, 19–20, 27–28
  - in airline operations room, 38, 53
  - in California court, 202, 205, 228–229, 230
  - in London Underground control room, 101
- Drug addiction, factors affecting, 300–301
- Ethnography of work, implications of, 319–336
- Experience, and skill formation, 279–294
- Expert/novice differences, 177–196
  - knowledge organization in, 179, 187
  - multimethod research approach to, 180–185. *See also* Telephone sales work in problem solving, 178, 188–189, 195
  - purpose and motives in, 179, 190, 195
  - working backward in, 178, 186, 187, 188, 192
- Expert systems, use of, 311
- Expertise
  - and collective nature of skill, 11–12, 279–294
  - creative nature of, 199
  - developed from system disturbances, 159–175
  - dialogical, in teamwork, 234
  - and differences between experts and novices, 177–196
  - flexibility in cockpit system, 6
  - multiple domains in airline operations room, 84–86
  - views of, 4
- Flexibility
  - in airline cockpit system, 6
  - in London Underground control room, 101
  - in Mexican automobile factories, 282, 283
- Forgetting, mechanisms in, 307
- Gender relations in scientific practice, 261–262
- Genealogy of scientific minds, entry into, 258, 262–264
- High-technology manufacturing, skill formation in, 11–12, 279–294
- Human agency and interaction in work, 2
- Identity, renegotiation of, 310
- Improvisation
  - in multiprofessional teamwork, 247–251
  - in scientific practice, 268
- Indeterminacy, types of, 303
- Information-systems research, application to interactionism and activity theory, 296–315
- Interactionism, symbolic
  - application to activity theory and information-systems research, 296–315
  - definition of, 314
- Intersubjectivity as basis for communication, 22–25, 30
- Jefferson transcription system, 91
- Judges in municipal courts, 199–230
  - dialects employed by, 201, 217
  - adjudication, 213–214, 226
  - document making, 213–214, 220
  - instruction, 215, 216–217, 225
  - monitoring, 216, 225
  - prevention, 215, 225

- Judges in municipal courts (*continued*)  
 socioeconomic adjustment, 214, 220, 224, 225, 226, 229  
 orientations of, 201  
 standard actions of, 217–220  
 disturbances related to, 222–224, 225
- Knowledge  
 local, and nature of all information, 312, 329  
 social nature of, 257, 259
- Labels and captions, information in, 65–68
- Labor  
 cognitive, distribution of  
*See* Distributed cognition  
 division of. *See* Division of labor
- Laboratory signatures, 264–267  
 in oceanography, 267–271
- Learning opportunities  
 in computer system development, 137, 139, 152  
 in court hearings, 225–226, 227  
 in manufacturing system disturbances, 160, 165
- Legal work in municipal courts, 199–230. *See also* Court hearings
- Local knowledge, and nature of all information, 312, 329
- Locutionary acts, 23
- London Underground control room activities, 8, 96–128  
 collaborative work in, 107, 119–121  
 and production of convergent activities, 108–119  
 flexible division of labor in, 101  
 information distribution in, 122, 126  
 mutual availability of, 123  
 information provided to passengers in, 101–103  
 intelligibility of actions in, 124  
 monitoring actions of colleagues in, 102–108, 118, 120, 126  
 mutual visibility conduct in, 119–121, 123–124  
 and participation in activities of colleagues, 121, 125, 126  
 reforming of timetables in, 100, 119, 123  
 service assessed in, 101–102  
 sociointeractional organization in, 119–121, 125  
 technology used in, 98–101  
 timetable in, 99–100  
 tools utilized in, 107, 121–126  
 trainee personnel in, 119
- Manufacturing  
 high-tech, skill formation in, 11–12, 279–294  
 system disturbances in, 159–175
- Mapping of connections between data and theory, 17, 19
- Marijuana use, factors affecting, 300–301, 305, 306, 307, 309–310
- Mathematics, various uses of, 297, 311
- Measurement practices, analysis of, 311
- Medical data systems, use of, 312
- Memory  
 and action patterns, 330–331  
 artifacts as form of, 28–29  
 collective  
 mediation of, 307  
 and skill formation, 280, 285, 288, 291  
 in conversation of team members, 247  
 as source of information, 27, 28, 29
- Mexican automobile factories, 11–12, 279–294  
 absenteeism in, 289–290  
 characteristics of, 281–282  
 managerial flexibility in, 282, 283  
 multiskilling techniques in, 288  
 plant performance in, 292–293  
 machine uptime in, 292  
 technologies employed in, 282–283  
 training strategy in, 284, 286–287  
 and job rotation in work teams, 289, 291, 292  
 transitional Taylorism in, 280, 287–288, 291, 293  
 unions in, 281  
 work organization in, 282, 288, 290–292  
 work teams in, 288–292  
 worker selection in, 283–284
- Mind and rationality as elements of science, 257, 258
- Mindfulness of human action, 3–4
- Multiple perspectives, validity of, 304
- Multiprofessional teamwork  
 and collective actions through conversations, 10–11, 233–253  
 common knowledge and working intelligence in, 239–243  
 contradictory aspects of, 237  
 conversational remembering in, 247  
 creation of interim solutions in, 235, 239, 241–242  
 improvisation in, 248–251  
 definitional work in, 237–239  
 dilemmas in, 237–239, 245  
 and creation of interim solutions, 248  
 equivalent actions in, 240–241  
 improvisation and innovation in, 247–251  
 incorporation of new information in, 242–243  
 informal communications in, 235  
 positive effects of argumentation in, 235–236  
 provisional management of uncertainties in, 241–242, 246

- role demarcation in, 244–247
- shared understandings in, 235, 239
- talk as situated action in, 236
- Multiskilling techniques in factories, 288
- Musicians
  - career pressures of, 300
  - cliques of, 300
  - group identity of, 299
  - marijuana use by, 300–301, 305, 306, 307, 309–310
  - occupational culture of, 299–301
  - professional autonomy of, 299, 300
  - relationship to audiences, 299, 309
  - unresolvable conflicts of, 304
- Navigation team in emergency at sea, 326–328
- Networks of practices, 5
- New possibilities of action
  - by semiotic representations, 321–322
  - by shared understanding, 308–310
- Nobel prizes, respect for, 262, 264
- Nondeterminism in planning and action, 304
- Oceanography, scientific practice in, 11, 260–275
- Operations room of airline, activities in, 7, 35–60, 71–77, 88–89
- Organizations, nature of, 234
- Physicist observed by sociologist, 323–325
- Planning
  - in airline cockpit crew, 20
  - concepts in artificial intelligence, 304, 311
  - nondeterminism in, 304
- Problem solving
  - expert/novice differences in, 178, 188–189, 195
  - reformulations in, 86–87
  - structuring resources in, 56
  - working backward in, 178
- Prototyping approach, cooperative, in systems design, 130
  - modifications in, 132
- Rationalism, failure of, 310, 311–312
- Rationality as element of science, 257, 258
- Rationalization of court hearings, 202, 217
- Scientific practice
  - and authorship of journal articles, 266
  - chief scientists in. *See* Chief scientists
  - collective construction of genius in, 11, 257–278
  - communication in, 261
  - cultural aspects of, 259–260, 264
  - distributed cognition in, 267, 269
  - and narrowness of vision, 269–270
  - gender relations in, 261–262
  - genealogy of greatness in, 258, 262–264
  - improvisation in, 268
  - laboratory signatures in, 264–267
  - in oceanography, 267–271
  - laboratory technicians in, 267–271
  - interacting with equipment, 267
  - invisibility of, 271–275
  - playing with machines, 268, 271
  - thinking through machines, 268–270
  - mind and rationality as elements in, 257, 258
  - social nature of, 257, 259
  - system of attribution in, 271
  - teamwork in, 260–262
  - work of support personnel in, 265–267
- Semiotics, and self-regulation of groups, 321–323
- Shared knowledge or understanding
  - affecting work style, 329
  - in airline cockpit crew system, 23–24, 31
  - and emergence of new behavior, 308–310
  - in multiprofessional teamwork, 235, 239–243
  - in seeing as situated activity, 79
  - tripartite structure of, 333–334
- Shared workspaces
  - in airline operations room, 35–60
  - in London Underground control room, 96–128
- Ship's navigation team in emergency situation, 326–328
- Signatory technique in laboratories, 264–267
  - in oceanography, 267–271
- Situated action, 328
  - in control room of London Underground, 120, 127
  - and looking at airplanes, 61–92
  - in multiprofessional teamwork, 216
  - in talk by team members, 236
- Situated meaning of artifacts, 306
- Situational territory, 37–38, 56
- Skill formation
  - in apprenticeships, 285–286, 293
  - and bias against skilled workers, 290, 291, 293
  - collective memory in, 280, 285, 288, 291
  - components of, 284
  - experience affecting, 279–294
  - in work teams, 289
- Social aspects of cognition. *See* Distributed cognition
- Social interactions in telephone sales work, 182, 192–193, 194–195
- Social mediation of technology, 159
- Social nature of science, 257, 259
- Social processes in seeing images, 79
- Sociology of science, 311
- Sociology of work, 1, 160

- Sociotechnical systems  
 bottom-up process in, 160, 172, 175  
 top-down process in, 160, 172, 175
- Spatial-orientational positioning in shared workspaces, 42–45
- Speech act theory, 23
- Support personnel, and collective construction of scientific genius, 265–267
- System disturbances, 9, 159–175  
 anticipation of, 174  
 attitude of management affecting, 172  
 causes of, 163–164  
 component failures in, 163–164  
 and cooperation between designers and users, 171  
 design-based failures in, 163–164  
 and design-oriented operation, 160, 171–172  
 diagnostic procedures in, 166, 169  
 duration of, 163, 164  
 elimination of, 166  
 feedback control of, 161–162  
 handled by operators, 164–172  
 individual reactions to, 164–165  
 official optimizing activities in, 169–171  
 opportunities for learning in  
 in computer system design, 137, 139, 152  
 in manufacturing system, 160, 165  
 orientations toward, 165–166, 172  
 orthodox model of, 161–162  
 prevention of, 174  
 rate of, 162–163, 164  
 routinized management of, 165, 168, 172  
 as threats to functionality, 161, 164, 172, 175  
 unofficial developmental work in, 169  
 conflicts in, 169  
 withdrawal from, 167–168
- Teamwork  
 in court hearings, 202, 230  
 dialogical expertise in, 234  
 in Mexican automobile factory, 288–292  
 multiprofessional, and collective actions through conversations, 233–253  
 in scientific research, 260–262  
 social actions in, 214
- Technicians in experimental science, 267–271
- Technology  
 in London Underground control room, 98–101  
 in Mexican automobile factories, 282–283  
 social mediation of, 159
- Telephone sales work  
 conflicting personal and company needs in, 190–191  
 expert/novice differences in, 180–196  
 external resources used in, 185, 188, 193  
 goals in, 186, 189–192, 194, 195  
 guesstimates of prices in, 186–187  
 internal knowledge affecting, 187–188  
 order processing in, 183–185  
 risk-taking activity in, 188, 194  
 social interactions in, 182, 192–193, 194–195  
 trigger or price-sensitive questions in, 185
- Textile workers, expert/novice differences in, 179
- Tools or artifacts, 4, 328–329, 330, 332, 335  
 external effects of, 322  
 as form of memory, 28–29  
 information represented in, 30  
 lack of, in prototype design, 149–150  
 in London Underground control room, 107, 121–126  
 and relationship between talk and tool-mediated seeing, 70–77  
 selection in airline operations room, 71–72, 89  
 situated meaning of, 306  
 supportive use in looking at airplanes, 63–65, 78
- Transactional segments, spatial, 42
- Transcripts, interpretation of, 18
- Transformations in workplaces, studies of, 2–3
- Undetermined conditions, concept of, 303–304
- User participation in design activities, 138, 148–149, 153, 160, 169, 172, 175
- Video and audio recordings of cockpit activity, 17
- Zone of proximal development, 308