CSCW:
State of the Union

Kjeld Schmidt
Copenhagen Business School
schmidt@cscw.dk

CSCW:
State of the ~~Union~~

Kjeld Schmidt
Copenhagen Business School
schmidt@cscw.dk

CSCW:
State of the Disunion

Kjeld Schmidt
Copenhagen Business School
schmidt@cscw.dk

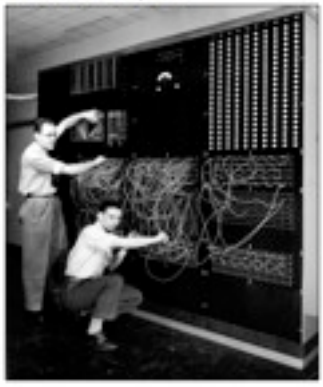
CSCW: Agenda

- Historical perspective:
  - Origins of the CSCW research program
  - CSCW's program: The work practice paradigm
  - CSCW: Intellectual roots
- What's has been achieved?
- What has failed?
- CSCW: prospects and challenges
- A key research problem: Practices of ordering

The road to CSCW

1944 – *c.*1960: Batch processing

Harvard Mark-1, 1944



ENIAC, 1946

Colossus, Bletchley Park, 1944

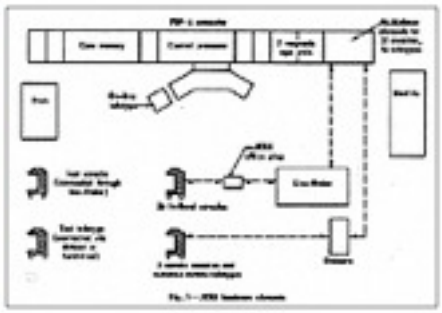
ACE, 1950

'The local dry cleaner regime: *In by 10, out by 5*' (Licklider, 1962)

Circa 1960 ff.: Time-sharing

JOSS (Johnniac Open Shop System)
conversational time-sharing service, 1964

DEC PDP-1, 1960



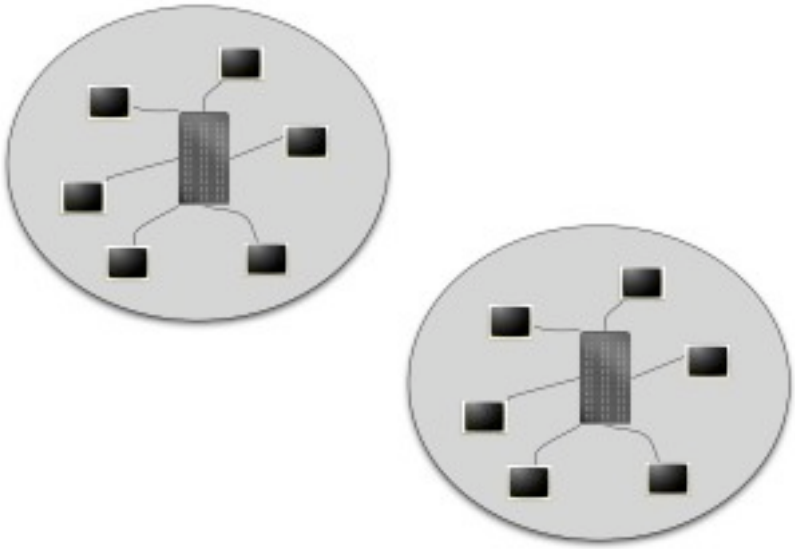
DAC-1, 1965 (CAD)

1965: Local mail

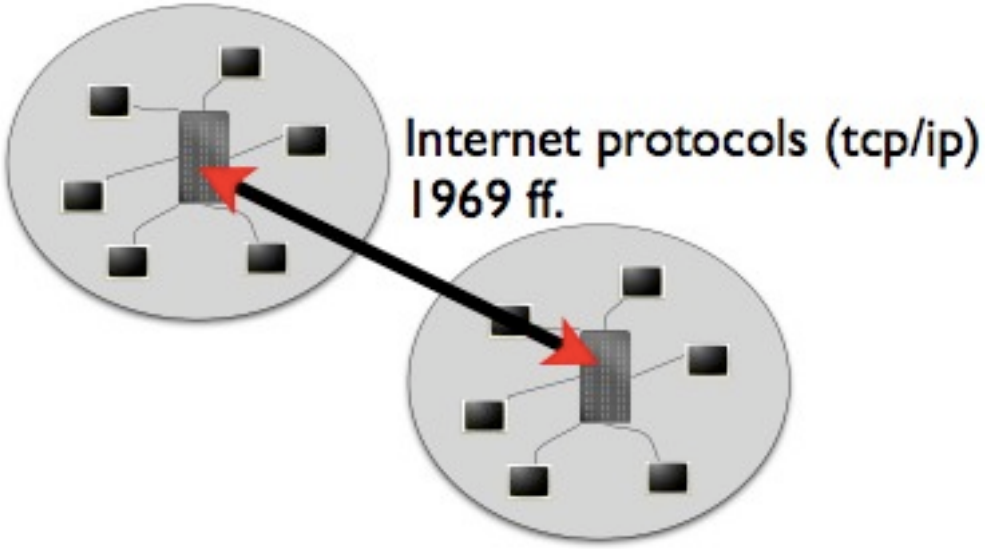
- 1965: 'Mail Box' (Tom Van Vleck and Noel Morris)

IBM 7094

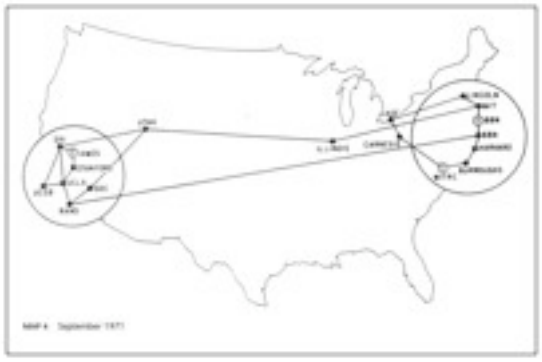
Local mail, worlds apart…



Local mail, worlds apart…



ARPANET, 1969-1971
A.k.a., Intetnet



1971: Network email

- 1971: 'SNDMSG' (Ray Tomlison)

The PDP10 mainframe on which Ray Tomlinson built network email

'Computer-Mediated Communication'

- **CMC as scaffolding**: Simple applications built by programmers for their own use.
- **Design-oriented experiments**: 'Computer conferencing' (Turoff, Hiltz, Vallee, Palme)
  - Initially based on models of rational decision-making (à la GDSS).
  - Critique of email: 'information overflow', no 'threads', 'one-to-one' pattern.
- **Technology assessment**: 'Computer Mediated Communication' (Hiltz, Kerr, Rice, Kreisler)
  - Not committed to design: The technology is presumed.
  - Unit of analysis: 'media'.
  - Focus on communication across distance.
  - Focus on communication divorced from work practices
  - Results conceived of in terms of 'effect' or 'impact'

'Office Automation'

- Based on
  - AI techniques (Hewitt, Barber, Fikes, Henderson)
  - Modelling techniques (Petri nets): computational models of parallel work processes (Ellis, Simone, Kreifelts)
- Approach:
  - Administrative procedures conceived of as algorithms
  - Experimental design of computational administrative procedures
- Early disappointments: *exceptions, exceptions, exceptions!*
- Early involvement of sociologists (Suchman & Wynn, Gerson & Star)
- Early realization that the OA program was conceptually naive

‘Office Automation’

- Based on
  - AI techniques (Hewitt, Barber, Fikes, Her
  - Modelling techni els of parallel work processes (Ellis, S
- Approach:
  - Administrative pr
  - Experimental desi procedures
- Early disappointments *ceptions, exceptions!*
- Early involvement of sociologists (Suchman & Wynn, Gerson & Star)
- Early realization that the OA program was conceptually naive

Crisis!

Another crisis!

CMC's crisis: Critique from within (1) Greif, 1988

'Computer conferencing has since been expanded to support a wide range of "many-to-many communication" patterns.

However, when computer conferencing is applied to some task, the model breaks down. The unstructured body of messages is suitable for the free-flowing text of natural language, but does not let us set the computer to work on our problems. Designers who draw pictures, software developers who jointly write code, financial analysts who collaborate on a budget — they all need coordination capabilities as an integral part of their work tools.

That means coordination support within the CAD engineer's graphics package, within the programmer's source-code editor, within the budget writer's spreadsheet program. It means support for managing versions of objects, be they pictures, programs, or spreadsheets. It means ways to distribute parts of the object for work by contributing group members, ways to track the status of those distributed parts, ways to pull completed objects back together again.

The limit of electronic mail and computer conferencing is that they have such features for managing messages only. CSCW widens the technology's scope of application to all the objects we deal with.'

(Greif, 1988, pp. 7 f.)

CMC's crisis: Critique from within (2) Pankoke-Babatz et al., 1989

(EU COST-11 AMIGO project)

- The AMIGO project 'chose […] to look at activities and the regulations required by a group of people to co-operatively execute a particular activity. The model we want to develop should therefore allow specification of such regulations' (Pankoke-Babatz, 1989, p. 20).
- a notation 'to model the activities, businesses, tasks, actions or work-flow[s], which are performed by a group of co-operating people', so as to 'facilitate the required co-ordination and possibly to automate co-ordination, thus reducing the co-ordination effort required of the participants in an activity' (Pankoke-Babatz, 1989, p. 23).

A new paradigm: Calls for social science contributions to technological research

- Pankoke-Babatz et al., 1989:
  - computational models and architectures must be grounded in 'fundamental understanding of Group Communication processes',
  - this requires contributions from 'sociology, anthropology, economics and political science'
- Greif, 1988:
  - 'Methodologies for testing individual user interfaces don't apply as well to group support systems. As a result, CSCW is looking more to anthropology to find methodologies for studying groups at work in their natural settings'

Two crises & a new paradigm

- CMC's crisis: the 'divorced communication' paradigm 'breaks down'
  - Greif, 1988.
  - Pankoke-Babatz et al., 1989.
- The crisis of Office Automation: problematic nature of 'office procedures'
  - Suchman, 1982, 1983; Suchman & Wynn, 1984.
  - Gerson & Star, 1986.
- CSCW
  - Work practice oriented
  - View towards computational regulation of interaction
  - Early 'exemplars': Suchman et al., Xerox PARC (1992 ff.); Tremont Institute (Gerson & Star, 1986); Lancaster group (Hughes, Harper, etc., 1989); Heath & Luff (1991)
  - Ethnography key method (in development of technology)

A note on terminology

- Distinction between 'technology' and 'system'
  - *Technology*:: technical principles devised to deal appropriately with a class of (practical) issues
  - *System*:: specific configuration of (known) technologies to perform a range of tasks
  - For example: 'Data base technologies' (e.g., relational databases) are applied to variety of systems — in conjunction with, e.g., data transfer technologies (protocols), bit map video technologies, plastic technologies, etc.

technology Etymology: Greek *technologia* systematic treatment of an art, from *technē* art, skill + *-o-* + *-logia* -logy
Date: 1859
1 a: the practical application of knowledge especially in a particular area : **engineering**
2 <medical *technology*> **b:** a capability given by the practical application of knowledge <a car's fuel-saving *technology*>
2: a manner of accomplishing a task especially using **technical** processes, methods, or knowledge <new *technologies* for information storage>
3: the specialized aspects of a particular field of endeavor <educational *technology*>
(Merriam Webster <http://www.merriam-webster.com/dictionary/technology>)

CSCW: Intellectual roots (1)

- Human Factors (Vygodskij, Piaget, Gibson)
- Ethnomethodology:
  - Suchman, Heath… (Schutz, Garfinkel, Sacks)
  - 'Lancaster group': Hughes, Sharrock… (Ryle, Wittgenstein, Schutz, Garfinkel)
- Social studies of science: Gerson, Star, Bowker (Dewey, Mead, Strauss)
- Sociology of practice (Marx, Bourdieu, Strauss)
- Distributed Cognition: Hutchins (Vygodskij)
- Participatory Design: Nygaard, Ehn, Kyng, Bødker, etc. (Marx, Heidegger, Wittgenstein)
- Scientific Management (alias Systems Development)

CSCW: Intellectual roots (2)

- Stored-program computer architecture (Turing)
- Time-sharing operating systems, Interactive computing (McCarthy, Licklider)
- High-level programming notations (Naur, Nygaard)
- Parallel process modelling notations (Petri)
- Distributed systems (Hewitt)

Status

What has been achieved?

- Situated action *versus* computational artifacts (Suchman, Gerson & Star)
- 'Mutual awareness':
  - Embodied action (London Underground study…)
  - Uses of material characteristics of settings and artifacts (ATC study, wastewater plant study)
  - Awareness engine architectures (Aether, etc.)
- Coordinative artifacts
  - Boundary objects (Star, Ackerman, Lee)
  - Coordinative protocols and artifacts, a.k.a. 'coordination mechanisms' (Schmidt, Simone, Carstensen)
- Complexes of coordinative artifacts
  - Ordering systems (Schmidt, Wagner)
  - Working medical record (Fitzpatrick)

What has been achieved? (2)

- Paradigm matured due to coupling of ethnography & technological development:
  - Rigorous studies of work practice (as opposed to IS research)
  - Refined focus on actual practices: skills, artifacts, settings

What has failed?

- Dogmatism:
  - Work practices are 'essentially ad hoc' (Suchman, Button, Harper…)
  - Computational regulation of interaction considered harmful
  - Workflow technology: developed outside of CSCW and in isolation from CSCW insights
    - E.g., BPEL ➡ BPEL4People
- Distractions:
  - The second coming of CMC
    - Driver: CMC technologies adopted by mass audiences
  - Attractions of frivolous technologies, e.g., 'ludic pursuits' (Brown, Crabtree, Rodden, etc.)
  - Method fetishism: 'Ethnography' of tourism, games, domestic life

CSCW: Prospects and challenges

- Prospects
  - Awareness:
    - Technologies under development under Ubiquitous Computing (wireless networks, sensor & effector technologies, positioning technology)
    - Challenges: understand practitioners' 'typifications' (routine categorizations)
  - Distributed computing: peer-to-peer protocols, etc.
- Challenges
  - Conceptual inhibitions must be sorted out: Computational regulation of interaction
  - Studies needed of coordinative practices in complex work domains (engineering, manufacturing, medical work, construction…)
  - How do coordinative practices evolve?
  - Is there a 'grammar' of coordinative protocols? Is there *a logic* to them?

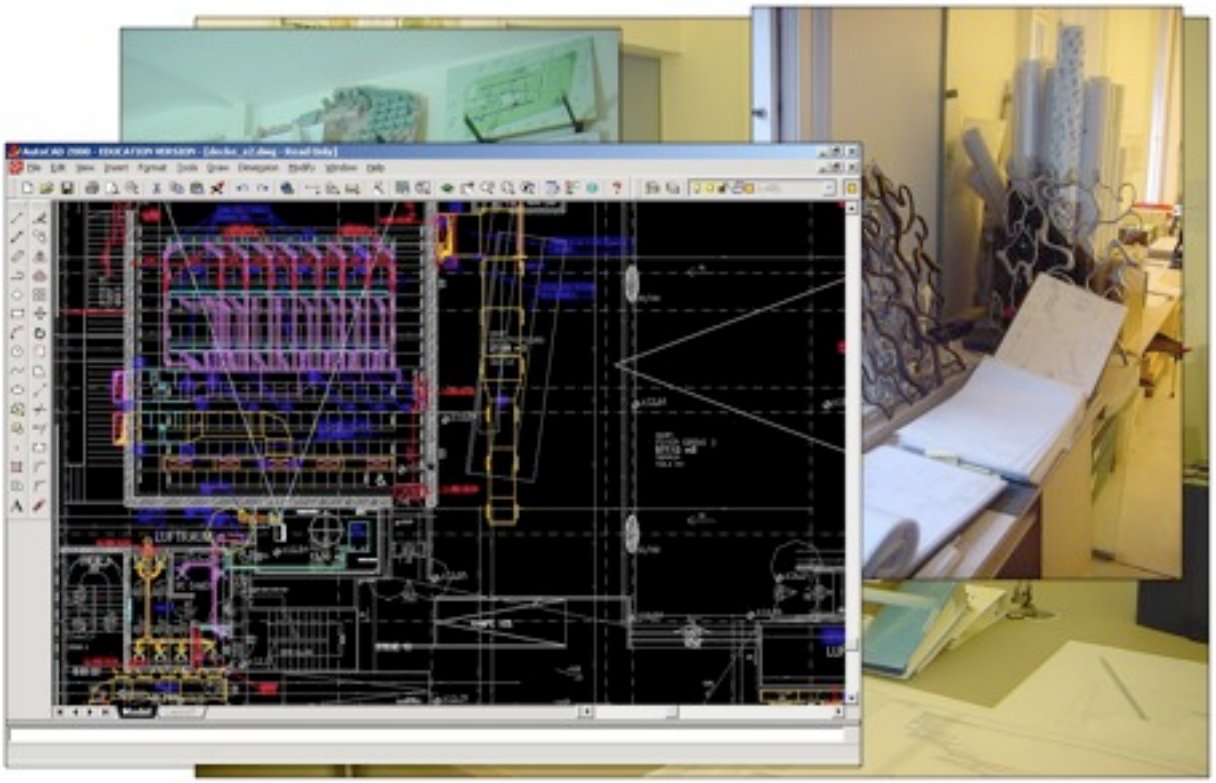
A key research issue: Practices of ordering

Architectural office: Practices of ordering

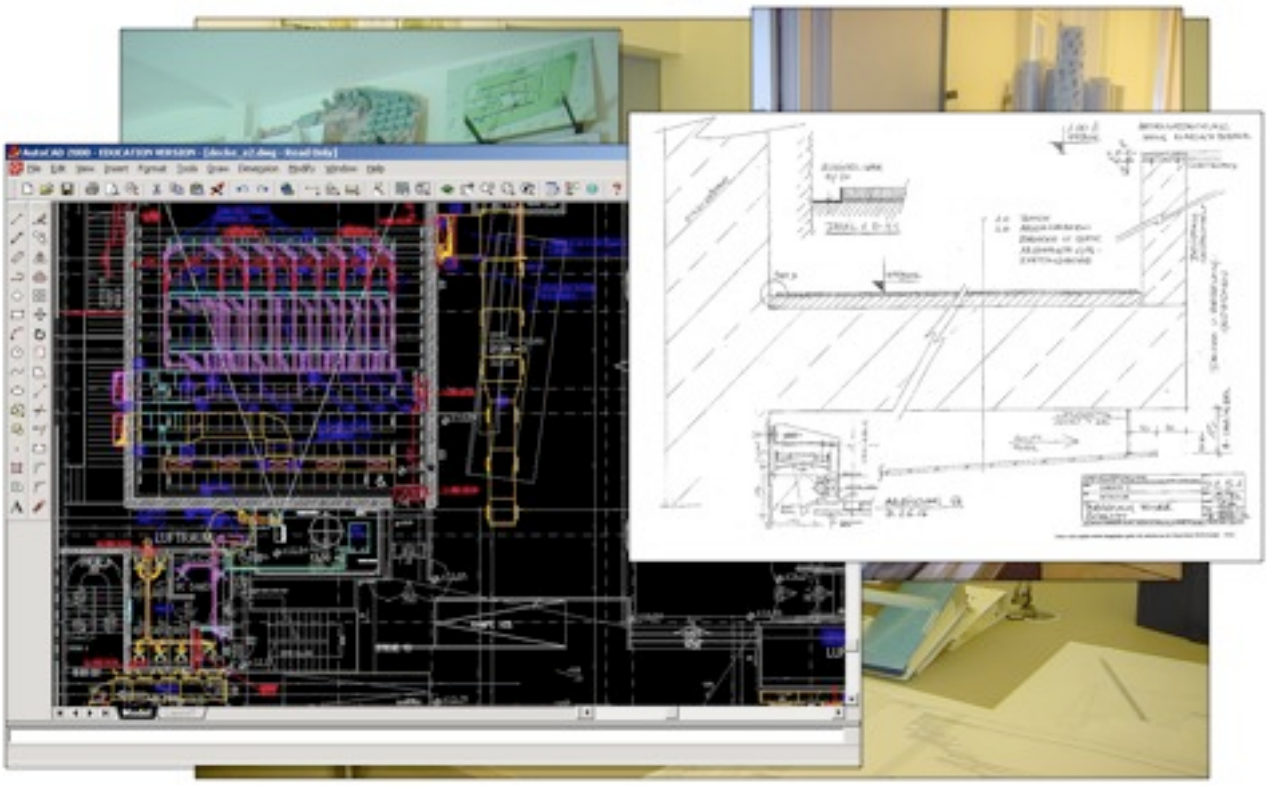
Architectural office: Practices of ordering

Architectural office: Practices of ordering

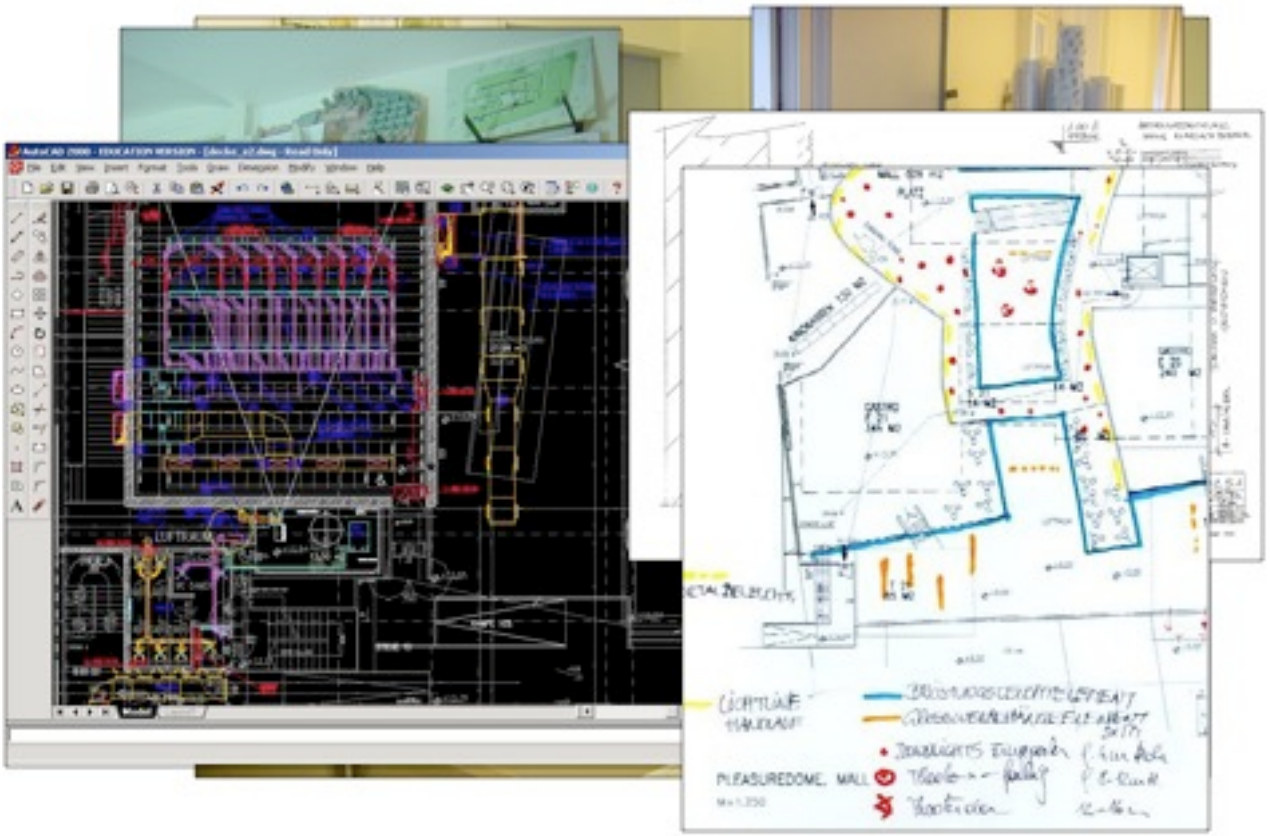
Architectural office: Practices of ordering



Architectural office: Practices of ordering



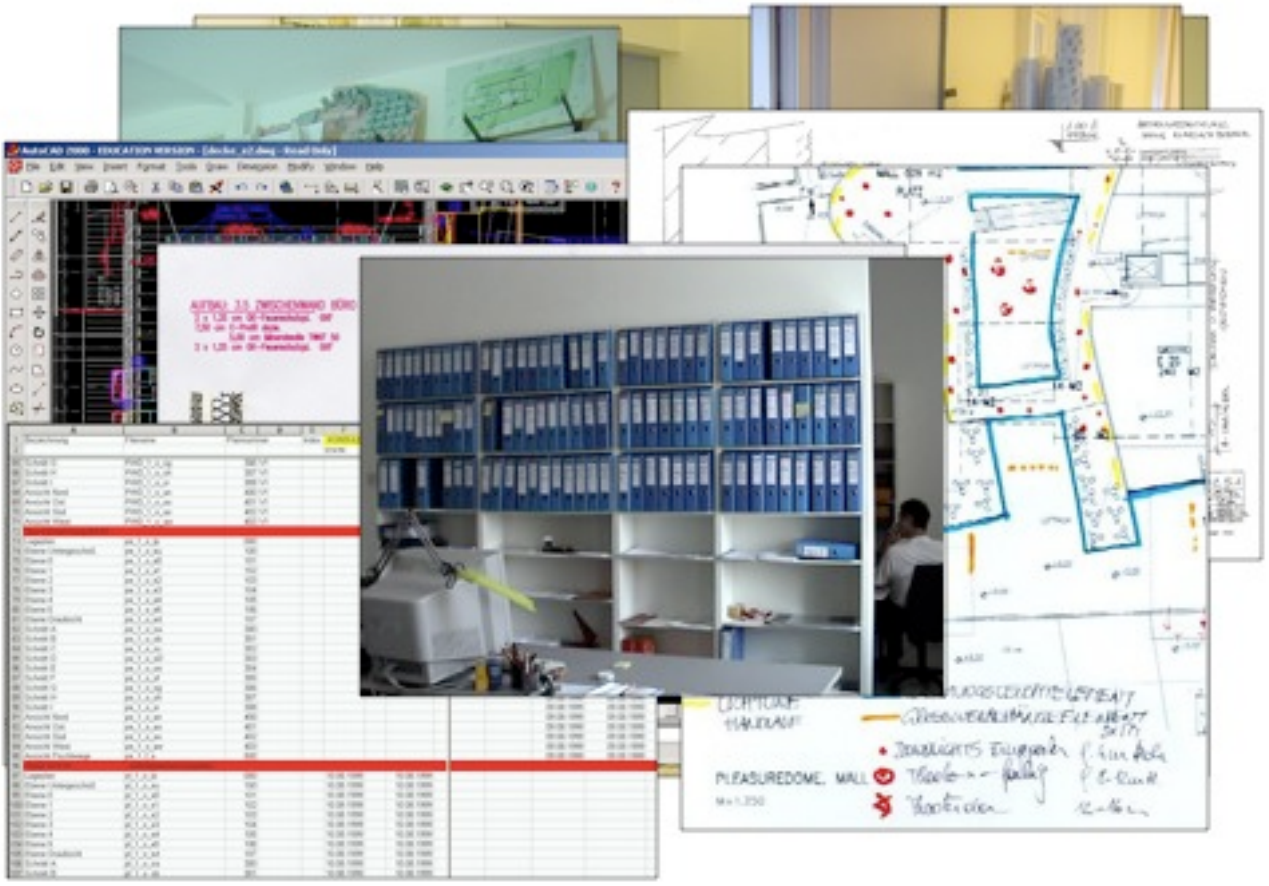
Architectural office: Practices of ordering



Architectural office: Practices of ordering

Architectural office: Practices of ordering

Architectural office: Practices of ordering



Multiple ordering principles

- Scheduling, synchronization; sequential order
- Accountability
- Identification (naming, ID coding)
- Validation (versioning, certification, priority)
- Standardization of outcome (templates)
- Standardization of format (notations, syntax)
- Conceptual order (classification)
- ...

Ordering system: A complex of coordinative artifacts and protocols

Practices of ordering

Plan ID:

PW – 1- M – E1 – M2 – 103 – V1

Plan layer codes

At-100 <text>: Completion <text> / widows, scale 100

Plan circulation list

Type of plan / file name {project / stage / level} / plan no.

List of detail drawings

K 8 11 <text>: Cinema / interior doors / wood / restrooms

Component catalogue

K-FD 01 <text>: Cinema / flat roof, to be walked on /

Correspondence archive ('binder system'):

role type /area of expertise /