## HCI Paper Specimen Answers

1. (a) **Performance** models deal with what the user (ideally) would do when using an interface. An example is Goals, Operators, Methods and Selection rules (GOMS) and its variants.

GOMS models user behaviour as a constrained sequence of a small set of processing operators. At suitable levels of analysis, e.g., Keystroke, these operators enable timing predictions to be made of ideal user task performance.

**Keystroke Level**

Goal: specify Command
- Goal: Type String
  - Home
  - Look at Keyboard
  - Look at Display
  - Type Characters

**Competence** models deal with the knowledge that the user ideally needs to use an interface. An example is the Task Action Grammar (TAG). TAG focuses on the structural organisation of the rules of dialogue expressions.

| **Command** | **Language** |
|---|---|
| move forward one character | ctrl-L |
| move back one character | meta-L |
| move forward one word | ctrl-E |
| move back one word | meta-E |
| move forward one screen | ctrl-C |
| move back one screen | meta-C |

**TAG Analysis:**

RULE SCHEMA

| | | |
|---|---|---|
| Task[Direction,Unit] | → | symbol[Direction] - letter[Unit] |
| symbol[Direction=forward] | → | "ctrl" |
| symbol[Direction=backward] | → | "meta" |
| letter[Unit=char] | → | "L" |
| letter[Unit=word] | → | "E" |
| letter[Unit=screen] | → | "C" |

[*8 marks* ]

(b) **Learnability** There is evidence that the *procedural complexity* of methods is correlated to the time to learn a particular interface in routine tasks. The length of a GOMS method provides a measure of procedural complexity.

TAG provides a measure of the cognitive complexity of a dialogue and an assessment of the impact of e.g. 'world knowledge'. These both have a bearing on learnability.

**Task conformance** The length of GOMS methods provides some measure of how well the input language matches the tasks the user has to carry out with the interface. TAG is not applicable to task conformance.

**Consistency and compatibility** GOMS is not applicable to these design principles. In TAG, the number of top level rule schema provides a comparative measure of consistency and 'name congruence' provides a measure of compatibility. [*9 marks* ]

(c) It is unlikely that user modelling will ever be a substitute for empirical evaluation of usability. The coverage of usability issues is too narrow. For example, people's subjective preferences for interfaces are not always in agreement with objective usability measures. Actual tasks may differ in significant ways from idealised versions represented in models. Usability issues may change over time as the user becomes more accustomed to using the system

To understand these issues, it is necessary to turn to the social sciences for suitable concepts and techniques. In particular, user-centred approaches and the participation of real users, rather than merely models of them. [*8 marks* ]

2. (a) i. Visual layout e.g:
    - Place recurrent items consistently
    - Make boundaries clear

    ii. Lexical input e.g.:
    - Avoid free-form input where possible
    - Allow users to edit entries

    iii. Responsiveness e.g.:
    - Feedback should be commensurate with action
    - Provide time affordances where time delays are unquantifiable [*6 marks* ]

   (b) See Figures. [*15 marks* ]

   (c) Two from e.g.:
    - Email participants the date, time, place of the meeting.
    - Confirm the room booking details.
    - Define the membership of named subsets of people for future use. [*4 marks* ]

3. (a) A good answer should mention:

- Paper retains advantages over digital media for some info retrieval tasks. Paper affords overview, browsing, portability; the physical desktop as an info and work management tool.
- Paper is a flexible instrument for information recording; digital media are often less flexible. Paper affords annotation, amednment, history; digital media tend to standardise recording work, eliminating important local work practices;
- Paper affords collaboration and coordination. Visibility and public character; the knowledgable participant can read off 'at a glance' who is doing what, work status; affords scrutiny and collaborative repair of mistakes; accumulating history of the work; flexibility of access.
- Case studies might include: air traffic control – paper strips as shared note pad, coordination device, informal collaboration for dependable work; medical record – awareness of patient status via the location of the record, annotations for flexible recording, amending etc. [*14 marks* ]

(b) Ethnography is concerned with the sociological study of commonplace, everyday activities and the ways in which people experience, make sense of, and create the social world in which they live and work. It was originally developed by anthropologists as way of gaining understanding of social mechanisms in primitive societies. Now ethnography is finding increasing application as a tool for understanding the social environments in which work is embedded and how these influence its performance.

Problems, one from:

- The outputs of ethnographic studies do not necessarily match the needs of systems designers. Typically, they are rich in detail, but lacking in formal content.
- Gaining access to the workplace for prolonged periods of time is often difficult. [*11 marks* ]