

APPENDIX D

Observation Schedule

System of Observation of Cognitive Processes (SOCOPSI)[#]

This system of classroom interaction observation has two dimensions viz., the Behaviour Dimension and the Process Dimension. A relevant instructional behaviour can be classified into one of the seven categories given in this system. Each behaviour exhibited by the Teacher or the Student has an underlying process. This process can be included in one among the nine categories given in the system. The categories in these two dimensions and their definitions are given below:

Categories and their definitions

I Behaviour: is meant to be an overt, observable, verbal or non verbal act on the part of the teacher or the student, classifiable into distinct categories. Here, only those behaviours having an underlying cognitive process dimension are considered.

1. **Exposition:** states, lectures, narrates, explains, describes, enumerates, etc.
2. **Questioning:** interrogates, calls for explanations; statements, justifications, etc.
3. **Directing:** instructs to carry out specific acts.
4. **Giving Feedback:** an act in response to and reinforcing another act.
5. **Guiding/Supervising/Listening/Watching:** All the above are passive behaviours. Guiding/supervising is when the actor passively oversees a certain activity done by another/others. Listening/watching is a passive activity of receiving.
6. **Performing/Observing:** both these are active behaviours. Performing means manipulating an object physically, e.g., writing. Observing means specifically looking for/at events or objects.
7. **Misellaneous:** any behaviour that has not been included in the above categories; but, relevant in understanding the mental processes of a behaviour.

II Process: is the cognitive activity underlying a behaviour. It is as the intentions behind manifesting a behaviour, and as such can be deduced from the

[#] Developed by Nelson et. al. (1961)

occurrence of the behaviour in a particular context.

1. **Giving information:** Retrieving facts or accepted data from one's repertoire of experience and presenting them. Reproducing facts, data from verbal or pictorial sources. Recognising an object or event based on one's repertoire of experience and presenting facts, data concerning them.
2. **Seeking/receiving/gathering information:** Active/passive reception of facts, data, etc. Seeking information means asking for information. Receiving information means a passive intake of information. Gathering information means collecting facts, data, etc., through observation, referring verbal or pictorial sources.
3. **Calling for hypotheses/Posing a problem:** Asking for identifying dependant and independant variables in a phenomenon and calling for possible causal relationships among them. Presenting incomplete information with a gap and asking for possible ways of bridging the gap. Presenting jumbled bits of information and asking for possible patterns of organising them.
4. **Giving hypotheses:** Identifying dependant and independant variables in a phenomenon and presenting possible relationships among them. Suggesting ways of bridging gaps among incomplete facts, data, etc. Suggesting alternative patterns of organising jumbled bits of information.
5. **Testing/Evaluating/Judging hypotheses/Working out the problem:** Deducing observable events from hypotheses. Planning/fabricating procedures of controlling relevant variables and observing. Making observations to verify hypotheses. Recalling and reconstructing past experiences to verify hypotheses. Trying out ways of bridging gaps among incomplete facts, data, etc. Trying out alternative patterns of organising jumbled bits of information.
6. **Accepting/rejecting Hypotheses:** Taking a hypothesis as confirmed, on the basis that testing procedures have been necessary and sufficient proof for its validity. Rejecting a hypothesis on the basis of insufficient proof.
7. **Challenging hypothesis/information:** Pointing out internal contradictions of a hypothesis. Pointing out factual errors. Pointing out contradictions in testing procedures. Pointing out insufficient basis of confirming a hypothesis.

8. Generalising/Delimiting hypothesis: Seeing a verified hypothesis in a wider context and determining the scope and extent of its applicability.
9. Summarising/Consolidating: Organising and taking stock of the various processes completed so far and draw relevant conclusions and ask further relevant questions. Highlighting the salient features of the various bits of information and organising them into a structure.

Recording a Classroom Instruction Using SOCOPSI

Recording using SOCOPSI is not done with a time interval. A teaching point or an 'instructional episode' is taken as the unit for coding and is coded within a square bracket. One 'instructional episode' comprises of several 'instructional events'. The teacher initiated events are recorded with the letter 'T' and student initiated events by 'S'. An event has two dimensions viz., the behavioural dimension and the process dimension. A recorder judges and then classifies the behaviour of the teacher or student into one of the seven categories. He records the number of the category next to the letter 'T' or 'S' as the case is. Based on the judged behaviour of the teacher or student initiated activity, the recorder infers the underlying process and identifies it among the nine process categories and records it. Therefore an instructional event is recorded with a letter and two numbers, the letter to represent the initiator and the numbers representing the two dimensions. A couple of illustrations are given below to illustrate the coding procedure. One, a teacher explaining/describing a teaching point is recorded as T₁₁. Two, a student asking a clarification on what the teacher spoke is recorded as S₂₁. Such a coding denotes an instructional event. An instructional event is differentiated from another with a (,) e.g., T₁₁, T₂₁. If two relevant instructional events take place simultaneously, then the recorder records it with an oblique sign e.g., T₂₃/T₆₃. Several such events put together forms an 'instructional episode'. And such an episode is bracketed using square brackets. There may be several such episodes in an instructional situation. Sometimes the entire duration of a class may have only one episode e.g. [T₁₁, T₁₁, T₁₉].

Patterns of Classroom Instruction

Pattern I: Narration Pattern

The teacher narrates an entire teaching point. He summarises and concludes the narration without attempting to make the students actively participate in the classroom instruction. The recordings may go like this: [T11, T11, T19]. Here, the whole content is treated at the information level.

Pattern II: Narration with aids Pattern

Here, the teacher covers an entire teaching point through his narration assisted by audio-visual aids including a demonstration. The recordings may go like this: [T11, T61, T11, T19]. The aids are used only to pass on an information i.e., no attempt is made to pose problems to the students.

Pattern III: Narration with recall questions

In this pattern of instruction the teacher covers a teaching point through his narration, but intermittently asks questions to seek information thereby evaluating the students' immediate learning. The recordings may go like this: [T11, T22, S11 ; T11, T22, S11, T41/T42, S11] etc. Here again the treatment of content is at the information level.

Pattern IV: Narration with aids and Recall questions

In this pattern the teacher covers a teaching point through his narration and with the help of aids and asking information level questions to seek clarifications from the students thereby evaluating the immediate learning. The recordings may go like this: [T11, T61, T22, S11, T41, T42, S11].

Pattern V: Process by-pass Pattern without aids.

Here, the teacher poses a problem calling for hypothetical solutions; the students give hypotheses; the teacher accepts it or rejects it; explains his reason for rejecting or accepting the hypothesis or hypotheses and concludes. The recordings may go like this: [T23, S14, T46, T11, T19]. The main difference in this pattern from the former four patterns is that the teacher calls for hypothesis from the student thereby 'kindling' their thought processes.

Pattern VI: Process by-pass Pattern with aids

Here, the teacher poses a problem, by recalling experiences, by the use of aids, calling for hypothetical solutions; the students give hypotheses; the teacher accepts or rejects it; explains the reason for accepting/rejecting the hypothesis or hypotheses and concludes. The recordings may go like this: [T63, S14, T46, T11, T19]. The main difference between Pattern V and this is that the teacher poses a problem with the use of aids or day to day experiences thereby attempting to 'kindle' the

thought process of students. Such a presentation of the problem may appeal as problems to the students rather than a prescriptive problem (as in the case of pattern V).

Pattern VII: Process Narration Pattern without aids

In this pattern the teacher, poses a problem calling for hypothetical solutions; then, gives possible alternate hypotheses; eliminates the unstable and internally contradictory ones, through logical arguments; tests the plausible hypotheses through arguments; accepts the validated solutions and fits into a large conceptual frame and concludes. A typical recording may go as follows: [T13, T23, T14, T15, T16, T17, T18, T19]. Here, the instructional episode is not at the information level but at the hypotheses testing level. This pattern does not attempt at ensuring the students' active participation.

Pattern VIII: Process Narration with Aids

In this pattern the teacher poses a problem with the help of aids or past/day to day experiences, calling for hypothetical solutions; then gives possible alternate solutions; eliminates the unstable and internally contradictory ones, through logical arguments; tests the plausible hypotheses with or without the help of aids; accepts the validated solutions and fits into a large conceptual frame and concludes. A typical recording may go as follows: [T62, T23, T14, T15, T16, T17, T18, T19]. Like Pattern VII the instructional episode is at the hypothesis testing level and not at the information level. This pattern is a shade better than pattern VII to the extent that the problem is likely to appear as a 'problem' to the students since the problem posing phase of the episode is augmented with real or simulated experiences. The lacuna in this model is that an active participation on the part of the learners is not ensured.

Pattern IX: Process of Inquiry Pattern

Here, a conceptual background is prepared by the teacher through discussion or through the provision of concrete experiences which culminates in the identification of the problem. The teacher consciously creates the background of the problem keeping in view the total curriculum frame and the concept to be highlighted and also the level of abstraction which the stage of cognitive development of the students' allows. Once the problem emerges from the students the teacher calls for hypothetical solutions or the students themselves come out with hypothetical solutions. Concomitantly the internally contradictory hypotheses are rejected by the students. Also, they reject the untestable hypotheses. The possible hypotheses are tested against actual observations or data based on earlier observations made by others. The tested hypotheses evoke further hunches

and the interaction proceeds in a cyclic manner; or it is integrated into the understanding of the phenomenon. A typical 'episode' may be recorded as follows: [T11, T22, S11, T23, S41, T27, T17, S27, S17, S16, S18, S19, T27, S16, S17, S18, T19].
