# The think-aloud protocol, adjunct or substitute for the nursing process

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We are presently undergoing a crucial period in the nursing profession and nursing education. Health care programs are overloaded, the role of the nurse has recently undergone important changes with the implementation of the directives of Bill 90 and the therapeutic nursing plan and in hospitals the time needed to formulate elaborate health care plans is getting rarer. Nevertheless, it is important that students learn to reflect on the situations that they will encounter, that they position themselves in relation to the actions to be taken, and that they plan and set priorities

How can we reconcile all of these requirements? The think-aloud protocol can help us by enabling students to present their rationale as they resolve a problem and to verify if they have understood the situation, thought of all the hypotheses in order to identify the principal difficulties, considered all the priorities of action and the necessary interventions. Verbalizing thinking can be an excellent adjunct to the writing process and in certain situations can even substitute for it.

## The think-aloud protocol

- **A teaching strategy used to foster the development of critical thinking.**
- **In the area of nursing care, it is particularly useful for building confidence during the early period of clinical reasoning.**
- **It can be used in real time or taped for later visioning (video, mp3, cassette).**
- **It enables one to emphasise areas of clinical reasoning which are not as well understood.**
- **A variation of the think-aloud protocol, can be used for learning the techniques of care.**

## The think-aloud protocol as a learning process

The think-aloud protocol is not a recent a strategy. It originates from the principles of task analysis posited by John B. Watson in the 20th century and developed later by Herbert Alexander Simon, a cognitivist who, about forty years ago, was interested in protocol analysis.[1] Protocol analysis includes a variety of techniques, including the think-aloud method, which serves to study the cognitive processes employed by a person while they are doing something. The use of this method is most often attributed to Ericsson and Simon and has since been used mainly for the analysis of the problem-solving process.[2, 3] The think-aloud method is very useful for practicing nursing procedures.

## The advantages of this teaching strategy

This strategy has undeniable educational advantages. It enables the student to develop expertise in clinical thinking by helping them to clarify their mental representation of the situation under consideration, an important element in learning. As Ericsson stated, expert performers have a more precise mental representation of the object of their study and can

better support their reasoning about a situation.[4] A clear mental image is the foundation of learning. It is already present in our intellectual structures; it is the terrain which nourishes our capacity to learn.

When we say a word, let's say, "house", our brain conjures up meanings, feelings, and images which have meaning for us and which call forth other connotations. That is how we learn, perceptions are created, evolved and structured, and they facilitate our comprehension of reality. And if the mental image is not clear, learning is fuzzy. Students taking care of a suffering patient already possess a certain mental image of what suffering is. Through learning, they can graft onto this basic concept a more precise image of what the individual is suffering, what causes their pain and what one must do to alleviate it.

**Mental representation**

• **A representation is a mental phenomenon corresponding to a more or less conscious, organised and coherent group of cognitive and affective elements in the domain of values concerning a particular object.**

• **It includes conceptual elements, attitudes, values, mental images, connotations, associations, etc.**

• **It is a symbolic universe, culturally determined, where spontaneous theories, opinions, prejudices, decisions to act, etc., are forged.[5]**

Another advantage of the think-aloud protocol is that it strengthens the attention capacity of students by focussing on the development of their mental processes. It also helps them to become aware of the relationships they establish between the elements observed and the subsequent stages of their reasoning. This verbal strategy can also, in certain situations, incite them to perfect their process of observation and data collection.

In nursing education, the think-aloud method is particularly useful for teaching the process of reasoning and the development of correct judgement. First of all, it enables students to become aware of the various mental processes that they use, and if needed, to improve on them. The possibility of teacher feedback is also interesting: teachers can check on the accuracy of the thinking process, can question students regarding their reasoning and can stimulate them to go further.

Another by no means insignificant advantage of the think-aloud method is that it stimulates the acceleration of the logical processes initiated by the student. With practice, students can not only attain greater accuracy and facility but can also resolve problems faster.

Moreover, it also contributes to the development of memory. The logical relationships which must be made during an exercise of the think-aloud protocol, between what one observes and the concepts learned, stimulate the capacity to remember and lead to the establishment of other relationships which proportionally increase mental representations. Students thus learn by speaking. Memory is also stimulated when the think-aloud protocol is carried out after the event.

Gérard Scallon confirms this in his writings on "thinking aloud" which he calls "verbalization". "We can ask individuals to articulate their reasoning as they solve a problem. The verbalization can take place during the resolution process or after the problem is resolved.

[. . . ] When the verbalization takes place during the execution of the task, it can increase the amount learned. When the verbalization takes place afterwards, memory is solicited."[6]

The think-aloud protocol also has the advantage of teaching the student to tighten up their mode of intellectual functioning, and to synthesize their thinking in order to make it more efficient. Making it a habit to state their method of data collection as well as the subsequent phases of the procedure increases their accuracy and conciseness. They can move more easily from one stage to another thus developing their capacity to focus on what is important.

> **The advantages of reasoning out loud**
> • **The reinforcement and clarification of mental representations.**
> • **The strengthening of attention capacity.**
> • **Training in the clinical procedures.**
> • **The possibility of metacognition, self-evaluation and self-correction.**
> • **The possibility of teacher feedback.**
> • **The stimulation of the clinical procedure and an increase in the speed of its elaboration.**
> • **The stimulation of memory.**

Via its capacity for increasing consciousness of self and self-correction, the think-aloud protocol favours metacognition and self-criticism, two characteristics useful for the evolution of the human being and especially necessary in nursing. Finally, it is a strategy which costs little, is reproducible at will and can be used in theoretical, clinical, or laboratory courses.

**Various methods of use**

The strategy of using the think-aloud protocol can take many forms. It can be done in the presence of the teacher, while answering in class or in the clinic or even at a later time. When the experience takes place in real time, the teacher can question the student and even orient them if need be. If the interaction is taped (video, mp3, cassette), the teacher can study it later and make comments, which can then be transmitted to the student orally, in writing or by electronic means.

The teacher can also use the think-aloud method to favour the learning of techniques. In this special case, the student enacts the procedure, naming what they are using while explaining what they are doing and why. This can be done in the presence of the teacher or the laboratory technician. Videotaped, it can help the student to see and correct themselves by comparing what they have said with the reference book or their course notes. The taped sequence can also be submitted to the teacher for correction which will enable the teacher to point out deficiencies or highlight accomplishments.

It is also possible for the teacher to propose given situations to their students and ask them at random to state their rationale for resolving the problem. But the student can also use the think-aloud protocol with a more advanced student[7] or simply take turns with a colleague at the same level. Recourse to small groups composed of a few students, where each one takes turns emitting their clinical reasoning in front of their colleagues, is also a possibility. The use of a reference scheme or a scale of analysis will facilitate the task and enable a paper trail of the observed performance, if required. An evaluation scheme which can be ticked off as they go along will at the same time facilitate the work of the teacher.

**Other uses**

The think-aloud and reason-aloud method are also very useful strategies for examining the use of computer technologies by the students,[8] since computers are becoming more and more necessary in nursing care. Moreover, it can also be used as an evaluation method and to prepare the students for the OSCE. This important exam must be prepared for a long time in advance in order for the students to acquire the confidence they need. The think-aloud method is an excellent barometer of the comprehension of the students and the teacher's performance as to their teaching approach.

> • **A serious student can very well assist a colleague in their learning. They have more or less the same age and thus speak the same language, share the same experiences and can understand each others difficulties. There is no hierarchy between them and those being helped see themselves in their mentor.**

**The clinical approach, written or verbal, what should one think?**

Let us say right away that we cannot claim that the think-aloud protocol can completely replace written work in the training of a nurse. Written work will probably always be of value in learning. But faced with the difficulty of finding the time to do it and above all in the face of the necessity for the working nurse to conserve and even reinforce her habit of clinical reasoning, this oral strategy is of great interest.

Besides, in order to be able to write an evaluation in the Therapeutic nursing plan (TNP), the nurse must have previously followed a logical sequence of data collection and clinical deduction. Observation in itself is not a structured process and the possibilities for error are numerous. Students must learn to target their observations and focus on what is important. The verbal exercise enables them to become better aware of what they observe as well as facilitating the supervisory task of the teacher.

The same applies to the treatment plan for wounds and ulcers as well as to the instructions to be transmitted to the other members of the care team. In this case, it regards the learning of a more general process of problem solving, since it involves making recommendations. The increased responsibility of the nurse in the team also supposes better worked out and better stated clinical reasoning. It thus turns out that this thinking strategy expressed verbally is an interesting means to support learning and make it last, as well as to evaluate it.

**A strategy of choice in order to develop critical thinking**

Caring is a process of problem solving applied to nursing and is based on a sequence of collecting and treating information. It requires the development of critical thinking that is, the capacity of sound thinking.[9] It is an important part of the education of nurses. To ensure that students perform well, it is not only a question of transmitting knowledge and inculcating a

few principles of asepsis and care, teachers must also be concerned with developing the students' capacity to reason and help them to develop the intellectual mechanisms involved.

Moreover, the nursing program is based on competencies which require getting students to develop their capacity to act. Now, serious action cannot exist unless it is based on a logical process. Thus, in a care-giving situation, the exercise of reasoning aloud, encompassing all that it does of inductive and deductive processes which orient action, is a choice strategy for learning.

## Various modes

In order to learn care procedures, reasoning aloud can be used in several ways that is, starting from appropriate situations it is possible to focus on certain portions of the process. For

> **Logic precedes all experience. It precedes the HOW and not the WHAT**. *Ludwig Wittgenstein*

example, it is possible to put the accent on data collection so as to lead the student to consider the situation in all its diverse dimensions. The teacher can also target clinical judgment, the priorities to be established and their rationale, or the interventions to be set out at the beginning of the care procedures.

## Effective application

In order to systematize the application of a strategy of reasoning aloud and to make it more effective, the presentation of simulated situations or direct intervention during care, are possible methods. Moreover, teacher preparation will vary depending on whether the method is used in a supervised manner or as self-learning. In the first case, the teacher can prepare a list of questions to ask the student in order to focus on the mode of functioning or to lead them to a better appreciation of the quality of their utterances. It is pertinent to ask certain questions such as: what do you think of upon seeing this person or on becoming aware of this situation? What is your reasoning behind collecting these data rather than others? Have you really taken into account the entire problem? Are there other aspects of the situation that you have omitted to consider? What are they? What is the relationship between these observations and what the person is experiencing? What can you deduct from this? What hypotheses can you postulate? Which one of these hypotheses appears to be the most important? What evaluation will you transcribe in the therapeutic nursing plan? Towards what conclusion or what clinical judgement do the collected data lead? What actions or interventions will be required in this case? Why did you choose these interventions? Do these actions suit the problem? Are they susceptible of correcting the problem or increasing the well-being of the person? What preventive measures should you consider? Are there certain precautions which must be taken for the care of this person? What will be your nursing instructions? How will you apportion these interventions among the various work plans of the other members of the team?

## Difficulties to be anticipated

Putting in place a strategy of reasoning aloud is simple but nevertheless several difficulties are foreseeable. Let us first of all mention that since time is of the essence in nursing, this method requires rigorous planning particularly if the teacher chooses to put it in place in real time.

To listen to the clinical reasoning of each of the students from real cases or simulations can be difficult to do when time is limited, for there are multiple points to be put forward. One must be efficient. In order to develop a functional method, it is for example possible to divide the class and to propose other activities to part of the group during the practice of reasoning aloud with the others and to alternate groups.

Another possible problem with the practice of this strategy is the difficulty that certain students have in organizing their thinking. Critical thinking and developing a logical sequence of ideas is not given to everyone and some students have problems articulating what they think in a clinical situation. But with time and practice, they will succeed in better evaluating the situation and in understanding more clearly the relationships which exist between the elements of the observations, the coherent conclusions which lead to well targeted clinical judgements and the communication of adequate nursing interventions.

**Difficulties to be anticipated**

- **The difficulties of organizing the experience:**
  - **Place in the time-table;**
  - **Preparation of the list of questions;**
  - **Forming the groups;**
  - **Preparing the partners;**
  - **Setting up a recording system;**
  - **Correcting the student's progress;**
- **Lack of time.**
- **Problems of verbal expression.**
- **Difficulties and slowness in organizing logical thinking.**
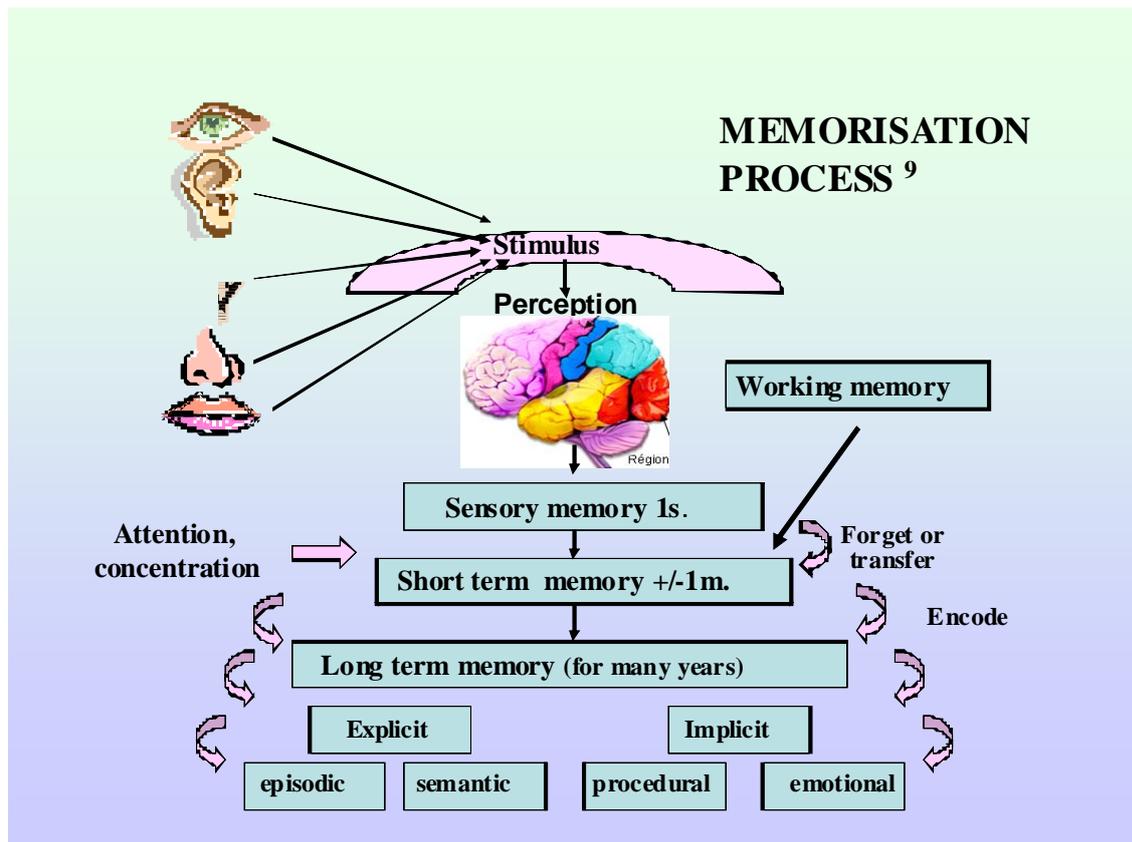- **Memory difficulties (working memory).**

Verbal expression is also, for some, a major difficulty. Some students have a limited professional vocabulary or they are too shy to express themselves in front of the teacher or other people. Lack of habit, natural timidity, and the fear of making mistakes can make some students nervous and lessen their performance. However, practice makes perfect.

Among the difficulties to be anticipated, one must not forget the blanks of the working memory. Articulating what one is thinking of when following a logical process constantly calls for this type of memory, that is, the student must constantly seek out the facts in the part of the short term memory that is called the working memory. This "*constitutes a category of memory corresponding to the capacity of keeping information in the forefront for a period of a few seconds to several minutes beyond the present moment"*.[10] It corresponds to "*the function of treating information within the short term memory and enables the connection with long term memory. The execution of information requiring attention summons the working memory which has the capacity to select, maintain and treat information while the subject does other cognitive tasks such as understanding, learning, reasoning and resolving problems*".[11]

Thus, certain students who present memory difficulties are disadvantaged with respect to others who perform better in this area. But here again, practice makes perfect.

**MEMORISATION PROCESS** [9]

Stimulus
Perception
Working memory
Attention, concentration
Sensory memory 1s.
Short term memory +/-1m.
Forget or transfer
Encode
Long term memory (for many years)
Explicit
Implicit
episodic
semantic
procedural
emotional

## Conclusion

Whatever the context, clinical reasoning remains essential and nurses must make a habit of doing it rapidly and efficiently in order to base their actions.  The actions posed are of the highest importance, the health and even the life of patients depends on it.  Thus, in education, despite all the pretexts of a lack of time or an overloaded program, and in health care establishments despite all the excuses claiming work overload and a lack of personnel, the logical process of the problems solving or clinical procedures remains vital.  It is thus of the utmost importance to find a means of attaining it during student training.  The think-aloud protocol is one of them and is far from being negligible.  "*Man is a thinking animal*" said Aristotle and the nurse is no exception.  The practice of thinking is carried out via the clinical process and becomes routine with repetition.

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