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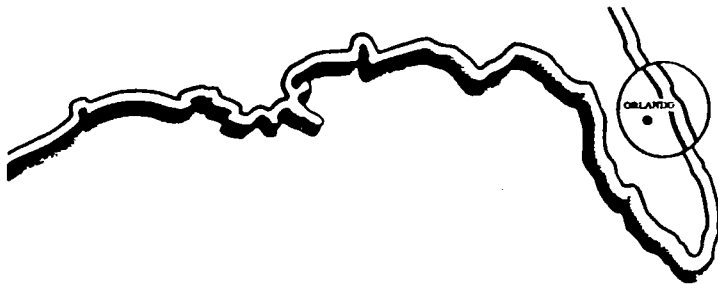
A COMPUTERIZED OPEN LEARNING ENVIRONMENT TO STUDY
INTRAPERSONAL VARIATIONS IN LEARNING STYLES : DELIN

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A. CONTEXT

Several studies have been devoted to interpersonal differences in so-called "cognitive styles" (Kagan & Kogan, 1970; Witkin & Goodenough, 1977; Pask, 1976, etc.). Pask himself has emphasised the notion of versatility, i.e. the individual's capacity to switch from a strategy to another, according to changes in conditions, constraints, etc.

In order to respect both the interpersonal and intrapersonal variations in learning strategies, we have developed a software of the hypermedia type called DELIN (from the French word DELINEARISE, that means non-linear).



**The Sixth
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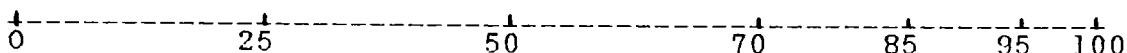
Orlando, Florida March 21-23, 1989

**Education in the 90's:
Challenges of the New Information Technologies**

vol 2 : pp 268-272

7. A questionning facility:

In question screens, MCQ are presented. The learner is invited to answer by pointing one of the suggested solutions. In addition, he (she) is requested to provide a confidence degree indicating how sure he (she) is about his (her) answer. The expression of this certainty (or doubt) is made by clicking one of the six areas defined on the probability scale as follow (Leclercq, 1983):



After that, the correct answer is displayed.

8. A note taking facility (in lines 19 to 22).

9. A direct branching facility : the learner may CALL a given screen by typing its name. A (paper) code book is provided with the names of all the screens.

10. Editing facilities for the author.

C. INDICES

The following indices are proportions (percentages) of the student's reactions:

L index : % of choices NEXT and BACK, i.e. of linear strategies.

Q. Index : % of requests for being questioned.

S index : % of requests for synthesis.

T index : % of pointing words in the text or (invisible) boxes in the screen.

M index : % of requests for more information.

V index : % of requests for video sequence (only in some coursewares).

D. EXPERIMENT

Two coursewares have been prepared by Pierret (1988). The first one presents Gagne's "conditions of learning" (1965), i.e. his Taxonomy of 8 categories of learning. This courseware (called TAXGAG) does not offer video sequences.

The second courseware (called TCHERNO) deals with the TCHERNOBYL accident, and a video sequence is available.

Two groups of students have been constituted: 8 students in education (university level) and 8 students of other specialities.

Two kinds of instructions have been used according to the purpose, the goal of the exercise.

In condition 1, learners were told that they will have to produce their own summary of what they have learned.

In condition 2, they were told that they will be invited to answer a series of MCQs about the content learned (assessment of knowledge condition). Additionally, some students were offered the possibility to "take notes" (by type writing).

B. DESCRIPTION

This software offers the following facilities:

1. Management of data base files containing the stacks of "screens" (that can be combinations of texts, graphics and scanned pictures).
2. A branching table indicating the next screen the program must display according to the learner's reaction to the current screen.
3. A screen" structure pattern:
Lines 1 to 18: the screen main content
Lines 19 to 22: an empty area where the learner can write personal notes that will be given back to him/her at the end of the interaction.
Lines 23- to 24: Permanent menu buttons (described hereafter, lighted in red when available for the particular screen.
The 8 right down characters of the screen display its name.
4. Permanent menus enable to:
 - (go to) NEXT screen
 - go BACK to previous screen
 - get more DETAILED information
 - be QUESTIONed (MCQ) to check comprehension
 - receive a SYNTHESIS of the content
 - receive a GRAPHIC or schematic representation of the content
 - receive an ICONIC or VIDEO presentation about the current content
 - CALL a given screen (designated by typing its reference name).
5. A text-pointing facility:
 - Each text introduced can be "boxed", i.e. each word is considered by the program as being in an invisible box. Each box can be made "sensitive or not" by the conceptor. When the user will click on a given (invisible) box, the program will react as the conceptor has decided (branching to a given screen).
 - The same facility is offered for graphic data, except that the "boxing" process is not automatic: the conceptor has to define the position and the size of each box.
6. A tracing facility:
 - Each student's response is recorded in an appropriate file. For instance, each click in the screen, even when it is on a non-sensitive area (that produces no apparent reaction from the system).

Experimental design has been conceived so that each student has received the two coursewares and has been assigned each of the two conditions.

E. RESULTS

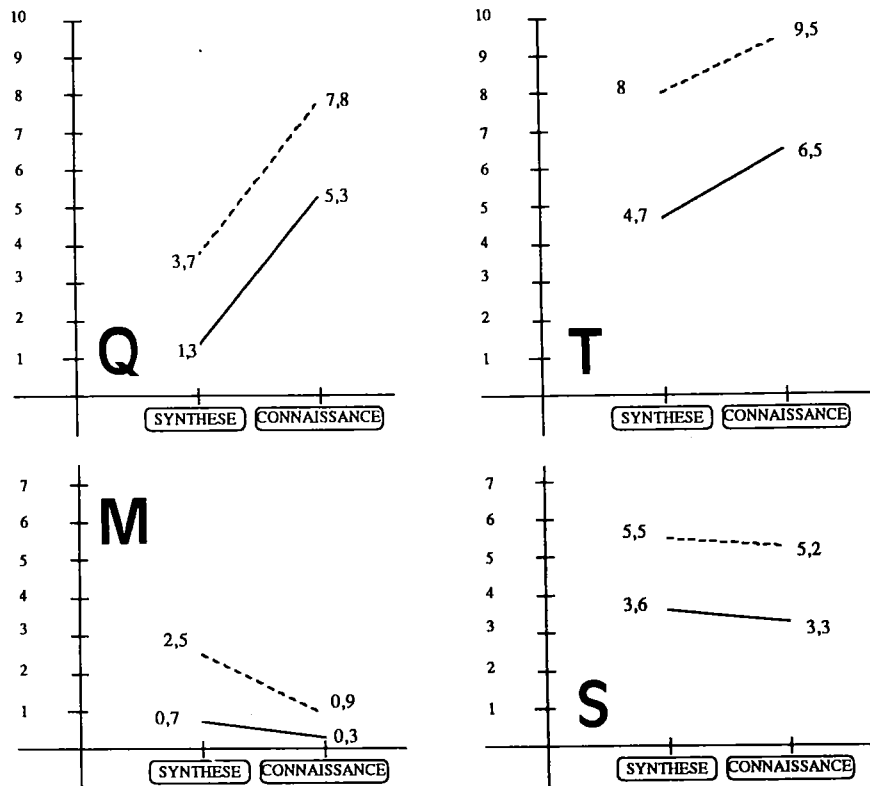
1. The L index has the highest value of all indices, for the two coursewares. This can be explained by several reasons: 1) the lack of attractiveness (and explicitness) of the accompanying (paper) booklet containing the screens' names; 2) the lack of display showing the itinerary already achieved; 3) a students' tendency to adopt a linear strategy.

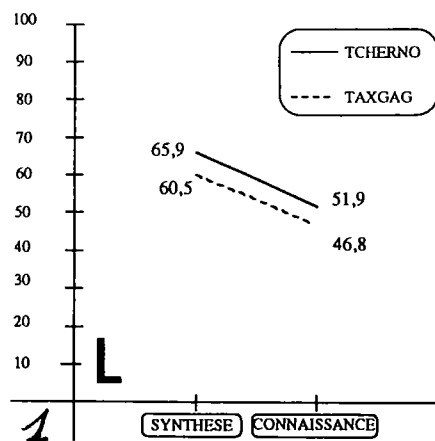
Figure 1 shows that TAXGAG has a lower L index than TCHERNO. This can be explained by the greater difficulty (expressed by the students during the interview) of TAXGAG, and, maybe, the tendency to ask DELIN for details (examples), synthesis, questions,... The same figure shows that the "assessment of knowledge" condition is linked to a lesser use of linear strategies (that means a greater use of NON LINEAR ones).

Figures show that the T and Q indices are greater for the TAXGAG courseware and for the "assessment of knowledge" conditions.

The S and the M indices, show only differences between the 2 softwares, but not between the two conditions.

There is no interaction for these indices.





E. CONCLUSIONS

Only a part of the experiment has been reported here. The number of subjects involved is not great enough to enable us to reach statistically significant conclusions. Although they are only indicative, the results obtained support the hypotheses of intra personal variations in strategies due to external conditions. This is to be interpreted in terms of intraindividual flexibility. More evidence should have to be collected from additional experiments involving more learners and more variations in conditions, and conceived so that intrapersonal variations can be studied in the same time as interpersonal ones.

References

- Gagne R. (1965), Conditions of learning. New York: Rinehart and Winston.
- Kagan J. and Kogan N. (1970), Individual variation in cognitive process, in Mussen P. "Carmichael's manual of child psychology".
- Leclercq D. (1983), Confidence marking, its use in testing. Oxford: Pergamon Press.
- Pierret D. (1988), Didacticiels à la carte, mémoire de licence en sciences de l'éducation, Université de Liège.
- Witkin M. and Goodenough D. (1977), Field dependance and interpersonal behavior, Psychological Bulletin.
- Witkin M. and Goodenough D. (1981) Cognitive styles : essence and origins, International University Press.