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ABSTRACT

An instrument has been designed and used to quantify the degree of student dissatisfaction with computer-assisted instruction (CAI) experiences. The instrument, entitled PERPI-LPI, was derived from the service test Perceptions Etudiantes de la Relation Professeur-Etudiants (Student Observations on the Teacher-Student Relationship). It measures the observed experiences and the desired experiences of students on 61 dimensions of teacher-student relationships, using a five-point scale. The difference between observed and desired responses provides an indication of student dissatisfaction. The test was administered to 35 secondary students who had taken a CAI course in data processing. Results indicated that student-machine interaction needed to be made more rapid and flexible and that machine failure could be reduced. In addition, it was found that the measuring scales needed improvement and that test modules should be constructed so that it would be possible to adapt situation specific instruments to appropriate contexts. (PB)

35 SECONDARY V STUDENTS COMMENT ON THEIR EXPERIENCE WITH C.A.I.

(Preliminary report)

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A. WORK TOOLS

In view of a constant revision and renewal of courses, it is important to know the degree of the students dissatisfaction with regard to a given situation as experienced by them. The consequent improvement of this situation could bring about increased motivation for learning and hence a better learning experience.

I- THE "PERPE-LPI" TEST:

For these reasons, it seemed desirable to adapt the "PERPE"* service test to our particular needs.

This test measures (on a five point scale and with sixty-one dimensions of teacher-student relations) on the one hand, the observed experience (question A) and, on the other, what is desired (question B).

For each dimension, the difference between the answers to questions A and B indicates a certain dissatisfaction on the part of the student.**

In collaboration with the "PERPE" service, we devised, over the summer of 1971, the "PERPE-LPI" test with about thirty dimensions taken directly from or adapted from the "PERPE général" test and about thirty others created especially in view of a controlled C.A.I. Laboratory experiment.***

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* Perceptions Etudiantes de la Relation Professeur-Etudiants (Student Observations on the Teacher-Student Relationship)

** cf. "PERPE" documents.

*** Réflexions sur l'écriture du test PERPE-LPI, SENTENI, Alain (internal report).

II THE EXPERIMENT:

Thirty-five* secondary V students attended an introductory course in data processing for an average of fifteen hours at the terminal, one hour of which was sonorized (laboratory sessions were two hours long).

At the end of the experiment, the students took the "PERPE-LPI" test and their answers were processed by the "PERPE" service whose programs were already in use.

The results were transmitted to us in the beginning of February 1972 and a rapid analysis already allows us to predict certain tendencies.

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* The "PERPE" service considered this number sufficient to indicate tendencies in a preliminary study.

B. TENDENCIES ACCORDING TO A RAPID ANALYSIS OF THE FIRST RESULTS OBTAINED FROM THE "PERPE-LPI" TEST

According to "PERPE", the following results are furnished for each dimension:

- MA: Average of the answers to question A
- MB: Average of the answers to question B
- MAB: Average of the absolute differences between A and B.
- MAL: Average of the algebraic differences between A and B.

I GREAT DISSATISFACTION:

1- What are the dimensions for which the greatest dissatisfaction was indicated?

On the suggestion of the "PERPE" "Guide d'analyse du dossier personnel", we have chozen from the sixty-one dimensions those which had the highest percentage of dissatisfaction (table 1).

Let us consider next the ten dimensions whose brute rate of dissatisfaction (MAB) is highest (table 2), then those ten whose net rate of dissatisfaction (MAL) is highest (table 3).

Through an analysis of these three tables (1, 2 and 3), we isolate the common dimensions which yield the table of greatest dissatisfaction (table 4).

TABLEAU 1

DIMENSION NUMERO	TITRES	%
30	Attentes dues au système	99
21	Boucles	89
15	Analyse des réponses	89
14	Questions ouvertes	83
09	Informations complémentaires	83
29	Erreurs de contenu	83
19	Questions suscitées	80
31	Fréquence des pannes	80
36	Fréquence d'utilisation des magnétophones	80
50	Capte l'attention/présentation	80
51	Capte l'attention/contenu	80

TABLEAU 2

DIMENSION NUMERO	TITRES	MAB
30	Attentes dues au système	1.40
15	Analyse des réponses	2.09
21	Boucles	2.03
09	Informations complémentaires	1.69
36	Fréquence d'utilisation des magnétophones	1.57
29	Erreurs de contenu	1.49
31	Fréquence des pannes	1.49
06	Structure rigoureuse	1.49
14	Questions ouvertes	1.40
07	Informations sur la structure	1.37

TABLEAU 3

DIMENSION NUMERO	TITRES	MAL
30	Attentes dues au système	-2.34
15	Analyse des réponses	-2.03
21	Boucles	-2.03
09	Informations complémentaires	-1.69
29	Erreurs de contenu	-1.43
36	Fréquence d'utilisation des magnétophones	-1.40
06	Structure rigoureuse	-1.37
31	Fréquence des formes	-1.37
20	Réponse aux questions de l'étudiant	-1.34
50	Capte l'attention/présentation	-1.31

(LE SIGNE "-" INDIQUE QUE, LE PLUS SOUVENT, B ETAIT PLUS GRAND QUE A)

TABLEAU 4

DIMENSION NUMERO	TITRES	MA	MB	%	MAB	MAL
30	Attentes dues au système	1.97	4.31	99	2.40	-2.34
15	Analyse des réponses	2.14	4.17	89	2.09	-2.03
21	Boucles	2.37	4.40	89	2.03	-2.03
09	Informations complémentaires	2.54	4.23	83	1.69	-1.69
29	Erreurs de contenu	3.00	4.43	83	1.49	-1.43
31	Fréquence des pannes	3.11	4.49	80	1.49	-1.37
36	Fréquence d'utilisation des magnétophones	1.89	3.29	80	1.57	-1.40

PLUS FORTE INSATISFACTION

2- Explanation of table 4:

Dimension number 30 attempts to evaluate the length of delays due to the system, the length of time required for an answer, the duration of intervals between the students' action and the machines' reaction. The students estimated them often to very often lengthy (1.97) and would have wished them rarely to very rarely long (4.31).

Dimensions number 15 and 21 measure two aspects of the analysis of answers: one (15) measures the quality of the analysis, the other (21) the machine procedure following this analysis. The students wished that the analysis would change from an often rough one (2.14) to one seldom rough (4.17) and that the frequent loops (2.37) become very rare (4.40).

In dimension 09, the students indicated that they would like to have increased possibilities (from 2.54 to 4.23) of obtaining information from machine (either by asking supplementary questions or by feedback).

Dimension number 29 evaluated the frequency of errors encountered in the course material. Having rated them as occasional (3.00), the students would have wished them rare to very rare (4.43).

Machine failure, rated occasional (3.11), should ideally be rare or very rare (4.49).

Finally, the use of audio messages should be increased from rare (1.89) to occasional (3.29). This result confirms the "Remarks on Students' Attitudes toward the Sonorized Part of the Introductory Course in Data Processing"*.

* See the internal report by Lise and Robert Patenaude (June 1971) "Les observations sur l'attitude des étudiants face à la partie sonorisée du cours d'initiation à l'informatique". Also, read "Audio-visuel et Cours automatisé" by Michel Thibaudeau (July 1971).

TABLEAU 5

DIMENSION NUMERO	TITRES	MA	MB	%	MAB	MAL
34	Fréquence d'utilisation des écrans cathodiques	4.71	4.63	29	.31	.09
54	Compétence du tuteur pour les questions techniques	4.03	4.34	31	.43	-.31
25	Utilisation du clavier	4.26	4.40	31	.37	-.14
53	Tâche du tuteur	3.26	3.49	34	.46	-.23
56	Disponibilité du tuteur	4.23	4.69	34	.46	-.46
60	Initiative du tuteur	3.57	3.97	37	.63	-.40
26	Bruit ambiant	4.03	4.51	43	.60	-.49
05	Structuration	3.37	3.83	43	.57	-.46

PLUS FAIBLE INSATISFACTION

II SLIGHT DISSATISFACTION:

1- What dimensions evoke the least dissatisfaction?

Having eliminated the dimensions which give rise to a wide divergence of opinion, we singled out those which had the smallest percentage of dissatisfaction. The same analysis was carried out with MAB and MAL which finally produced the table of least dissatisfaction (table 5).

2- Explanation of table 5:

Two interesting points: the mastery of the keyboard (dimension number 25) was judged easy, and the use of the cathode ray screen (dimension number 34) rated as very frequent did not cause dissatisfaction.

Dimensions number 53, 54, 56 and 60 evaluate the tutor in several aspects, and the students indicated their satisfaction with his technical competence, the importance of his role (moderate), and his availability (very frequently available); finally, they found it satisfactory that their tutor come to see them occasionally.

Although the students were satisfied concerning external noises (dimension number 26), judged rarely loud, it should be noted that the experiment was conducted in the evening when the laboratory was not being used by other persons.

The content of the course was judged moderately structured (3.37), but the students seem to have been satisfied by this structure (3.83).

TABLEAU 6

DIMENSION NUMERO	TITRES	%	MAL
13	Fréquence des questions fermées	97	0.03
18	Mémorisation	96	-0.03
19	Questions suscitées	95	0.06
11	Difficulté des exercices	85	-0.09
35	Fréquence d'utilisation des documents écrits	85	0.11
02	Contenu substantiel	79	-0.17

PLUS FORTE CONTRADICTION

One of the consequences of such contradictions is that they produce an abnormally small MAL; for that reason, they were omitted in the study of minimal dissatisfaction.

III CONCLUSION AND WARNING:

It seems then that a definite effort should be made to improve the interaction between the students and the machine, that is, to make the system which analyses the students' actions (students' questions, students' answers) both as flexible and as rapid as possible. It would also be desirable to improve machine maintainance so as to reduce the number of system failure.

The results of this study are only indications of the direction that further efforts should take; these efforts might include changes in courseware, software and hardware.

As for the measuring mechanism ("PERPE-LPI"), the scales for certain dimensions should be shifted either to the left or to the right; in certain cases the hypothesis of equal spacing of points on the scale should be tested. For example: should the same distance exist between "occasional" and "rare" as between "rare" and "very rare"?

C. CONCLUSION AND POSSIBLE DEVELOPMENT:

A more detailed analysis of the 61 dimensions of "PERPE-LPI" and comparison with future experiments could help us to improve different CAI procedures, either by improving the courses which are used in the experiments, or by improving the measuring mechanism, itself. The contributing factors in CAI being so complex (terminals, supplementary material, pedagogical strategies, the context in which it is applied), it is difficult to devise a single instrument capable of measuring all of them. This evokes the concept of a dynamic test which could adapt to different situations. A possible solution would be a "modular test" in which each "module" would measure a specific aspect of CAI*. A regrouping of several "modules" would thus permit an evaluation of a situation experienced under given controlled conditions. These different modules could be made available by computer to a greater number of teachers reaching a greater number of students.

A "PERPE" test has actually been devised to study the attitudes of students with regard to a CMI study being conducted at the Laboratory.

* A module would be, for example, a significant grouping of five or six dimensions.