INTERACTIVE MULTIMEDIA PROGRAMMED BIOGRAPHIES (IMPB):
A NEW METHOD FOR CLINICAL TRAINING

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## Abstract

*Clinicians in psychiatry, criminology, psychology and education are trained by various methods. One way consists in watching videos of persons demonstrating mental disorders or conflictual social relations such as class disruption. An other way is commenting fiction films such as « Rain man » (Autism), « The eighth day » (Trisomia – Dow syndrome), etc. The aim of those approaches is to provide experiential learning, i.e. multimedia, striking the learners' episodic memory with affective components as well as cognitive ones.*

*A new alternative method is inspired by the principle of « programmed biographies" created by DAILEY (1965) and refined by DE WAELE (1975) and VAN DEN BRANDE (1994). It consists in reconstituting a person's life (for example, a criminal, a drug-addicted person, a neurotic patient, a teacher in relational difficulties with students). Then this life (or a portion of it) is splitted into episodes, each of them being presented to learners in a Multiple Choice format, one of the answers being the (historically) correct one. The learner has to guess at each episode, what the biography actually did. Those "programmed cases" have been constructed and used in paper format, in computer interactive format, in a collective interactive format (with the FORUM software) and, as such, have been used in an electronic theatre. One of those cases has been filmed and has been put on CD Rom so that it can be used with the FORUM software. Experimental results are encouraging.*

## 1. Six learning/teaching paradigms

The method and the experimental setting that will be described hereafter are to be considered in a theoretical framework developed by DENIS & LECLERCQ (1995). In this model, there is an infinite number of training strategies that are original combinations of only 6 learning/teaching paradigms. Each paradigm can be encapsulated in a couple of words, the first one coining the learner's activity and the second one representing the trainer's (or animator's or teacher's) one.

- Paradigm 1 : Imitation/Modelling

This paradigm involves the *internalisation of stimuli* such as sound sequences (words, music, noises, songs, ...), iconic structures (photographic or pictorial images, movie sequences, ...), behavioural events (dancing, walking, eating, etc. ...), emotions. Learners internalise sensorial stimuli, and animators provide those stimuli. From the most ancient ages, human beings have learned by imitation. For instance the hero of the movie « La guerre du feu » (« Fire quest ») observes an other human being « making » fire out of « nothingness». Nevertheless, communication tools, from cavern wall painting up to current New Information Technologies, contribute to make an eternal learning process (imitation) more and more efficient. For instance, video recorders enable us to imitate dead persons' behaviour, internet and satellite enable us to imitate a remote person's behaviour; distributed TV sets and cable TV enable numerous learners to imitate a unique model in the same time, etc.

- Paradigm 2 : Message Reception and Transmission

This paradigm involves the use of a language, either verbal or not, where an expert, i.e. a person who knows, « explains » to the novice how to make thinks (comments a model), what to observe, why things are the way they are, what efficient responses to problems are, etc.
For instance, in the movie « Le Bossu », the character Lagardere is not able to understand « La botte de Nevers » (i.e. a specially efficient and murderous « passage of arms» in sword combat) by observation only, whereas he has repeatedly witnessed the Duke of Nevers performing this movement under his eyes. The Duke has to explain (transmit) him the whats, the hows and the whys.

- Paradigm 3 : Practice and Guidance

By « practice », we mean the-learner-exercising-himself and by « Guidance », the trainer's coaching performance, i.e. indicating to the learner the optimal succession of steps (progression), the correctness of each learner's behaviour, etc. Words like *exercising* or *training* are ambiguous since they do not indicate who is the subject of these verbs : a trainee can *train* (oneself) and a coach can *train* (someone else). Of course, the learner's own action is a necessary condition for this kind of learning to take place. May be the person who described the best known sequence in Practice and Guidance (usually called « supported drill and practice ») is Georges Bernard SHAW in his Pygmalion script, adapted as « My fair lady » where Miss Elisa Dolittle repeats orally « correct english » dictated by a phonograph under Professor HIGGINS' corrections.

- Paradigm 4 : Exploration and Data provision (Answering)

This paradigm is the reverse of the first one, i.e. exposition to message, but here, the trainer (or teacher) has to create the conditions for the learner to take the initiative. The learner is the one who asks for, who formulates the questions, who browses into internet, into books, or into databanks. To be able to play this part of the game, the trainer has to take in charge the answer part, either because he knows it, or because he has facilitated the access, by the learner, of a data bank that contains the answers. At the end of the XVIIth century, a well known scientist, AMPERE, was able by explorating the recent ENCYCLOPAEDIA written by DIDEROT and DALEMBERT, to learn a lot of « disseminated » pieces of information, and, by grouping them together, to create the concept of « electrical current ».

- Paradigm 5 : Experimentation and transformation

Instead of performing according to the trainer's guidelines, an experimenter states his own hypothesis, his/her own designs, his/her own method and takes advantages of his/her own observations to infer or reject ideas, i.e. « laws » (some very limited). A typical character is FLEMMING experimenting repeatedly to detect the efficient agent (Penicillin). Typically, the question this kind of learners raises is « What if ... ». Here, the trainer has to provide a « reactive » environment, either real or simulated.

- Paradigm 6 : Creation and valuation (appreciation - decoding)

Whereas paradigm 1 deals with internalisation (encoding) by the learner of an already existing model, creation consists in encoding (in words, sounds, events, shapes, movements), models that do not already exist. Maurice BEJART is a prototype of this kind of creation. No one even dared to conceive a dance ballet on musics such as Stravinsky's « Spring Sacre » or Beethoven's « Ninth Symphony ». The trainer's role in accompanying creation is encouraging, criticising, appreciating, valuing...the creator's productions.

## 2. The specificity of expertise and its learning consequences

An expert is not only someone who has passed exams, but someone who has « lived » numerous critical situations, who has « experienced » them. Note that the words « expert » and « experience » contain the same verbal root. How far is it necessary (for deep and long lasting learning to occur) to live things ? How multisensorial, how thrilling, how unpredictable, how anxiogenic must they be ?

It is well known that when people are in stress situation, they regress in adopting the behaviours they experienced. This principle is encapsulated in the sentence « teach as taught ». An expert, who has « experienced » various problem solving situations, can relate (or link) concrete problematic situations and solutions on the one hand and their theoretical analysis on the other hand. In the framework of his reflections on extraction of experts'knowledge for the purpose of Artificial Intelligence Research, DREYFUS (1983) has suggested that experts frequently « map » a problem with a « template-like » process, i.e. seeing the problem by placing something like a « template » on it, a kind of grid; this process being sometimes called « overlay ».

Many research projects have been conducted to sort out whether episodic memory would elicit better learning achievement then semantic memory (NORMAN, 1988; TULVING,

Research data indicate that results are influenced by a lot of other variables, such as content, representativeness (prototypness of the example), objectives, use of and familiarity with the media, learners' previous knowledge and motivation, etc. . (SCHRAMM, 1975).

It often appears as a good strategy to provide multisensorial and emotionally loaded stimuli such as fiction films. That is the case, for instance, for « Rain Man », that gives to lay people the « feeling » of a better (cognitive) understanding of adult autism. In the same way, the film « The 8th day » also gives this impression of (affective) empathy with Dow syndrome (Trisomic) affected persons. Nevertheless, those episodical memory oriented media are not interactive in the classical meaning of the word. Programmed biographies aimed to provide a greater interactivity. Interactive Multimedia Programmed Biographees (IMPB) intend to take advantages of the strongest characteristic of both approaches (movies + PB).

## 3. The method of programmed biographies

The case method (BROMLEY, 1986), systematically exploited in PBL-Problem Based learning (BARROWS & TAMBLIN, 1990; VAN DER VLEUTEN & WIJNEN, 1990) is a frequently used method in medicine, criminology, psychology, education, where social perception of others is important (HAMLYN, 1974; MISCHEL, 1974; HARRE, 1987).

The method of programmed biographies is a particular way of presenting case studies. It has been developed by WRIGHT(1963) and DAILEY (1966, 1971) but has been given its recent forms by DE WAELE (1975). In 1994, VAN DEN BRANDE has tested its applicability and effectiveness with students learning psychiatry who were given programmed biographies of criminals. LECLERCQ has applied the method on other contents, such as predicting addicted persons behaviors and dealing with conflict situations between professors and students in classrooms (LECLERCQ & VAN DEN BRANDE, 1997, LECLERCQ et al., 1997). The principle of the methods are the following ones :

1. Students are presented a person's biography, i.e. authentical segments of his/her life, in successive portions called « episodes » (about 50 episodes in one biography).
2. Each episode is shaped in multiple choice format, i.e. the stem introduces the context, and characters'previous behaviours. Then the question deals with prediction of the biographee's action. Only one out of the four (or five) suggested options (or alternatives) is correct (what really « happened »).
3. Just after he/she has answered, the learner is given the (historically) correct solution to the episode question. This feedback is usually given in the next page, just before the introduction of the next episode.

## 4. The JP case

This case describes a series of micro-conflicts lived in 1995 by J.P., a 24 years old novice professor in religion, teaching for the first time. Students were 22, in grade 12 (the last year of secondary education). This case describes events that have occurred during about 9 months. It has been split into 34 episodes, among which 11 have served as pre and post-test questions to mini-debates.
Here are two episodes in sequence :

(E1) J.P. enters the classroom, introduces himself and, then, invites students to introduce themselves, each at his turn, suggesting that they first write down the general idea of their presentation. What is the students'reaction ?

1. Many students protest : they have been doing this exercise repeatedly during the previous courses. Writing down notes is boring.
2. They introduce themselves with enthusiasm realistically and in a pleasant way.
3. They introduce themselves in an unrealistic way, inventing incredible stories.

Correct solution is 1.

(E2)　　What is the professor's reaction ?
1. In order to punish the students , he requests a long written self presentation from each of them.
2. He accepts that the presentations be oral.
3. He allows everybody to answer as he/she prefers : to give a written or limit themselves to an oral presentation.
4. He informs them that yesterday a parallel class has displayed a particularly bad performance as a result of lack of preparation.

Correct solution is 2.

## 5. The CAFEIM infrastructure and the FORUM software

The FORUM method has been described by JANS & LECLERCQ (1996). In the CAFEIM[1] electronic amphitheatre, each (of the 24) student has a MMPC (Multi Media Personal Computer) connected to the animator's own PC. Each student can provide his/her answer to the question and the professor obtains, on his screen, an overview of all answers.  The JP biographee has been used into the FORUM environment, in a multimedia version.

O. ROMMES and F. GEORGES have filmed a fictitious version of the JP case (following strictly the authentic case and its written version). With the help of J.L. GILLES and M. PIRSON, this film has been inscripted on CD Rom support, so that the animator can display the film portions either on a large screen or via each student's screen, or both, via the following windows :

In a first step, the teacher selects an episode amongst the pre-recorded biography, and sends it on each student's screen.
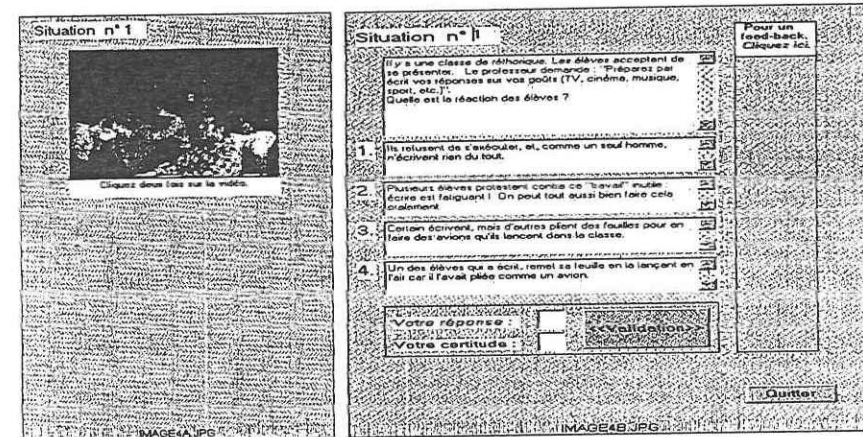


In a second step, each student sends to the teacher his/her answer and his/her confidence degree i.e. his/her subjectively estimated probability of this answer being correct. Students have to choose (among six possible degrees), using the following percentage scale (LECLERCQ, 1993) :
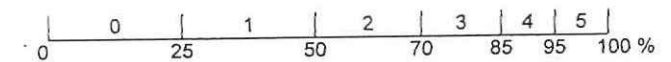


Codes 0 to 5 designate 6 confidence « zones », the central values of which being : 12,5 %; 3,75 %; 60 %; 77,5 %; 90 %; 97,5 %. Reaction times are automatically computed by FORUM.

The teacher is the only one who knows all these data answers, confidence degrees, reaction times in seconds since they are all concentrated on his grid-screen (see hereafter the list of names in this grid display). He/she can switch at will from the grid-screen to the bar-chart screen.

Question n° 1
Temps(sec) : 97

| N° | Nom | R | C | Tps | N° | Nom | R | C | Tps |
|----|-----|---|---|-----|----|-----|---|---|-----|
| 1 | HUBERT Sylvianne | 2 | 0 | 59 | 24 | | | | |
| 2 | DENIS Brigitte | 7 | 3 | 47 | 25 | | | | |
| 3 | LLORET Edith | 2 | 3 | 33 | 26 | | | | |
| 4 | REGGERS Thérèse | 7 | 3 | 71 | 27 | | | | |
| 5 | PLUNUS Ghislain | 7 | 3 | 21 | 28 | | | | |
| 6 | BOSMANS Cathy | 3 | 0 | 81 | 29 | | | | |
| 7 | | | | | 30 | | | | |
| 8 | | | | | 31 | | | | |
| 9 | | | | | 32 | | | | |
| 10 | | | | | 33 | | | | |
| 11 | | | | | 34 | | | | |
| 12 | | | | | 35 | | | | |
| 13 | | | | | 36 | | | | |
| 14 | | | | | 37 | | | | |
| 15 | | | | | 38 | | | | |
| 16 | | | | | 39 | | | | |
| 17 | | | | | 40 | | | | |
| 18 | | | | | 41 | | | | |
| 19 | | | | | 42 | | | | |
| 20 | | | | | 43 | | | | |
| 21 | | | | | 44 | | | | |
| 22 | | | | | 45 | | | | |
| 23 | | | | | 46 | | | | |

STOP  FIN

QUEST  HLP  STAT

The case has been submitted to 18 last year of University students following Prof. LECLERCQ's course of educational psychology in the framework of their preparation to become teachers in higher grades of secondary schools. The experiment took place in the CAFEIM Centre.

An evidence is a very well predicted episode receiving a high rate of correct answers, i.e. 90 % (or more). A surprise is an episode displaying a rate of success (R.S.) inferior to 10 %. In many cases, students learn more from surprises than from good predictions (evidences), since, if according to SHANNON and WEAVER (1949), « information is what reduces uncertainty », it is also what changes the degree of certainty on a great extent. Surprises are not rare, since there exists a tendency to overconfidence (OSKAMP, 1965).



In a third step, the animator stops the possibility to introduce new answers (usually when all students have answered) and can either send the following bar-chart display (hereafter) to each student's screen (i.e. revealing the correct answer) or organise a debate after which he/she will send the same question acting as a post-test for the debate.

Question n° 1
Temps(sec) :

La synecdoque est un procédé de style ou un mécanisme mental qui consiste à prendre la partie pour le tout ou le tout pour la partie.
Identifiez, parmi les propositions suivantes, celle qui illustre ce concept.

1: Une frite pour la table 5
2: Boire un verre
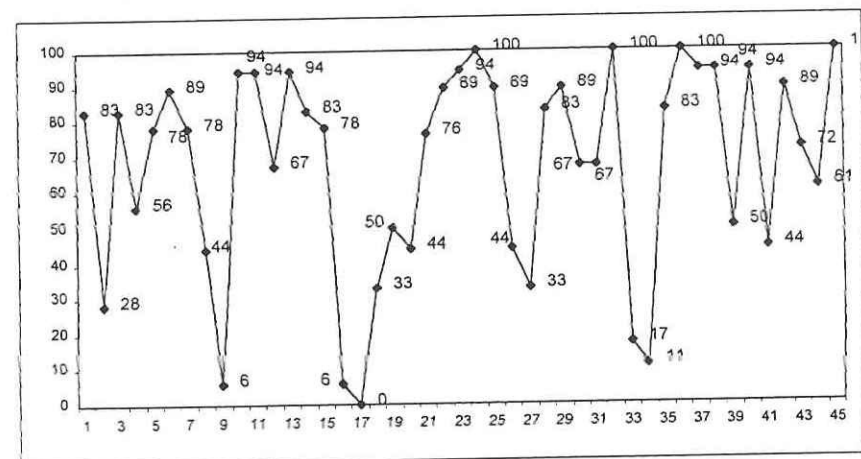3: S'exclamer devant une peinture : "c'est du Picasso"



Notes :

Envoyer

QUEST  REP  STAT

All these interactions are recorded in two ways (on computer files and by video recording) so that a full session (about 3 hours) can be studied afterwards for research purposes (e.g. influence of what has been said on changes of opinions).

For instance, in episode 9 (RS = 6 %) future teachers do expect (confidently) disruptive behaviour to occur as early as the first lesson and are surprised that it is considered by the students as an « observation round », just like in boxing. Such a wrong idea exposes them to be « knocked out » in the second lesson (round), since they believe « the most dangerous move is behind ... whereas it is ahead».

In episode 16 (RS = 6 %), future teachers are astonished that secondary school disruptive students do not feel any kind of culpability, even considering disruptive behaviour as « their part of the contract ».

In episode 17 (RS = 0 %), the biographee has adopted a behaviour that classical expectations would not have predicted. Later on, in the biography, it will be observed that he was wrong in adopting this behaviour ... but on the moment that was what he did !

These unexpected behaviours constitute what could be designated as micro « desequilibrations » in PIAGET's terms, forcing the learners to consider a broader range of behaviors than before.

## 7. The debates and their efficacy

Out of 11 debates, 8 have produced better RS at the POST-TEST, one has had no affect and 2 have lowered the average RS (Rates of Success) of their episode.
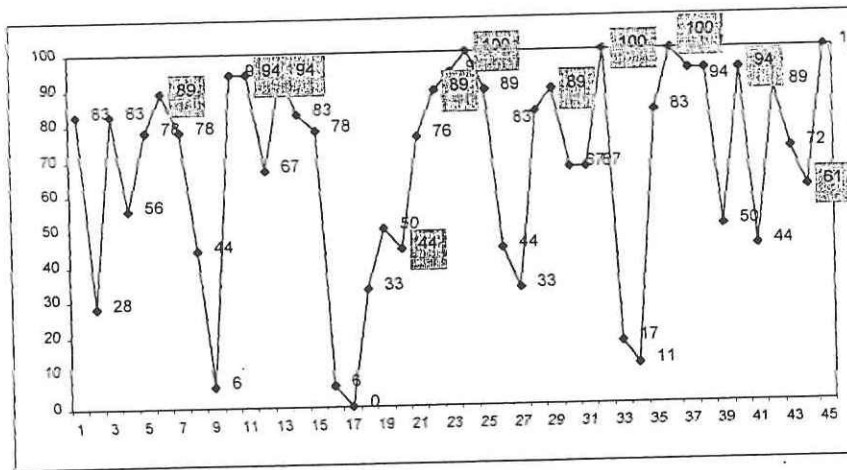


Average Point biserial correlation between the total score (on the 34 episodes) and each episode is 0,24. That is better than the significance level (namely $1/\sqrt{NE}$; $1/\sqrt{34}$; $1/5,83 = 0,17$). Where NE stands for « Number of Episodes » . Consequently, point biserial correlations can be used to detect « coherent episodes », but not INFORMATIVE ones (see point 6 hereover). This question of usefulness of incoherent (but informative) episodes is still an issue of debate. There is no increase in « coherence », probably since episode specificity plays an important role. So the question is raised : What is learned ?The capacity to predict other cases ? this case ? the difference between this individual case and general tendencies ? These questions are other objects of debates.

Contrarily to programmed cases in criminology or drug addiction, the biographeed teacher can be from the beginning the co-author of the programmed case and the principal film actor playing his own role. That is what happened for François GEORGES (F. GEORGES) « interview-like » sequences have been recorded where the teacher (F. GEORGES) *comments*, afterwards, each episode (what he intended to do and what he actually did, why he did it, whether he regrets it or not, etc.).

## 8. The spectral analysis of debates

LECLERCQ, JANS & GILLES have defined a student's spectral score to an episode (or question) as the position of this score on the following « unfolded » scale of performance :
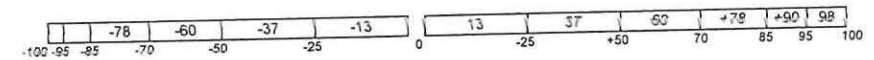


For instance, the score -37 is obtained by answering incorrectly with a 37 % of confidence. The distribution of 18 students'spectral scores for pretest .. of episode 5, were as follows :
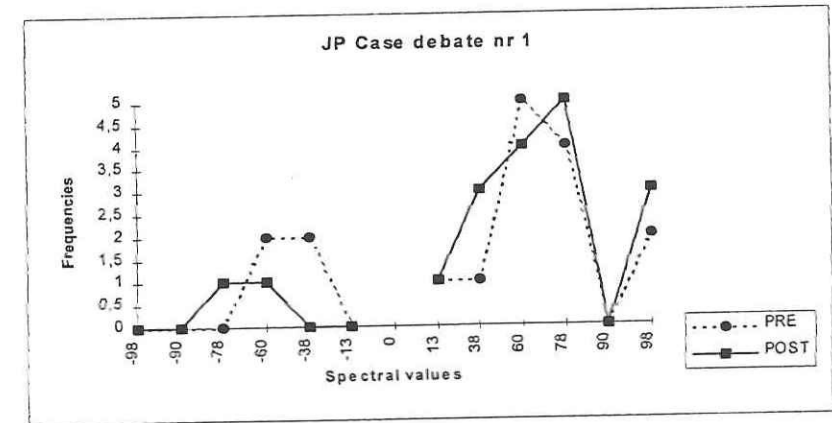


It can be seen that the dated line curve (post-test) is more j shaped (more negative skewness) than the black curve (pretest) on the right side (positive part of the spectrum). Each episode can be analysed this way.

## 9. Conclusions

The interactive Multimedia Programmed Biographies (IMPB) method is a relevant answer to a range of specific training problems requiring a clinical approach. It is possible to develop them with the current Mutimedia resources. Specific ways of exploiting these resources and of collecting, and interpreting data do exist.

A lot remains to be done in terms of interface, of artistic design, but this article aimed to present already available principles and observations from a strategy that mixes various paradigms (imitation, transmission, practice, simulation) in an original way.

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