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 confictual social relations such as class disruption. Another 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 split 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 another 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 Lagardère 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 whys, 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 Eliza 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 XVIIIth century, a well known scientist, AMPERE, was able by exploring 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 » (very some limited). A typical character is FLEMING 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 (appraisal - decoding)

Whereas paradigm 1 deals with internalisation (encoding) by the learner of an already existing model, creation consists in encoding (words, sounds, events, shapes, movements), models that do not already exist. Maurice BEJART is a prototype of this kind of creation. No one ever dared to conceive a dance ballet on music 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, someone who has « lived » numerous critical situations, who has « experienced » them. Note that the words « expert » and « experience » contain the same verbal root. How fast is it necessary (for deep and long lasting learning to occur) to live things? How multisensory, 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 raise (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 absent better learning achievement than semantic memory (Norman, 1988; Tulving, 1983).

Research data indicate that results are influenced by a lot of other variables, such as content, representativeness (prototypicality 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 « Man Rain », that gives to lay people the « feeling » of a better (cognitive) understanding of adult autism. In the same way, the film « The 5th 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 Biographies (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 & Tamblyn, 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; Michels, 1974; Harré, 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. authentic 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 student introduces the context, and characters’previous behaviours. Then the question deals with prediction of the biographer’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 & LECLERCOQ (1996). In the CAFEIM 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 biography 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 inscrped 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 (LECLERCOQ, 1993):

<table>
<thead>
<tr>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>90</th>
<th>97.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>90%</td>
</tr>
</tbody>
</table>

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.
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.

For instance, in episode 8 (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/\sqrt{53} =
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 biographied 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 Francois GEORGES. In addition, close up
"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 dotted 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 Multimedia 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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