

Profiling on three difficulty levels – a practical method of (self) education

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Abstract: The paper presents a didactical approach in a genuine form (by continuously structuring and profiling the education contents/processes on three levels of accessibility). Also, the aspects of effective applying of this methodology in self-education and in continuous education are highlighted.

Keywords: structuring, profiling, difficulty levels, accessibility, self-education.

1. Preamble: reavealing and materializing the idea

In this paper I will try to describe a didactical approach that I found and firstly applied in my activity of trainer (in teaching several disciplines of informatics parentage), and then I used it in conceiving and writing two unprecedented books of informatics. Without claiming that I discovered an extraordinary solution (its core is not new at all), I mention that my both applications have had some success, and I consider that they deserve to be taken into consideration for studying and for possible ammelioration and reapplication.

1.1. Infomatics teacher

As informatics instructor (accredited by „The Informatics Training Center Bucharest” – <http://www.cpi.ro>) I had the job of teaching several series of students (ageing between 18 and 60 years) in order to transmit them knowledge and skills in exploiting computers and information systems.

After the very first teaching series (series during between two weeks and six month – according to the type and the scheduling plan of the course) I observed a phenomenon that incited me: usually there appeared a natural stratification of the group (of the students class) depending on aptitudes, motivations and even on affinities. A stratification that frequently conditioned my teaching and assessing tasks, and that I had to not ignore. And – in order to profoundly accept it in the process of working with students of those post-college and post-university classes – I had to learn to accept it and to manage it.

Briefly, the things have revealed in this manner: in almost all the teaching series, the students practically split themselves in three groups/classes: beginners, intermediates, advanceds. They were not stringent working groups, but ad-hoc constituted, self-classified by unimposed „rules” of affinities, with a free dynamic, but still with enough stability/consistency to be taken into account. I noticed that I had to reconsider my teaching approach, especially when I worked in other way than frontal (and, in teaching informatics – where most of classes are deploying as practice laboratory, with immediate computer application – the frontal exposition did not constitute the major didactical method), in order to present the teaching matters specifically tailored to the assimilability level of each group.

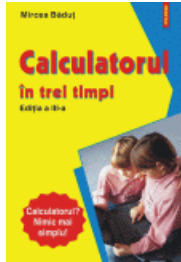
1.2. Two books of informatics

After this stratification idea was clear enough in my mind, I proposed to the Polirom Publishing House to edit an unprecedented book of teaching informatics, and I explained this approach in the publishing project: to depict every subject/issue in the book in three levels of accesibility (each subject of teaching/learning unit). The publishing house appreciated this as being an original and interesting idea (and this happened when the romanian books market was full of titles on informatics/computer learning). And thus – in 2001 – the „Calculatorul în trei timpi” (The Computer in three snaps) book appeared. It will be republished in September 2003 and then in August 2007.

Due to the success of this book, I begin a demarche toward O.S.I.M. (State Office for Inventions and Trademarks) to pattend and protect the „în trei timpi” (“in three snaps”) concept.

Based on the viability of this original didactic idea (the feed-backs received meantime have confirmed the special applicability for

autodidacticism), in the year of 2004 I proposed to the Polirom Publishing House to edit together another book profiled on the same style, but – this time – on a more specialized theme. In October 2006 already appeared the second edition of the „AutoCAD-ul în trei timpi” book (about computer-assisted technical designing).



By this continuous structuring of the information on three level of interest (beginner, intermediate, advanced), the two books offer to the reader the possibility of choosing himself the most suitable approach. This ingenious “filtering” makes the information to exactly arrive at the right target. In the book’s preamble I recommended that the reading of the book to not be made sequentially: the beginner will read (at his first lecture) only the “Level 1” section of every subject, and – on the other hand – the advanced reader will focus himself on the “Level 3” sections. At the formatting the books’ pages, we applied a typographical artifice (a intensity marker on the sleeve of the page) that helps the identification of the three accessibility levels (see the sample images above).

In spite the fact that the originality of this education approach has excited everybody, for me not the distribution of the accessibility on three levels has constituted the most difficult and chalanging issue, but the idea of doing this structuralization with minimum of redundancy (a requirement naturally self-imposed under the reason that the repetability of the matter would have discomforted those reader willing to pass from a level to another in the act of reading).

2. A didactic approach using three accessibility levels

Before entering in details, I want to emphasize the fact that the idea of didactical splitting on three difficulty level is not a new one. Time and again it was applied in education, but its results were appreciated only limited, and it was rarely considered as having large

applicability. I am aware of this disadvantageous context, but I still consider that presenting my own experiences could be somehow useful in (more or less particular) educational situations.

2.1. The details of the continuous tripartite structuration

The essence of this educative approach consist in organizing the instructing processes (teaching, learning, assessing) in three distinct levels of accessibility/dificulty, respectively in (quasi)simultaneously creating, assisting and monitoring of three student profiles. I named these profiles „beginer”, „intemediate”, „advanced” – which have an obvious suggestivity in the teaching informatics context (being a discipline that usually is learned from scratch). But a larger application of this methogology should probabilly operate with more generic names.

In the followings, I will mainly exemplify/detail the teaching aspects (leaving beside the learning assessment), based on two reasons:

- (by) profiling the content on three accesibility levels is the best manner of sugesting the valences and the specificity of this approach (and these aspects will be obvious in practice activity);
- the profiling of the content on three accesibility levels also constitutes the most difficult part of this methodology, first through the addaptation efforts, an second becuase of the possible requirement of redundancy diminishing.

Now I will insert several samples of profiling the didactic matter on three levels (from the above mentioned books):

At each one of the three accessibility/difficulty levels, I tried to adapt the didactical methods that I applicatively combined in the teaching-learning-assessing activity:

- » oral exposing (frontal or on the three groups, combined with interrogative methods);
- » algorithmic methods (sequential-modular instruction and/or programmed instruction);
- » heuristic conversation method (incitement towards discovery, by provoking student effort, by engaging the three forms of discovery: inductive, deductive, and by analogy);
- » practical demonstrations and didactical modelling (presenting/constructing logical schemes and examples);
- » problematization methods (presenting problems and guiding in their solutioning);

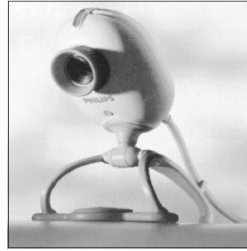
» case studies (presenting and discussing of several significant cases/problems); etc.

Camere video digitale

1 Level 1



Ne vom ocupa deocamdată de acele mici camere video folosite la mesageria instantanee prin Internet. Numite și „WebCam”, aceste camere de luat vederi sunt destul de simple și de accesibile, fiind ideale pentru video-conferințe sau pentru înregistrarea unor filmulețe scurte în jurul PC-ului. De cele mai multe ori, este vorba despre un „ochi” digital instalat fie deasupra monitorului, fie pe cutia unității centrale, și care „privește” spre utilizatorul PC-ului. Operarea lor se face prin intermediul software-ului care le însoțește (și care se instalează o dată cu driver-ul software).



Cameră video digitală

2 Level 2



Cu puțină îngăduință putem încadra aici atât camerele video web, cât și camerele de filmat digitale (acestea din urmă jucând doar sporadic rolul de „periferic” al PC-ului). Cel mai frecvent web-camera se conectează la calculator prin portul USB. Principalii parametri de lucru sunt :

- rezoluția de captare/transmitere video: 320x240, 640x480 pixeli;
- rezoluția imaginii statice (fotografie): 640x480, 1024x768 pixeli;
- numărul de cadre pe secundă: 10-30 fps;
- condițiile minime de iluminare: 2-10 lăcuși.

Camera video desktop servește atât la înregistrarea de secvențe video (AVI, MPG), cât și la capturarea de instantanee (fotografierea obiectului vizat și stocarea acestor imagini ca fișiere în memoria calculatorului). Calitatea imaginilor nu este grozavă, însă pentru video-telefonie este suficientă.

Prețul *webcam*-urilor este relativ redus (20-100 Euro).

3 Level 3

Aici avem o problemă de terminologie, întrucât conceptul de «**cameră video digitală**» ar cuprinde atât banalele camere-web, cât și camerele de filmat digitale și chiar camerele „IP” de supraveghere video. Ca să nu ne risipim în dezbateri lingvistice, hai să vorbim acum despre *camerele de filmat*!

Camerele digitale sunt destul de asemănătoare videocamerelor analogice, subsistemele și facilitățile optice fiind aproape identice (lentilele, zoom-ul de 15-30x). O primă diferență apare odată cu stocarea, care poate fi *cvasi-digitală* pe casete (cu bandă magnetică) de tip miniDV sau Digital 8, respectiv stocare *pur-digitală* pe disc miniDVD (fișiere în format compresat MPEG și cu organizare DVD), sau pe hard-disk, sau pe memorie „flash”. Uzual, capacitatea de stocare trebuie să asigure captarea a minim 1-2 ore de material video. Rezoluția de captare video a camerei nu este pretențioasă (800x600) însă crește substanțial pentru eventuala facilitate de fotografiere. Sensorul camcorder-ului este unul CCD simplu sau triplu (pentru captare separată RGB).

Conectarea camerei la PC se face prin port FireWire (IEEE 1394) sau USB (2.0), având ca scop transferarea materialului video pe calculator pentru editări și salvări. (Transferul acesta se mai numește și „captură video” și se realizează cu programe specializate, înrudite cu aplicația „Windows Movie Maker” din furnitura sistemului de operare Windows.) În general editarea materialului video (asumată eventual în vederea creării de DVD-uri) presupune tăieri, mixări, adăugări de fundaluri audio, efecte de tranziție între secvențe, titluri și note scrise pe imagine, organizarea pe capitole și definirea de meniuri DVD.



Cameră video digitală



Concomitantly with the deploying of these didactic methods, I worked up to attract most of the psycho-pedagogic resources of the students (creativity, spirit, attention, nosiness, competitiveness, positive attitude, previous experiences, skills etc). Likewise, I pursued the key elements of activating the students, following the affinities of the stratification method for the intellectual education ways:

- cognitive form (the “informatics” matter assume an intense knowledge transfer);
- motivational formation (a key of this methodology consist in subliminal motivation);
- affective formation (the proposed stratification favoures the interpersonal affinities at group level, and also this approach is characterized by a less formal/generic student-teacher relation).

I have to mention that – along my activities of teaching general or applied informatics – I have not always succeeded to apply the tripartite stratification proposed by this particular education methodology. For instance, the programming languages teaching units proved themselves difficult in this aspect, because there are sometime aspects (lessons) so essential that they can not by presented in diminished/alternative forms. If the education program (approved by the Education Department of the govern) impose studying a certain programming language (as is in the “Informatics” profile of the college/high-school education institutions), then a such stratification is difficult or even inapplicable. But, if it is about to transmit generic programming skills (similarly to the “ICT” profile from college) then the unit can be still divided in three difficulty levels, in a manner like this one:

- Level 1: programming in the Visual Basic (or Quick Basic) language;
- Level 2: programming in the TurboPASCAL (C, or FoxPro) language;
- Level 3: programming in the C++ (or Java) language.

Of course, a such division – when the educational context allows it – can be determined also by the skills and experiences of the students. I observed that a tripartite stratification reduces the discontent of those students who have (programming) experience formed in an autodidact regime, and who (in a classic/frontal approach) would be maintained at an unsatisfactory intermediate teaching-learning level. Also, those students usually intimidated by the programming discipline (software programming proving itself as one of the most exigent branch of the

computer science) would have more chances to assimilate the base elements in this three-stratification approach.

2.2. Applicableness presumptions

This particular didactical approach/methodology is very suitable for practice activities, because the Laboratory organization and its working ways (specialty class) favour the grouping of those who participate at the educational act. In the same way, I underline its distinguished applicableness in continuous/permanent (adult) education, and – especially – in self-education (where the free reading allows the reader to chose a proper level, then to reread the matter at a higher level, with grown chances for assimilability).

In those concrete situations where this three-levels accessibility stratification can be considered as applicable, one can take – for the teaching-learning activity – one of two possibilities: choosing (or creating) a text-book formatted like the previously presented books, or simultaneously accepting three alternative text-books chosen according to the three aimed levels. (Both variants have advantages and disadvantages, and the final choosing should be determined by the practical context.). The teacher has to endeavor to make the students understand that they can migrate anytime from a level to another (without demonstrating some competencies, or without presenting a motivation), and even to encourage a such migration (in a direction or other) when he consider that a movement is suitable or welcomed.

Also, we must ensure that in the concrete situation there are no discrimination or conditionings that can balk migrations between levels/groups. For instance, the ICT Laboratory class should be organised such as the spatiality of the room (architectural constraints, furniture layout) to not significantly embarrass the formation of groups and neither the free migration between these.

3. Risks prevention and disadvantages combating

In the whole world (including our country) there often were experiments with level differentiation in education – and that differentiations have usually meant a profilation on the proved assimilation capacity of the students, in order to extra-help those who have difficulties, or to encourage those who have peak abilities. But, for the mass education, this generic practice has two essential drawbacks:

- it requires supplementary efforts/costs (to profile and to manage the teaching-learning processes);

- it suggests a discrimination not suitable with these modern times (“political correctness”).

Thus, we can say that the differentiation on accessibility levels is no more encouraged, and it remains applicable only locally, mostly in the informal education.

But, beyond these two socio-economical unfavorable aspects, I have also identified a series of concrete issues that must be taken into consideration:

Stratification Risks/Disadvantages	Applicable Countermeasures
<p>The education assessment hardly succeed to offer a covering classification for the whole class (especially if a summative assessment is needed).</p> <ul style="list-style-type: none"> • The school grading can be differentiated on levels (typically resulting in grades’ intervals such as 10-8, 8-7, and 7-5; a grading that has advantages and disadvantages), or can be opened at each level (when a grade – in the 10-5 range – obtained at a level can hardly have a correspondent at another level). 	<ul style="list-style-type: none"> • If one uses a level-differentiated grading, then the students have to understand/accept this fact from beginning, along with the option of trying to migrate at a higher level (this option constituting a strong motivational element); • If one uses an opened grading (at any level) the students have to be forewarn (to accept) that the assessment will be different for each level. This approach is applicable (almost exclusively) when the classification is less important than the knowledge/skills transfer (therefore, being hardly suited to mass education). • Accent on formative education (and formative assessment, with grading based on group-reporting). • Applying an assessment-grading based on differential standards on the three levels.
<p>A student caught in one of the three groups will hardly migrate into other group, even if he has the potential to advance or if he can not cope (keep up) with the chosen level.</p>	<ul style="list-style-type: none"> • Frequently presenting the freedom to migrate into other level/group. • Encouraging to temporarily experiment another level. • Recommendation to pass in a

	more suitable group.
A student who choose the “beginners” group could feel somehow humiliated by reporting to the other levels.	<ul style="list-style-type: none"> • Introducing applications/elements with high attractiveness (because interesting things can happen also at the beginner level): exciting/challenging didactic methods – heuristic and problematization – profiled on this level. Refreshing the knowledge that anyone can migrate anytime at the intermediate level.
A student who realize that a lower level should be more suitable hesitates to do it.	<ul style="list-style-type: none"> • Recommendation of trying – on a temporary basis – to activate at a lower level, along with presenting the advantageous aspects (interpersonal affinities, homework more interesting/accessible, time savings, etc).

Probably, subsequent researches can reveal – at this didactical methodology – other aspects that would require to be analyzed and addressed. In like manner, one can not conclude if the three-accessibility-levels structuralization must be or not validated at a general mode. T all intents and purposes, the times are more and more dynamics, and the solutions proposed by the society can take various forms.

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