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DOCIMOLOGIC ISSUES IN EVALUATING THE THEORETICAL WORKS IN MUSIC EDUCATION

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Abstract: *The paper will specially focus on some docimologic aspects in the evaluation of the theoretical works specialised on the theory of music, which can be found in any theoretical subject of the musical educational system, both at highschool level and at university level. These refer to the multitude of factors which are part of the assessment criteria, as well as the number of items, their individual score and their correlation with the marking schemes of performance. The author of the present paper shows how the table like calculation sheet of Excel, Microsoft Office can facilitate the marking of the candidates' answers, independently of the complexity of the assessment or of the number of candidates.*

Key words: *docimology, evaluation, music education, theoretical works.*

1. Introduction

Docimology, the science of examinations, marking schemes and of the differences which occur between various assessors, deals both with the subjective factors of assessment and the prerequisites meant to ensure the objectivity of assessment as well as with the means of assessment [1, p. 119]. Shortly, docimology is the science related to evaluation, which is one of the essential stages of the educational process.

Out of the many perspectives on assessment [2, p. 308-309], I will focus on the one which defines assessment as the activity "which is *the result of the collection, processing and interpretation of the information regarding the status of a system and its functioning, of the results which are obtained and measured on the basis of some criteria* which has a great influence on the whole development of the system" [3, p. 16]. Its importance is a consequence of the essential role which it has not only in qualifying the performance at the end of the process, but especially in the adaptation of the didactic approach, as a follow up of the stage assessment.

The assessor is responsible for the coordinates of setting up assessment – out of which I mention the following: defining the knowledge area/the skills area/ the assessed skills area, the design of the "hypothesis", the choice of the right methods and techniques, as well as the design of the instruments used in assessment – as well as for the design of the criteria used in marking scheme and the operations of data processing [3, p. 16].

My paper deals with the aspects related to the processing of the data collected as a

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result of the assessment, with focus on the *Excel* application of *Office*, produced by *Microsoft*.

2. Computer based marking scheme

The utility of the assessment stage in the didactic process can be clearly noticed by the analysis of the didactic process through the informatics perspective..

2.1. The teaching process perceived as an informatics process

During the didactic process, the student is compared with *a black box*, whose activity cannot be controlled, unlike the information collected by the music teacher, who is compared with *the control unit* in the informatics system; the student's ways of perception (auditory, visual, kinetic and tactile) help us infer the development of the process in the *black box* . Correction may be planned only after the analysis of the student's output, which is considered *the execution unit* in the informatics system. A student's end product proves his knowledge, skills and abilities as a result of the activities assessed; the student is "an entity whose reaction can be anticipated /…/ unlike his inner structure, which is completely unknown to the others; you can only make assumptions on it" [4, p. 149-151]. A student expresses himself through his/her execution organs: mainly through his/her voice as well as his/her hands, feet and other body movements associated to the rhythmic input.

The relation between"the order unit" – represented by the educator in our case – and the"the execution unit" – represented by the student – is defined by informatics as the relation between the one who coordinates and the coordinating process. In the educational process these terms refer to the didactic technology:

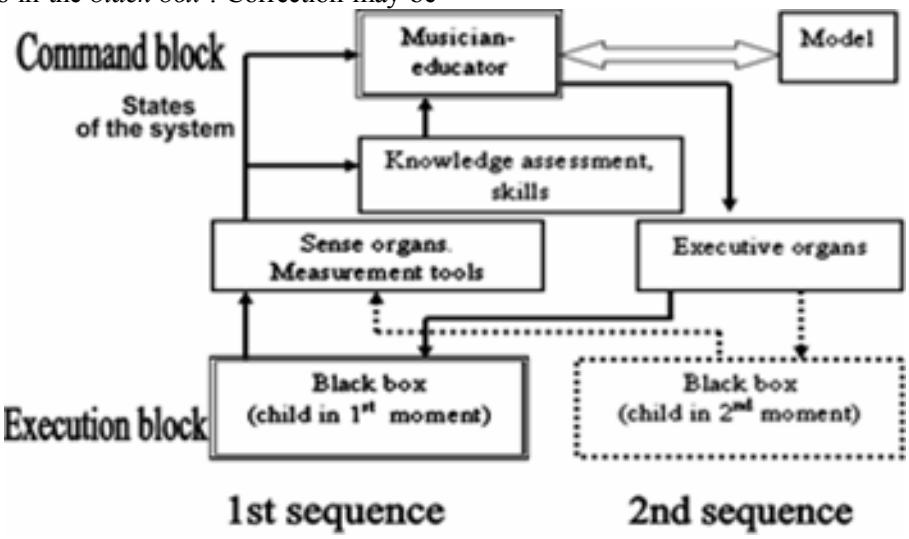

Fig. 1. *The scheme of the educational process in interpreted from an informatics* (*point of view according to D.D.Fărcaş* [5, p. 40]

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Sequences *I* and *II* from *fig. 1* represent the states of the system, in which regulations/corrections are produced due to *the feed-back* sent to the *order unit* by the *execution unit*. Assessment is associated to *feed back*; it becomes the essential means through which the educational prerequisites are fulfilled.

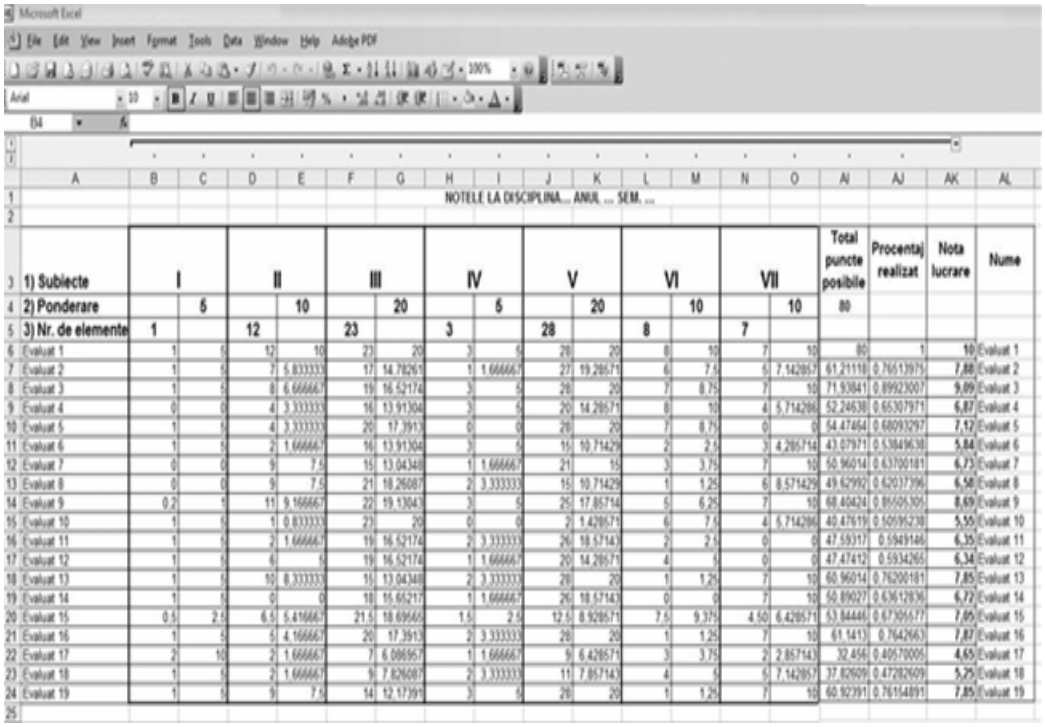
2.2. The table like calculation sheet in the process of the final grading

Any assessment, written, oral or practical covers the following stages in the process of designing the test:

a) setting the number of items/practical tests;
b) assigning special values per item/practical test within the limits 1 to 10;
c) algorithmic processes in series of concepts/subpractical tests or operations which, if covered in the necessary order, lead to the answer on the whole, or, in case of the practical tests, to proving the acquisition of the skills or abilities assessed; the algorithmic process allows the sequential marking of the whole answer expected, which makes the assessment work easier and guarantees an objective evaluation.

Setting the number of items/practical tests, their weighting and the algorithmic process mainly depend on the assessor's assessment objectives and on his/her capacity of systemizing / operating the elements assessed. The type of grading is a difficult aspect related to ranking the results of the assessment. The table like calculation sheet is such an instrument which makes the assessor's work much easier.

To centralize and complete the marking of the theoretical works of *music theory*, *solfeggio*, *musical dictée* at university I have designed a table like calculation sheet in *Microsoft Office Professional 2003*, which I have been using to complete the grading of students for over ten years. An example of this kind can be seen in figure 2:



NOTELE LA DISCIPLINA... ANUL ... SEM. ...

1) Subiecte	I		II		III		IV		V		VI		VII		Total puncte posibile	Procentaj realizat	Nota lucrare	Nume
2) Ponderare		6		10		20		6		20		10		10	80			
3) Nr. de elemente	1		12		23		3		28		8		7					
Evaluat 1	1	6	12	10	23	20	3	6	28	20	8	10	7	10	80	1	10	Evaluat 1
Evaluat 2	1	6	7	5.833333	17	14.78261	1	1.666667	27	19.28571	6	7.5	5	7.142857	61.21118	0.765139	7,88	Evaluat 2
Evaluat 3	1	6	8	6.666667	19	16.52174	3	6	28	20	7	8.75	7	10	71.93841	0.899230	9,09	Evaluat 3
Evaluat 4	0	0	4	3.333333	16	13.91304	3	6	20	14.28571	8	10	4	5.714286	52.24638	0.653079	6,87	Evaluat 4
Evaluat 5	1	6	4	3.333333	20	17.3913	0	0	28	20	7	8.75	0	0	54.47464	0.680932	7,12	Evaluat 5
Evaluat 6	1	6	2	1.666667	16	13.91304	3	6	15	10.71429	2	2.5	3	4.285714	43.07971	0.538496	5,84	Evaluat 6
Evaluat 7	0	0	9	7.5	15	13.04348	1	1.666667	21	15	3	3.75	7	10	50.96014	0.637001	6,73	Evaluat 7
Evaluat 8	0	0	9	7.5	21	18.26087	2	3.333333	15	10.71429	1	1.25	6	8.571429	49.62992	0.620374	6,58	Evaluat 8
Evaluat 9	0.2	1	11	9.166667	22	19.1304	3	6	25	17.85714	5	6.25	7	10	68.40424	0.855053	8,69	Evaluat 9
Evaluat 10	1	6	1	0.833333	23	20	0	0	2	1.428571	6	7.5	4	5.714286	40.47619	0.505952	5,55	Evaluat 10
Evaluat 11	1	6	2	1.666667	19	16.52174	2	3.333333	26	18.57143	2	2.5	0	0	47.59317	0.594915	6,35	Evaluat 11
Evaluat 12	1	6	6	5	19	16.52174	1	1.666667	20	14.28571	4	5	0	0	47.47412	0.593426	6,34	Evaluat 12
Evaluat 13	1	6	10	8.333333	15	13.04348	2	3.333333	28	20	1	1.25	7	10	60.96014	0.762001	7,85	Evaluat 13
Evaluat 14	1	6	0	0	18	15.65217	1	1.666667	26	18.57143	0	0	7	10	50.89027	0.636129	6,72	Evaluat 14
Evaluat 15	0.5	3	6.5	5.416667	21.5	18.69565	1.5	2.5	12.5	8.928571	7.5	9.375	4.50	6.428571	53.84446	0.673056	7,65	Evaluat 15
Evaluat 16	1	6	5	4.166667	20	17.3913	2	3.333333	28	20	1	1.25	7	10	61.1413	0.764266	7,87	Evaluat 16
Evaluat 17	2	10	2	1.666667	7	6.086957	1	1.666667	9	6.428571	3	3.75	2	2.857143	32.456	0.405700	4,65	Evaluat 17
Evaluat 18	1	6	2	1.666667	9	7.826087	2	3.333333	11	7.85714	4	5	5	7.142857	37.82609	0.472826	5,25	Evaluat 18
Evaluat 19	1	6	9	7.5	14	12.17391	3	6	28	20	1	1.25	7	10	60.92391	0.761489	7,85	Evaluat 19

Fig. 2. *Table like calculation sheet used to complete the grading after the assessment process*

As it can be noticed in *fig. 2,* the table like calculation sheet has got several fields:

a) the columns A and AL − number 6-24 − where the names of the students assessed are listed;
b) row 3 (no 1, *Items*), with *cells* from A3 to O3 the items are numbered from I to VII, with Roman numerals;
c) row 4 (no 2, *Weighting*), which covers the cells C4, E4, G4, I4, K4, M4 and O4, mentioning the score whose quantum represents the rate of each item as compared with each other and the whole;
d) row 5 (no 3, *Elements*) where the segmentations within the algorithm of necessary sequences to make up the whole answer for the respective question are mentioned;
e) the data collecting fields, which represent the number of algorithmic sequences fulfilled for each item are the ones in the columns belonging to the number of sequences of the algorithms, described at *d* (the cells of the lines 6-24 on the columns B, D, F, H, J, L, N, on which the number of the algorithmic sequences can also be found;
f) the line's cells 6-24 are the ones which represent the percentage of the correct answers in the columns C, E, G, I, K, M, O, which also include the weighting of each item in numerical indicators;
g) the field that contains the columns AI, AJ, AK includes the last part of the centralization, namely summing up all scores achieved (column AI) in relation to the total number of points possible (cell AI4), the percentages derived from the percentage of the total score of 100% (column AJ); the test score is shown in the column's cells AK.

For automatic calculation of the results – the intermediate and final one – the table like calculation sheet requires the introduction of some mathematical formulas in the cells on the columns fields C, E, G, I, K, M, O, AI, AJ and AK.

The calculation procedure - used below to explain the grading done by the first assessed - as well as the mathematical formulas to determine the scores are as follows:

a) the percentage of each subject is the result of the division of the number of sequences of the item solved by the student assessed (B6) the total number of sequences of the item; the result is multiplied with the numerical value which represents the weighting of the item (C4): (B6/B5)*C4; thus we obtain a score which is correlated with the number of elements / algorithmic sequences solved as part of the item and with the value/ percentage score assigned to the specific item;
b) to obtain the percentage which shows the test achievement there are some operations which need to be covered:
   i. the points obtained for each item assessed individually are summed up in the cell AI6: = *SUM(C6;E6;G6;I6;K6;M6;O6)*;
   ii. the total points possible to be achieved are calculated (AI4), by adding the points assigned as weighting to the test items: *=SUM(A4:AG4)*;
   iii. the proportion/ percentage of items achievement is calculated (AJ6), the total points achieved are reported (AI6) to the total points possible (cell AI4): *=(AI6/AI4)*;
   iv. the final mark is calculated (AK6) as a result of multiplying the proportion/ percentage of subjects achievement (AJ6) with the nine points – which are part of the grading variability minus the ex officio point - , to which a

point is added (+ 1), given ex officio to the student assessed: *=((AJ6*9)+1)*. For the two decimal numerical indication, the final calculation formula will be: *=TRUNC(((AJ6*9)+1);2)*.

Filling in formulas related to the central one and the process of filling in the marking centralizer is applied to each student assessed individually, until the final grade is obtained.

The efficiency of this evaluative means is demonstrated by the centralizer illustrated in *fig. 2* provided with a variety of scoring situations, including the complete success - a 10, in case of assessed number 1.

To ensure objectivity and balance in grading the assessed students, the assessor is required to declare prior to the assessment the number of issues and the marking scheme/ the weighting given to each topic, possibly also the algorithmic process of the items/ tests.

3.1. Conclusions

The detailed information presented above demonstrates the ability to turn the calculation of the final grade of a test - theoretical, oral or practical – into a simple process which relieves the assessor of the laborious and many mathematical operations. The application of the calculation matrix designed for the table like calculation sheet within the application *Excel* of *Microsoft Office*, the final part of the assessment work which is incredibly difficult and overwhelming for the assessor musician becomes easy and even interesting; he is surprised to witness some results which occur independently of his will, as a result of the informatics calculations. His responsibility is thus reduced to filling in the number of items and algorithmic sequences solved by the assessed students in the cells provided for the data collection, after having filled in the number of items and algorithmic sequences of each of them in the centralizer as well as to designing the marking scheme/weighting of each individual item.

The numeric results are thoroughly calculated until the end mark is obtained, which is provided with two decimals. Unfortunately, we should point out that the accuracy of grading according to this highly efficient means is lost because of the rigid legislative regulations promoted by the Romanian authorities who are in favor of the full marks, with no decimals; as a consequence, therefore, there the expressive nuances are not possible.

Here are some of the advantages of this means: a) the flexibility in marking tests allows diverse dimensions, both in terms of the number of assessed students and in terms of the number of items/tests (the stable like calculation sheet shown in fig. 2 is reduced; it is a reduced rendition of the one I have used, which is ampler in order to allow various dimensions of assessment, with a variable number of items. b) the possibility of adjusting the weighting of items/tests without influencing the correctness of the answer provided by the student assessed as related to the algorithmic sequences achieved; c) the variable nuances of weighting; the assessor is not restricted by a score limit similar to the traditionally 9 point score; this means enables the division of each point up to the point it is considered useful, as there can also be used inferior variants as a total score, like the one provided in the present paper.

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