

Dance Notation as a Cognitive Aid

Experimental Labanotation Research for Dance Education

by
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Introduction

Labanotation not only preserves but also analyses and elucidates movement. This ability entitles it with good reason to an emphatic role in dance education. To verify this feature of LN and direct dance education from the automated, mainly unconscious imitative dance teaching ways to a more conscious and creative one, I started a Ph.D. project to investigate a possible solution for this change of dance education paradigm.

At the 1999 ICKL conference in Barcelona I have already indicated this intention. Searching for scientific supports, as a first step I have investigated the movement psychological backgrounds¹. The discovered cognitive psychological theses pointed out the following conclusions:

- the verbalization has an important role at the beginning of learning movement tasks²,
- cognitive factors might be used in an effort to improve performance (the cognitive factors do not become nonfunctional with practice)³,
- in the stage of perfection the mental activity makes the needed correction of the performance⁴,
- movement imagination has a positive effect during movement acquisition⁵,
- mental practice makes possible to structure and organize an action plan⁶
- mental practice also improves the quality of movement⁷.

Dance notation, especially Labanotation is a result of cognitive activity, a very intense, conscious analysis of movement. It also can be called the verbalization (or as we refer to it: the language) of movement though as Laban put it, it may go beyond the limits of the real language. To reconstruct dance from notation needs mental practice, as many of us see, imagine the movement from the score of the dance. Therefore regarding Labanotation a cognitive means may be taken a proven statement.

But *how* does Labanotation work in practice, how does it influence reconstruction, which aspects of dance get advantages using Labanotation, has not been experimentally investigated and documented so far. My intention was to introduce the *Experimental Labanotation Research*, to make it a science with hypothesis, conclusions based on experimentally verified results and repeatable processes⁸. The Laban system of notation is especially suitable for established scientific methods because of its high movement analytical capability and deeply developed contextual structure.

¹ Fügedi 1999, 152

² Adams 1971, Fitts 1962

³ Adams 1981

⁴ Sjobumov 1978

⁵ Paivio 1971

⁶ Minas 1980

⁷ *ibid.*

⁸ It seems so far only Moses carried out documented experiment on dance notation – see Moses 1993.

The Experimental Conditions

To ground a proposal that introducing Labanotation into curriculum may provide valuable help for dance education, an experiment was needed to verify this hypotheses. From the many possible approaches the experiment I accomplished, focused on primarily comparing dance reconstruction from Labanotation and from video. I constructed a task consisting of 12 short movement sequences (MS), the length ranged from one to eight measures. The MS were deemed to reflect some important movement features of Central European folk dances. Since these movement characteristics have not been researched and classified so far (I have initiated it in case of springs which was introduced in this forum in 1997⁹), here I outline shortly some general categories regarded essential from the point of dance style, based on the space-time-force trinity of movement.

Space:

- accuracy in direction
- accuracy in level (e.g. the proper up or down movement of the body, level of gestures, etc.)
- accuracy in making difference between movement categories (e.g. between step and spring, contacting or not contacting gestures, etc.)
- accuracy in weight distribution on the supporting body part (partial weight)
- accuracy in contacts (referring only to parts of the foot contacting the ground or each other, e.g. heel clicks)
- accuracy in rotation

Time:

- accuracy in rhythm (a very important feature in traditional dancing)
- accuracy in relation to the musical primary accent

Force:

less investigated in folk dance so far – I included only one genre

- the "bouncing" spring.

The task for the Notation Group (NG) was to reconstruct the MS from Labanotation, while the members of the Video Group (VG) were expected to do the same from video. Both groups consisted of 18 persons, between age of 20 and 40, six professionals and twelve amateur dancers. NG members were trained in Labanotation for two or three years (at corresponding courses), and all graduated at the Hungarian Dance Academy as dance teachers. VG members were selected not being educated in the analytical approach of Labanotation, or at very low level, not being able to use it in the case of the introduced tasks requiring high level analytical capabilities. Almost all participants started dancing before age 10, therefore even the amateurs could be regarded qualified performers. In the Central European traditional dance the male dance technique is considerably more difficult than the female material, therefore the sex of participants is important. The professionals were represented by 5 males and one female, the amateurs by 5 males and 7 females in the NG, and 7 males and 5 females in the VG. Since all the MS were selected from male dance material, the VG may be regarded slightly “stronger” in reconstruction ability.

The MS were ordered in an increasing difficulty re technique, rhythm, structure and tempo. The rule was for the NG members not to see the movements, therefore the NG and the VG

⁹ Fügedi 1997, 41-76

was separated during the experiment, and members of NG as well. There was no time limit for the reconstruction and the time needed for reconstruction was also not measured¹⁰.

During evaluation of reconstruction a different set of points were selected from the general list of categories regarded essential (introduced above) in case of each MS, and their fulfillment or absence indicated respectively by 1 or 0. The last evaluating criterion was the same for all the MS: the general spectacle of performance, whether it could be regarded dance or not, independently from the required accuracy. From this respect four categories were established:

- A: spectacular performance
- B: not spectacular, but acceptable performance
- C: hesitating performance
- D: impossible to evaluate (reconstruction given up)

Level A means splendid, enjoyable performance. Performance level B is not regarded really spectacular, but it means continuous dancing. Level C is not continuous, a kind of movement by movement, ragged performance. Level D means that the performance could not be evaluated either because it represented such a low level or the person gave up reconstruction.

Some Examples from the Experiment

There is no time here to introduce and analyze all the MS and their performance. I selected four, which may characteristically represent the relations of reconstructing and analyze dance from notation versus video.

MS 3

MS 3 consists of comparatively simple dance material with medium tempo, without special dance technique – see Fig.1. In the second measure a triplet made up from quarters can be found which is quite unusual in folk dance.

To my surprise reconstructing this MS caused a great trouble for the vast majority of the VG. The reason – and also a lesson for me – was its amorphous structure, the sequence of movements lacking the usual logic changing support and gestures¹¹, which made this MS one of the most difficult tasks.

From the evaluation chart it can be seen that while almost all the points were realized by NG members, none of the VG members realized the really unusual triplet in the second measure, and only two of the 18 recognized that the right leg is touching in measure 2.

Another very interesting point is that in general performance quality there was no recognizable difference between the NG and VG. The performance of both groups could be accepted as dance (NG: 10 A, 6 B, 2 C; VG: 10 A, 7B, 1 D), with two low-level (C) performance in E and one person could not reconstruct the MS in the VG. So VG performed generally convincingly but something very definitely different from what was expected.

¹⁰ I deeply regret it now, because as it turned out, the system of argument for Labanotation could also gain much from this aspect as well. But including the time factor needs a different, special research approach.

¹¹ To clarify this logic needs further research.

MS 10

In this longer MS the task was the two aspects of the same point: recognizing the uneven, 5/8 motive structure, then performing the shift in relation to the musical primary accent see Fig. 2.

If we investigate the notation of MS 10 we can realize a repetition of the support-gesture structure after five eights. Since the accompanying music had even metrical structure, and because the musical primary accent heavily influences our movement segmentation, it was a hard task for the VG to recognize the shift and another difficulty to perform it. A sharp contrast is that all the members of the NG solved the task without fault. Even the general performance level of the NG was higher than that of the VG.

MS 11

MS 11 was perhaps the most difficult task in the whole series because of the extremely high tempo and because the dance itself was familiar to few – see Fig. 3. Now the evaluation points were detailed, covering all the movements of the task.

The difference in reconstructing the expected movements is really striking here. Actually all the NG members were successful: the rhythm, the structure and the movements were simple and notation presented it for them unambiguously. Notation made them possible to abstract from tempo and build up reconstruction slowly. It is true although that some less trained ones could not perform at last the dance in the original tempo. In case of the VG even if some members recognized the syncopated rhythm, either they failed performing the right movement category or mixed the movements and performed the required categories at a wrong musical place. Now even the general performance level was higher in case of the NG. Although members of VG presented a greater number of level A, almost all failed performing the right movements.

MS 12

In case of MS 12 the task was different from all the others. Here the persons were shown a short, 8 measure long dance, and they had to state the structure – see Fig. 4.

An interesting result again that NG went deeper in the dance structure than VG. Except two, who could not state the structure, VG members were clearly influenced by the music where the two-measure long musical half-phrases directed their attention. As I could witness, many had to learn first the dance to be able to say opinion.

The NG members went deeper, they stated the structure in one-measure units. Though they were affected by the graphical identification of symbols, which may show a tendency for formalism. Three members of the NG gave two solutions. Interesting enough that neither NG nor VG members paid attention to the actual expression of the movement sequence, which clearly shows a cadency in the second measure with its closed posture and an amorphous structure afterwards with consequent upbeats by the right leg gestures.

Conclusions

Although the experiment has not been statistically analyzed so far, the research already presented many interesting conclusions.

It confirmed that Labanotation clearly reveals the structure of the dance and makes possible to reconstruct it as close to the original performance as notations reflects the concepts.

Labanotation is a great help in case of

- amorphous dance structure
- realizing shifts in relation to the musical primary accent
- high tempo

Since the performing quality depends heavily on training in fact significant difference in movement quality could not be pointed out here¹². However the NG showed a very definite vantage in *movement fidelity*. In other, harsher words even if the superficial spectator can not distinguish imitative reconstruction from a notation-based reconstruction, imitative reconstruction is definitely exposed to undesired change or loss of value in the movement material. Notation-based reconstruction can be regarded definitely far more reliable.

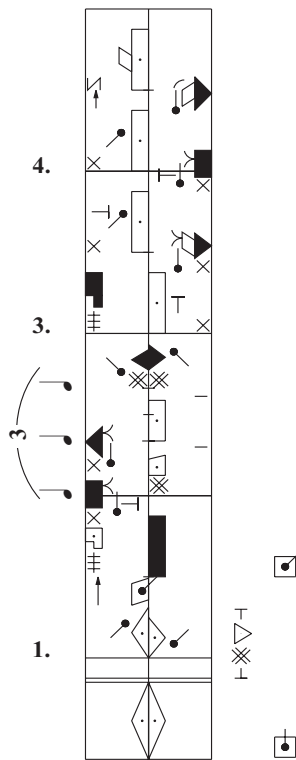
Let me close this presentation with a special thanks for my present and former students and my colleagues who helped this research by taking part in the experiment and devoted their precious time to promote the research in the field of Labanotation.

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¹² To point out the difference in performing quality between the two types of reconstruction was not a subject here, though as I have already experienced it exists. It can be proved in case of dancers at very similar level of training and with tasks selected specially for this purpose.

Movement Sequence 3.



Notation Group					
	3.1	3.2	3.3	3.4	3.5
1.	0	1	1	1	A
2.	1	1	1	1	A
3.	1	1	1	1	A
4.	1	0	1	1	A
5.	1	1	1	1	A
6.	1	1	1	1	A
7.	1	1	1	1	A
8.	1	1	1	1	B
9.	1	1	1	1	A
10.	1	1	1	1	B
11.	1	1	1	1	B
12.	1	1	1	1	C
13.	1	1	1	1	A
14.	1	1	1	1	B
15.	1	1	1	1	A
16.	1	1	1	1	B
17.	1	1	1	1	B
18.	1	1	1	1	C

Video Group					
	3.1	3.2	3.3	3.5	3.5
19.	0	0	1	0	A
20.	0	0	1	0	B
21.	0	0	0	1	A
22.	0	1	1	1	A
23.	0	0	1	1	A
24.	0	0	0	0	A
25.	0	0	1	0	B
26.	0	0	0	0	A
27.	0	0	1	0	B
28.	0	0	0	0	B
29.	0	0	0	0	B
30.	0	0	0	0	A
31.	0	0	0	0	B
32.	0	0	1	0	A
33.	0	0	0	0	D
34.	0	1	1	0	A
35.	0	0	1	0	A
36.	0	0	0	0	B

3.1	Measure 2.: performing the triplet
3.2	Measure 3. beat 2.: touching gesture
3.3	Measure 4. beat 1.: direction and rotation of leg gesture
3.4	Measure 4. beat 2.: direction and rotation of leg gesture

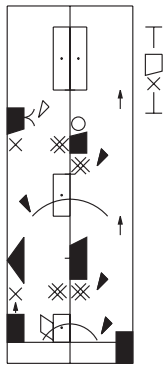
Movement Sequence 10.

1. 2. 3. 4.

Notation Group			
	10.1	10.2	10.3
1.	1	1	A
2.	1	1	A
3.	1	1	A
4.	1	1	A
5.	1	1	A
6.	1	1	B
7.	1	1	A
8.	1	1	A
9.	1	1	A
10.	1	1	B
11.	1	1	A
12.	1	1	C
13.	1	1	B
14.	1	1	B
15.	1	1	A
16.	1	1	B
17.	1	1	B
18.	1	1	C

Video Group			
	10.1	10.2	10.3
19.	0	1	A
20.	1	1	A
21.	0	0	C
22.	0	1	A
23.	0	0	C
24.	1	0	A
25.	1	0	A
26.	1	1	A
27.	0	0	D
28.	0	0	C
29.	1	0	A
30.	1	0	A
31.	0	0	A
32.	0	1	A
33.	0	0	C
34.	1	1	A
35.	0	0	C
36.	0	0	C

10.1	Recognizing the uneven, 5/8 motive structure
10.2	Performing the shift in relation to the music



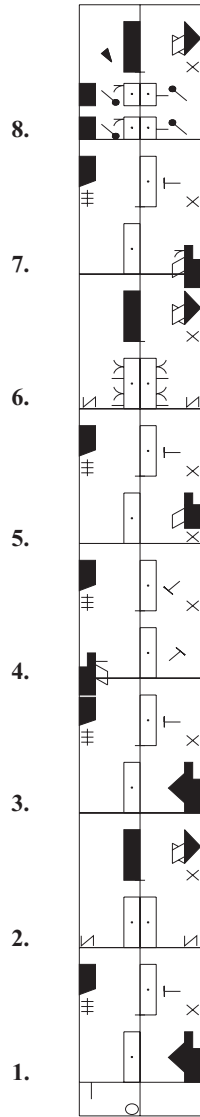
Movement Sequence 11.

11.1	Recognizing the rhythm
11.2	The accuracy of movement 1
⋮	
11.7	The accuracy of movement 6
11.8	Performance in the original tempo

Notation Group									
	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	1	1	1	1	1	1	1	0	B
2.	1	1	1	1	1	1	1	1	A
3.	1	1	1	1	1	1	1	1	A
4.	1	0	1	1	1	1	1	1	A
5.	1	1	1	1	1	1	1	1	B
6.	1	1	1	1	1	1	1	1	A
7.	1	1	1	1	1	1	1	1	A
8.	1	1	1	1	1	1	1	0	B
9.	1	1	1	1	1	1	1	1	B
10.	1	1	1	1	1	1	1	1	B
11.	1	1	1	1	1	1	1	0	B
12.	1	1	1	1	1	1	1	0	C
13.	1	1	1	1	1	1	1	0	B
14.	1	1	1	1	1	1	1	0	B
15.	1	1	1	1	1	1	1	0	B
16.	1	1	1	1	1	1	1	0	B
17.	1	1	1	1	1	1	1	0	B
18.	1	1	1	1	1	1	1	0	C

Video Group									
	1.	2.	3.	4.	5.	6.	7.	8.	9.
19.	1	0	0	0	0	0	0	1	A
20.	1	0	0	0	0	0	0	1	A
21.	1	0	0	0	0	0	1	1	A
22.	1	0	1	0	0	0	0	1	A
23.	1	1	1	1	1	1	1	1	A
24.	0	0	0	0	0	0	0	1	A
25.	1	1	1	1	1	1	1	0	A
26.	1	0	0	0	0	0	1	1	C
27.	0	0	0	0	0	0	1	0	C
28.	0	0	0	0	0	0	1	0	C
29.	1	0	0	0	0	0	0	0	C
30.	1	1	1	0	0	0	1	0	A
31.	0	0	0	0	0	0	0	0	A
32.	1	0	1	0	1	0	1	0	A
33.	1	0	1	0	1	1	1	0	C
34.	0	0	0	0	0	0	0	0	C
35.	1	1	1	1	0	0	0	0	C
36.	1	0	1	0	1	1	1	0	C

Movement Sequence 12.



Notation Group		
	12.1	12.2
1.	0	1
2.	0	1
3.	0	1
4.	0	1
5.	0	1
6.	0	1
7.	0	1
8.	0	1
9.	0	1
10.	1	0
11.	1	1
12.	0	1
13.	0	1
14.	0	1
15.	0	1
16.	1	1
17.	0	1
18.	1	1

Video Group		
	12.1	12.2
19.	0	0
20.	0	0
21.	1	0
22.	1	0
23.	1	0
24.	1	0
25.	1	0
26.	1	0
27.	1	0
28.	1	0
29.	1	0
30.	1	0
31.	1	0
32.	1	0
33.	1	0
34.	1	0
35.	1	0
36.	1	0

12.1	Structure stated by two measures (based on music)
12.2	Structure stated by one measures (based on notation)