

## MUTUAL INFORMATION TRANSFER BETWEEN TEACHER AND THE STUDENT

by

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The aim of this work is getting acquainted with lesson activities of a teacher and learners dominating in teaching. It seems interesting to find out which of them form interactions of feedback nature. The relations between the features of an authoritarian personality and preferred by them teaching methods were also researched. The research covered total of 46 physical education lessons conducted by teachers from Wrocław primary schools. The research method consisted in the observation of the process of teaching-learning, which took place during the lessons and was their main goal. The observation was performed with the use of Flanders technique (Flanders 1970) with the help of observation sheet and assistance of the film recording technique (video camera). The recording sheet covered actions of a teacher (10 categories) and learners (7 categories), every 10 seconds. Within the process of motor teaching teachers much more often transmit information towards learner than receive it. This relation is more often found in women than men. Among didactic activities of teachers one can observe the domination of verbal activities and those related to the observation of learner. Women talk more, while men observe more. The mutual arrangement of the activities of a teacher and learners confirms the low level of activity of learner in the information transfer towards teacher. Learner only listen and practice. The regulatory activities occur in all teacher and learner activities. Correction and change of the direction of the information transfer, being the reinforcement, constitute approximately 20% of the activities. Such activities occur more often with men than women. Teachers showed a balanced level of authoritarian and democratic features.

### *Introduction*

The process of teaching and learning proceeds as an interaction sequence between teacher and learners. The interactions take the form of activities performed by teacher and learners. Among the activities performed by teacher one can differentiate between, among others, verbal and motor activities, demonstrative and observation activities, as well as listening to learner, correction and activities supporting the process of information trans-

fer. Within the group of learners the activities may cover observation and listening to teacher, performing motor activities, movement demonstration and verbal transfer towards teacher (Flanders 1970, Newcomb et al. 1970, Srokosz 1993). Between these activities feedback occurs. The literature on subject contains its various descriptions and notions. It is called a stepping feedback (Tałyżina 1980), correction feedback (Galloway 1988), it is also referred to as the abbreviation TOTE (Miller et al. 1980) or simply behavior regulation (Tomaszewski 1976). The importance of feedback information in motor teaching is also emphasized in the works of Czabański, Schmidt and Wiesner (Czabański 2000, Schmidt 1988, Wiesner 1992, 1999).

In the process of motor teaching teacher provides learner not only with information related with the aim of teaching, but also with the significant feedback information. Thanks to the feedback information from teacher, learner may better recognize the whole course of the process of learning, learner may perform self-evaluation and correction of own activities. The feedback information from teacher to learner (T-L) affects the modification of learning (Czabański 2000, Galloway 1988, Schmidt 1988, Tomaszewski 1976).

Effective learning, based upon regulation, assumes that teacher is both the sender and the recipient of the information from learners. The perception of the information from learner takes place during the introductory recognizing, during current controlling of the learning process and during the evaluation. Limiting learner's perception, teacher will not be able to perform any diagnosis concerning learning and teaching, depriving oneself of the possibility to test his or her own didactic effectiveness. Information from learner (L-T) constitutes feedback information for teacher, which in turn influences his or her further didactical behavior (Schmidt 1988, Tomaszewski 1976, Wiesner 1999).

Mutual didactic observation of teacher and learner depends considerably on the nature of the personality of teacher. Research of Bukowiec and Srokosz implied that physical education teachers possess balanced nature, are extroverts, get on well with people around them, are self-confident and tend to dominate their surrounding (Bukowiec 1987, Srokosz 1993). The need to dominate is typical for an authoritarian personality. Teacher's authoritarian features would be marked by excessive sense of power, projecting, advantage of tutoring over accepting, lack of mutual trust and sincerity in contacts with pupils and so on. Teacher's authoritarian personality would make it difficult to regulate his/her didactic behavior (Newcomb et al. 1970, Tomaszewski 1976). This assumption requires empirical evidence.

The aim of this work is getting acquainted with lesson activities of a teacher and learners dominating in teaching. It seems interesting to find out which of them form interactions of feedback nature. The relations be-

tween the features of an authoritarian personality and preferred by them teaching methods were also researched.

Most researchers take up the problem of information transfer by teacher towards learner (T-L). The research conducted in this paper leads to becoming acquainted with the regularities related to the course of teaching in the relation of a learner being the information sender, whereas teacher – the recipient of the information from learner (L-T). The present work presents a fragment of conducted research.

### *Material and methods*

#### *A. Observation of the physical education lessons*

The research covered total of 46 physical education lessons conducted by teachers from Wrocław primary schools. The research method consisted in the observation of the process of teaching-learning, which took place during the lessons and was their main goal.

The observation was performed by way of Flanders technique (Flanders 1970) with the help of observation sheet and assistance of the film recording technique (video camera). The recording sheet covered actions of a teacher (10 categories) and learners (7 categories), every 10 seconds. Only these actions of a teacher and learners were analyzed which might contain information related to the didactic aim of the lesson. The way of description of the set of behaviors of a teacher and learners was inspired by the works of Bukowiec and Srokosz (Bukowiec 1987, Srokosz 1993, Wiesner 2001).

The didactic activities of teacher were divided into those related to information transfer to learner – *talking* (M), *showing* (P) and those related to the reception by learner of the transferred information – *observing* (O), *listening* (S), performing *other activities* related to the perception of learner, such as empathy, direct contact etc. (I). Similarly, the division was performed among learner: *talking* (M), *showing* (P), *practicing* (C), *observing* (O), *listening* (S), *doing nothing* (N), *disturbing* (Z). Besides, teacher's activities were additionally divided into *learning reinforcement* (W+, W-), *correcting* (K) and *organizing* (G). It was also assumed that teacher may do *nothing* for a while (N). Table 1 comprises the whole specification of all teacher's and learners' activities.

#### *B. Scale F*

The level of the features of an authoritarian personality of teachers was estimated by way of a balanced scale F, worked out by Athanasiou and modified by Adorno. The authority value is estimated at 1 to 6. The low values imply the democratic personality, whereas the higher ones - the authoritarian one (Newcomb et al. 1970, Tomaszewski 1976). The research covered 16 teachers who conducted the observed lessons.

### C. Statistical procedure

Activities of a teacher and learners, considered proportionally to the entire time of teaching, have been subjected to statistical analysis. The significance of the difference between the mean values of particular teachers' activities were calculated by use of t-Student test for dependent samples, and alternatively, the test of range signs of Wilcoxon was applied. Analogical values for women and men, including differences in the level of authoritarian personality qualities, were obtained by way of application of the t-Student test for independent samples and, alternatively, the U test of Mann-Whitney.

The Spearman correlation was applied in order to calculate the interdependence between the level of authoritarian features and teacher's work experience and the remaining variables, as well as the dependence between the activities of teacher and those of learner.

### Results and discussion

#### 1. Activities of teacher and learners

The gathered material, as a result of the observation of 46 lessons of physical education, contains 4670 mutual interactions between the activities of teacher and learner. Among the didactic activities of teacher dominates the observation of a learner – 1418 activities, which constitute 30.36% of the total of teaching activities. Only slightly fewer were the verbal activities of teacher – 28.72%. The results are shown in table 1.

Table 1. Teachers and learner activities occurring during the lessons of physical education (information from the lesson observation)

| Learner activities (L) | Teacher activities (T) |           |           |        |     |               |            |            |         |     | Sum L | %     |
|------------------------|------------------------|-----------|-----------|--------|-----|---------------|------------|------------|---------|-----|-------|-------|
|                        | Pass                   |           | Reception |        |     | Reinforcement |            | K          | G       | N   |       |       |
|                        | M                      | O         | S         | O      | I   | W             | +          |            |         |     |       |       |
| Speaking               | Showing                | Listening | Observing | Others | +   | -             | Correction | Organizing | Nothing |     |       |       |
| Speaking               | 5                      |           | 27        |        | 2   |               |            | 2          |         |     | 36    | 0,77  |
| Showing                | 10                     |           | 3         | 17     |     |               |            |            |         | 2   | 32    | 0,68  |
| Listening              | 1169                   | 47        |           | 4      | 13  | 45            | 24         |            | 149     | 1   | 1452  | 31,09 |
| Observing              | 8                      | 541       | 1         | 1      | 3   | 3             | 2          |            | 41      | 7   | 607   | 13,00 |
| Practising             | 141                    | 140       |           | 1388   | 69  | 132           | 15         | 415        | 142     | 28  | 2470  | 52,89 |
| Nothing                | 5                      |           |           | 8      | 4   |               |            |            | 32      | 14  | 63    | 1,35  |
| Distracting            | 3                      | 1         |           |        |     |               |            |            | 5       | 1   | 10    | 0,21  |
| Sum T                  | 1341                   | 729       | 31        | 1418   | 91  | 180           | 41         | 417        | 369     | 53  | 4670  |       |
| %                      | 28.7                   | 15.6      | 0.7       | 30.4   | 1.9 | 3.9           | 0.9        | 8.9        | 7.9     | 1.1 |       | 100   |

In the process of motor teaching the activities of a teacher and learners serve mutual information communication. Thus, the activities of teacher may be seen as activities related to sending and receiving of information towards learner. The transfer of information occurs by way of verbal communication, that is by movement demonstration and in indirect kinetic way (for example by arranging relevant practical activities for learner). The perception of the information from learner occurs as a result of observation of learner's activities, listening to his/her verbal statements, as a result of empathy, by means of test and control tests (Czabański 2000, Schmidt 1988, Wiesner 1999).

In all didactic activities of teachers prevails transmitting (M+P) over receiving (S+O+I), that means asymmetry in didactic communication between teacher and learner. Women dominate over men in the process of data transmission to learner. This difference is observed in particular in verbal activities – women talk significantly more than men. However, men considerably more often performed activities related to learner's perception (Tables 2, 6, 7, 8).

The collected empirical material imply that the main way of perception of learner is observation of his/her behavior. However, the transfer of information towards learner occurs mainly by verbal means. Here dominates such arrangement of mutual activities, during which learner practice, whereas teacher observes them. The dominant activity of learner was performing practical exercises (52.89% of the total of learner's activities) and listening to the verbal information of teacher (31.09%), (Tables 1, 3, 4). This data confirms the fact that learners are little active in the process of motor teaching in the transfer of information towards teacher.

The above results were compared with the research results obtained by other authors. The information is comparable in terms of proportions between particular ways of perception and ways of information transfer towards learner.

The data included in the table show nearly identical results obtained Bukowiec, Kocourka and Srokosz (Bukowiec 1987, Srokosz 1993, Zatoń 1995). Thus, the presented data confirms the thesis that observation constitutes the dominating way of learner's perception (over 80%), which constitutes around 30% of all teaching activities of teachers.

Learner nearly never transfer verbal information to teacher. The reason may lie in the specificity of the process of motor learning and perhaps teacher attitude does not give learner any chance of verbal contact with teacher. It is confirmed by the results of Zatoń and Srokosz (Srokosz 1993, Zatoń 1995). Receiving of verbal information from learner constitutes only 3.17% of the total teacher activities.

The t-Student test of dependent sample and (alternatively) the ranging sign test of Wilcoxon.

The examined feature: proportion of the time of performing particular activity with respect to the whole time of observation during particular lesson.

Table 2. Transmission (M+P) vs reception (S+O+I) of information (the whole material)

| M+P        |                    | S+O+I      |                    | Difference of mean values | Standard deviation of difference |           |       | Wilcoxon test |         |
|------------|--------------------|------------|--------------------|---------------------------|----------------------------------|-----------|-------|---------------|---------|
| Mean value | Standard deviation | Mean value | Standard deviation |                           |                                  | t-Student | p     | Z             | p-level |
| 0,467      | 0,166              | 0,320      | 0,143              | 0,147                     | 0,274                            | 3,632     | 0,001 | 3,196         | 0,001   |

Table 3. Talking vs showing (the whole material)

| M          |                    | P          |                    | Difference of mean values | Standard deviation of difference |           |          | Wilcoxon test |         |
|------------|--------------------|------------|--------------------|---------------------------|----------------------------------|-----------|----------|---------------|---------|
| Mean value | Standard deviation | Mean value | Standard deviation |                           |                                  | t-Student | p        | Z             | p-level |
| 0,301      | 0,139              | 0,165      | 0,092              | 0,136                     | 0,168                            | 5,497     | 0,000002 | 4,474         | 0,00001 |

Table 4. Listening (S) vs observing (O) (the whole material)

| S          |                    | O          |                    | Difference of mean values | Standard deviation of difference |           |           | Wilcoxon test |           |
|------------|--------------------|------------|--------------------|---------------------------|----------------------------------|-----------|-----------|---------------|-----------|
| Mean value | Standard deviation | Mean value | Standard deviation |                           |                                  | t-Student | p         | Z             | p-level   |
| 0,006      | 0,013              | 0,298      | 0,134              | -0,293                    | 0,134                            | -14,801   | <0,000001 | 5,905         | <0,000001 |

Table 5. Positive vs negative reinforcement

| W+         |                    | W-         |                    | Difference of mean values | Standard deviation of difference |           |        | Wilcoxon test |         |
|------------|--------------------|------------|--------------------|---------------------------|----------------------------------|-----------|--------|---------------|---------|
| Mean value | Standard deviation | Mean value | Standard deviation |                           |                                  | t-Student | p      | Z             | p-level |
| 0,037      | 0,048              | 0,007      | 0,017              | 0,029                     | 0,052                            | 3,832     | 0,0004 | 3,904         | 0,00009 |

The t-Student test for independent tests and (alternatively) the U test of Mann-Whitney

Table 6. Transmission (M+P) vs sex

| Women (N=32) |                    | Men (N=14) |                    |           |       | Mann-Whitney test |         |
|--------------|--------------------|------------|--------------------|-----------|-------|-------------------|---------|
| Mean value   | Standard deviation | Mean value | Standard deviation | t-Student | p     | Z                 | p-level |
| 0,504        | 0,164              | 0,382      | 0,143              | 2,422     | 0,020 | 2,280             | 0,023   |

Table 7. Reception (S+O+I) vs sex

| Women (N=32) |                    | Men (N=14) |                    |           |       | Mann-Whitney test |         |
|--------------|--------------------|------------|--------------------|-----------|-------|-------------------|---------|
| Mean value   | Standard deviation | Mean value | Standard deviation | t-Student | p     | Z                 | p-level |
| 0,311        | 0,153              | 0,341      | 0,118              | -0,643    | 0,523 | -0,633            | 0,527   |

Table 8. Correcting (K) vs sex

| Women (N=32) |                    | Men (N=14) |                    |           |       | Mann-Whitney test |         |
|--------------|--------------------|------------|--------------------|-----------|-------|-------------------|---------|
| Mean value   | Standard deviation | Mean value | Standard deviation | t-Student | p     | Z                 | p-level |
| 0,098        | 0,125              | 0,065      | 0,074              | 0,916     | 0,365 | 0,549             | 0,583   |

Table 9. Sex vs authoritarian features

| Women (N=32) |                    | Men (N=14) |                    |           |       | Mann-Whitney test |         |
|--------------|--------------------|------------|--------------------|-----------|-------|-------------------|---------|
| Mean value   | Standard deviation | Mean value | Standard deviation | t-Student | p     | Z                 | p-level |
| 3,050        | 0,379              | 2,831      | 0,555              | 1,564     | 0,125 | 0,716             | 0,474   |

However, in reality it is the verbal transfer which dominates during lessons (on average 50% of the total of teacher activities). Verbal communication in motor teaching amounts solely to transfer of information consisting of words, and not to mutual exchange of word information. In her studies Zatoń obtained identical results in this respect (Zatoń 1995).

## 2. Feedback occurring between the T-L activities

A strong relation (at the level of 0.001) was observed between the pairs of activities of teacher and learner, i.e. “*talking – listening*”, “*listening – talking*”, “*observing – practicing*”, “*showing – observing*”.

The study consisted in an attempt to describe those teacher activities, which play the regulating roles, that is which are of a feedback nature. According to the division suggested by Strzyżewski and Poplucz these are “control activities” (Srokosz 1993). They comprise observation, measurement and correction, as well as comparison of the result with the assumed goal. The high level of observation activities, stated in the research, thus constitutes the base for the regulatory activities of teacher. These activities are based upon the following algorithm of teacher activities: speaking – observing - correcting - speaking...etc. It was calculated how often the change of the direction appears, that is the change of the direction of information transfer from teacher towards learner and from learner to teacher (T–L). The regulatory activities are also covered by the correction activities of learner (on average 9% activities a lesson), in applied reinforcements (4.8% activities). The results are shown in tables 1, 5, 8, 10.

The above results show that teachers under research apply various forms of regulatory activities. On average during one lesson the change of direction of information transfer from and towards learner occurred 10 times. Generally, however, sending overwhelms receiving. Reinforcement aspect was of more informative than motivational character (Tomaszewski 1976). The positive reinforcement (reward) was applied four times more often than

the negative one (punishment). The regulatory activities mentioned constituted approximately 20% of the total of lesson activities of teacher, although they were also covered by other activities of teacher (for example in observing or in speaking).

### 3. Authoritarianism of teachers versus didactic activities

Teachers under research showed a balanced level of authoritarian and democratic features. One may conclude that the majority of physical education teachers possess features of a personality improving the interpersonal contacts with learner (Bukowiec 1987, Srokosz 1993). Women turned out to be, insignificantly more authoritarian than men (Table 9). That is perhaps why they showed lower tendency to regulatory activities than men.

Authoritarian teachers much more often performed activities related to learner's perception than those related to data transmitting. This result may be surprising, yet it must be related to the typical qualities of authoritarian persons, that is secretiveness and distrust, which affect self-control processes and thus cause limited transmission. Persons of democratic tendencies have shown, on the contrary, tendency to a larger amount of transmission activities (Table 10). This result, however, requires confirmation in further research.

Table 10. r - Spearman correlation of authoritarian features of teachers with the remaining variables. The whole material (n=46)

| Feature       | r             | T (N-2) | Level p |
|---------------|---------------|---------|---------|
| Changes       | 0,177         | 1,193   | 0,239   |
| Chang. coeff. | 0,218         | 1,483   | 0,145   |
| <b>M</b>      | <b>-0,366</b> | -2,609  | 0,012   |
| P             | -0,158        | -1,062  | 0,294   |
| <b>M+P</b>    | <b>-0,407</b> | -2,952  | 0,005   |
| S             | <b>0,252</b>  | 1,724   | 0,092   |
| <b>O</b>      | <b>0,376</b>  | 2,691   | 0,010   |
| I             | 0,262         | 1,801   | 0,079   |
| <b>S+O+I</b>  | <b>0,343</b>  | 2,424   | 0,020   |
| W+            | 0,155         | 1,042   | 0,303   |
| W -           | -0,180        | -1,213  | 0,231   |
| G             | 0,312         | 2,181   | 0,035   |
| N             | -0,117        | -0,784  | 0,437   |
| K             | -0,014        | -0,091  | 0,928   |

The correlation coefficients statistically significant at the level of  $p \leq 0,05$  are represented in bold.



## Conclusions

1. Within the process of motor teaching teachers much more often transmit information towards learner than receive it. This relation is more often found in women than men.
2. Among didactic activities of teachers one can observe the domination of verbal activities and those related to the observation of learner. Women talk more, while men observe more.
3. The mutual arrangement of the activities of a teacher and learners confirms the low level of activity of learner in the information transfer towards teacher. Learner only listen and practice.
4. The regulatory activities occur in all teacher and learner activities. Correction and change of the direction of the information transfer, being the reinforcement, constitute approximately 20% of the activities. Such activities occur more often with men than women.
5. Teachers showed a balanced level of authoritarian and democratic features.

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