SINGLE SUBJECT EXPERIMENT EXPERIMENTAL DESIGN – IN THE BENEFIT OF STUDENTS WITH DISABILITIES*

Maria SALLOUM,
PhD, Lecturer,
„Aurel Valicu" University of Arad, Romania

Abstract: Single-subject research is a rigorous, scientific methodology used in clinical activity and in special education. Our article show that a specific study and practice offer a useful methodology in the benefit of children with disabilities and their families. We started from our desire to see the extent to which a disabled child can be helped in learning, when she was receiving a support teacher and the importance of knowing strategies to approach a child with some disability, by the class teacher, in order to provide truly equal opportunities to education. The experiment is a clear indication that when instruction is in accordance with educational requirements of children, the results of work can be surprising.

Keywords: Single-subject experimental designs, baseline, integrated in mainstream school.

The single-subject experimental paradigm has much to offer as a clinical and an educational research tool. It provides a flexible alternative to traditional group designs. Single-subject experiment may involve only one participant or multiple participants in a single study. Performance before intervention is compared to performance during or after intervention. Dependent variables are form of observable behavior and are measured repeatedly. Independent variable is the intervention, it is actively and manipulated. Measurement of dependent variable during baseline is sufficiently consistent to allow prediction of future responding

* Paper presented at The International Synposium *Research and Education in an Innovation Era*, 6th Edition, December 8th -10th 2016, Arad

in therapy. Experimental control allow confirmation of a functional relationship between manipulation of the independent variable and change in the dependent variable.

In our study we have only one participant, a nine grade girl with hard hearing disability which studies in an Art High School.

Method

We have proposed an action research which has as a g**eneral objective:** increase the quality of life of pupils with disabilities and some **specific objectives:**

1. Changing the attitudes of the teachers regarding accepting children with disabilities in mainstream schools, by raising awareness and improvement.
2. Identify barriers of the teachers on the integration of children with SEN.
3. Acquiring specific strategies to address students with different disabilities by teachers working with integrating children into mainstream schools.

Because, using an experiment with a single subject, we could clearly establish the causal relationship between the attitude of teachers and school performance, we have done a research which showed the importance of strategies in order to address to pupils according to their specific disability.

Before therapeutic intervention, the research participant has undergone an observation periods, respectively two months. It was found the presence of maladaptive behaviors exhibited by topic in certain situations.

During the hours of specialized workshop (perspective, sketches, composition) students received work instructions while performing different tasks. After several consecutive hours on subjects requiring precision and execution of drawings by specific patterns, the girl failed to complete the task and became anxious.

The drawings were mediocre, they did not comply with the requirements requested by the teacher, the school marks reflected the quality of execution of tasks and the student manifests quitting: she do not wanted to attend these lessons anymore, and the teacher made her inhibited and anxious. When the teacher explains the particular pattern and logical approach of execution, the girl managed to execute the drawing correctly, and obtained high marks.

At first sight, teachers felt that the student is not consistent or is working inconstant.

Following the assessment of the situation, we have set ourselves the goal for the study: to develop the interest of the student in the sketches discipline by offering direct access to work tasks by another teacher, on after-school form of tutoring and delegating a colleague as a consultant in the classroom. We achieve the following objectives: to decrease anxious behavior of the student in the presence of the teacher and to develop the individual autonomy during school classes (by increasing confidence in her own abilities).

We started the following assumption: There are significant differences in terms of interest on drawing sketches in base phases and stages of intervention, meaning that it is raising with the help of therapeutic intervention (using individual counseling and positive reinforcement) and reflected by school marks.

Participant and design:

The participant of the study is a teenager, aged 16, in nineth grade at the Art High School. At age two, through computerized tomography, she has been diagnosed with hearing disability - bilateral atresia of middle ear, auditory canal total atresia. The causes are unknown, both parents and two years older sister are hearing. Hearing loss is 70 decibels on the right ear and 80 decibels on the left ear. She has a bone conducted prothesa, placed on mastoid with a removable belt. The disability can be included such a severe hearing loss. She made speech theraphy from the age of two and a half and now she owns lips reading. She has a slight linguistic retardation associated with hearing disability. She pronounce correctly all the words, but the specific topic is according deafs, she makes linguistic disagreements. She was given Raven Standard Progressive Matrices test, being nonverbal is was easily administered to people with hearing disability. Intellectual coefficient (IQ) is 118 and she can be integrated in "above-average intelligence." We used also Unconditional self acceptance questionnaire (USAQ), where the score was 93 points (unconditional self acceptance - intermediate level) and Self-esteem Rosenberg Scale, the score was 31 points (medium level of self-esteem). We also use a sociometric test. We found that the girl is neighter rejected, nor preferated, but rather ignored by her school mates.

We used an experiment with a single subject, reversing ABAB pattern. In the first phase (A) design (the first baseline), we measured objectively and repeatedly anxious behavior of the participant to the research, thus establishing the basic behavior submitted to. In the second phase she was introduced to therapeutic intervention (B), which consisted of individual counseling after school. In the third phase (A) we eliminated the therapeutic intervention and we restore the level of base.

In the last phase of design (B), we were applied the therapeutic intervention again.

Instruments and procedure:

During observations carried out in the school class, we found that when the load of work was explained individually to the girl, the results were very good, as opposed to situations where teaching was front, due to the loss of hearing or the fact that hearing aid is not effective at a distance greater than about 2m. So we considered it was necessary individual counseling materialized after hours.

The intervention period lasted 56 days, 14 days for each of the four phases. We counted daily drawings made by the subject on its own initiative, and the results were accounted for in an observation grid, which helped us to organize and systematize intervention results during the 56 days:

Table. 1. Grid observation. The number of drawings executed by subject in each of the four phases of the experiment.

Day	Phase A	Phase B	Phase A	Phase B
1	2	4	4	3
2	0	3	2	4
3	0	4	2	4
4	0	5	3	5
5	1	5	2	4
6	2	6	1	4
7	1	7	4	6
8	2	7	3	4
9	0	5	3	5
10	0	5	1	5
11	0	5	5	5
12	1	5	5	4
13	1	6	2	6
14	1	8	1	6
Total	11	75	38	65

At the same time we watched the anxious behavior of the student during the execution of drawings, the quality of drowings, marks obtained in school or marks obtained in individual consultations. For

intervention phase (B), we worked with a specialized teacher who conducted individual counseling and explained the requirments from a small distance. The girl had the opportunity to ask if she did not understand something, thus she received further explanations. The intervention lasted 14 days, the student was monitored daily during this period. There were four meetings with the teacher, at intervals of time (Monday and Thursday) and on other days the student was assisted by a classmate, who possesses very good technical work and was delegated by the teacher to provide advice when needed. In the next phase of the experiment, the basic level 2 (A), all means of intervention were withdrawn and we returned to observing the behavior of the student, without intervening treatment but monitoring of the grid. In this phase we had the opportunity to see if changes in behavior are due to our intervention. The last phase of the experiment, intervention 2 (B), meant the reintroduction of therapeutic intervention that we used a first intervention. It was kept the same structure of the intervention. The news in this phase was the moving to another stage in teaching sketches (outline of the human body placed asymmetrically), which means a new challenge in terms of technical learning.

Results:

The degree of stability of the base level of experiment was calculated using the turning points test and the results are shown in the following table:

Table 2. The basic level of stability A

T calculated	T expectated	P calculated
3	14	.21<.66

The string of 14 data of the first phase are: 2, 0, 0, 0, 1, **2, 1, 2**, 0, 0, 0, 1, 1, 1. There are two points of the top, one bottom point, and three turning points. The number of expected turning points is greater than calculated points. It indicates that successive points are correlated and there is a certain trend in the average variance of the data. This is confirmed by calculated p-value (.21) higher than the critical p (.66), which represents the probability of finding a turning point in three successive observations, respectively 2/3 (.66). Thus we can say that in our experiment, the characteristics of the basic level meet the requirements of the degree of stability.

We compared the results of the four phases of the experiment, respectively basic phases alternate with phases of intervention. For statistical processing of the data we used simple ANOVA for independent

samples, considering repeated measurements of the basic levels and interventions levels as data from independent groups of subjects.

The decision to use ANOVA for independent samples was taken after previously we checked the normal distribution of data (K S = 1.138, p = .150 cal> .05), graphical representations of data from four experimental phase.

Table 3. Statistics index for the variables involved

	M	Σ
Baseline 1	.78	.80
Intervention 1	5.35	1.33
Baseline 2	2.71	1.38
Intervention 2	4.64	.92

From the table above we can see that the average of observed behavior (interest in drawing sketches resulted in the number of drawings made on her own initiative) in phases 2 and 4, respectively during interventions, is greater than the stages of base 1 and 3 when the subject was monitored without intervention.

Table 4. Comparison between the number of observed behaviors manifested in the four experimental phase

	SP	Df	PM	F	P calc.
intergroup	177.48	3	59.16	45.47	.000
intragroup	67.64	52	1.30		

Data presented in table 3 confirm our expectations and reveal significant differences {F (3,52) = 45.47, p calc. = .000 <P critic .01}, which highlights a growing interest for drawing phases of intervention compared to basic phases. Increasing interest in drawing can be seen in the quality drawings executed, too (Annexes).

The drawings of the first phase of the experiment are clumsy, they do not respect any rule of execution. The first intervention phase shows remarkable progress and understanding tasks. In the third stage there is a slight grasp of the art fixed during the intervention, but without individual support, new enforcement of contrapost details are deficient. In the last phase, introducing the second intervention, the subject manages to perfect her technique, this creates a psychological comfort, less anxious, more relaxed work and pleasure.

Anxiety during the observations and the first phase of the experiment was due, on the one hand, to uncertainty given to the inability to understand workloads at times when the teacher addresses the whole class, from a distance too great to understand what he or she says, and on the other hand, the fact that there was no manual or other written support from which to find the necessary information.The subject is very technical and the execution of sketches is making after some very precise rules, which once learned, provide safety and enables students to improve their execution, to make the step to detail, finesse and quality executions.

During the observation and basic phase (A), the teenager was tense, she was upset because she could not make the homework alone, she tried several times to make sketches at home but she failing and erased much of what she drew, she broke the sheets, then became agitated. She told her parents that she was afraid to go to the sketch class because that teacher "would believe I am stupid", she could not sleep well.

During the classes she was inhibited, she failed to do almost anything and the teacher, in turn, threatening her and told her that she does not belong to an art high school, that she "entangled" and punished her to do another ten sketches for next class without explaining her the technique individually.

On the intervention phase it was chosen another teacher from the same school, with which the subject had another discipline, less technical (color) and with which she had a much closer relationship. During the classes of consultation, the girl listened carefully, was able to engage in dialogue with the teacher, to request an explanation of technical terms. The tasks were more easily understood, she was cooperative, relaxed. The first drawings were executed with small mistakes but from the beginning, one could see that she understood the technique of work, followed the rules and proportions. Drawings gradually became well done and quite beautiful. At home she was quieter, she was drawing on her own initiative, she had the desire to improve her technique and to reduce working time. If at first she needed an hour for a sketch, at the end of 14 days of intervention she could make a sketch in about 5 minutes.

In the third phase, after the withdrawal intervention, the specialist teacher switched to teaching contrapost sketches, involving drawing of a human body in a relaxed position, or sitting and also introduce other technical rules. The girl managed to draw the body proportions fixed during the intervention phase but she failed to understand without individual support, the new rules of drowing according changing the center of gravity and body relaxation. She started

to be tense again, agitated, her fear of going to school appeared and she asked her parents to find a teacher to teach her in private because she realized how much she was helped during the intervention phase.

The last phase of the experiment, the second intervention, was eagerly awaited by the girl and by her parents, and the results were again spectacular.

Another proof of the successful intervention were the marks resulted in school class. In Phase 1, she received two marks of 5, in the second phase she received 7 and 10, in the third phase she received a 5 and a 6, and on the last phase she received good marks again, 9 and 10.

The success of the experiment enables us to say that for students with disabilities integrated into mainstream education in high schools, there needs to be a support teacher. Also we consider that the attitude of the teachers is extremely important. Very often teachers, even if they know that the student has a sensory or locomotor disability, they do not know how to approach them and labels them from the beginning as incapable, although these children may be very intelligent and with expert support they are able to achieve even performance.

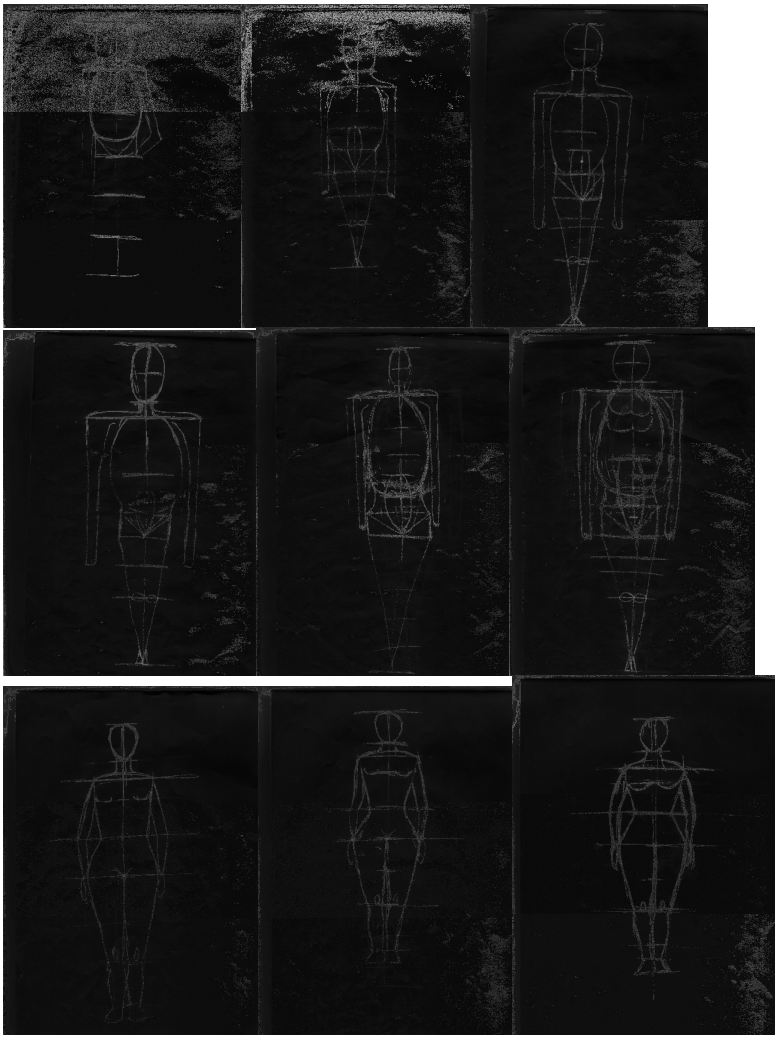
In order to change the attitude of teachers there are needed training courses in order to identify the existence of possible obstacles to their availability, to value the their experience, for raising awareness and empathy with parents and pupils concerned. To approach the needs of children with disabilities integrated in mainstream schools, we need well-defined strategies, a very good information and documentation. This can not be done if there is not availability and the integration of children is done without preparing ourselves. Therefore we find it is very important that the first part of a course on the integration of children with disabilities to focus on awareness.Without awareness, being familiar with all the problems faced by children with disabilities and their families, without knowing the full implications of disability, the real limits of possible recoveries, the effort required from the child, the teacher is failing. He or she has no the right perspective on particularly heavy and generous burden it involves.

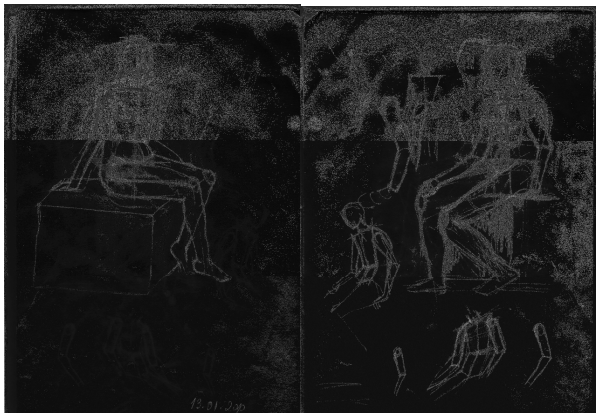
Conclusion

The experiment with single subject, started from our desire to see the extent to which a disabled child can be helped in learning, when she was receiving a support teacher and the importance of knowing strategies to approach a child with some disability, by the class teacher, in order to provide truly equal opportunities to education, on the other hand, in order to incrase the psychical and physical potential of a child to its true value. The experiment is a clear indication that when instruction is in

accordance with educational requirements of children, the results of work can be surprising. When the child understands what he or she have to do and feels accepted and encouraged, he or she is more interested in school tasks and more motivated.

Anexes:





References

Horner, H. Robert; Carr,G. Edward; Halle,James; Mcgee, Gail; Odom,Samuel; Walery,Mark, (2005), The Use of Single-Subject Research ti Identify Evidence – Based Practice in Special Education, *Council for Exceptional Children, 2005, Vol. 71, nr. 2*, pp.165 -179

Radu, Ioan; Miclea, Mircea; Albu, Monica; Moldovan, Olga; Nemeş, Sofia; Szamoskozy, Ştefan, (1993), *Metodologie psihologică şi analiza datelor*, Editura Sincron, Cluj-Napoca

Salloum, Mioara Maria, (2011). *Starea de bine la persoanele cu dizabilităţi*, Editura Napoca Star, Cluj-Napoca