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ORIGINAL RESEARCH

Effect of a movement education program on the level of bodily-kinesthetic intelligence of preschool children (5-6 age)

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Abstract

The research is designed to identify the effect of a movement education program on the bodily-kinesthetic intelligence level of children in the kindergarten stage (5-6 age) using the experimental method of two groups, a control one and an experimental one, using the pretest and posttest for both groups due to its relevance to the nature of the research. The research sample has been randomly chosen from the kindergarten children of El Sayeda Khadija Accredited Primary School in Port Said, during the second semester of the academic year 2018/2019. The main sample is 40 children randomly distributed into two equal groups, each of 20 children. The author has verified the normality of the main sample distribution, the invariance of the experimental and control groups under investigation, the availability of scientific coefficients, validity, and reliability of the intelligence testing battery used under investigation. The most important results are that the proposed movement education program has realized positive results better than the usual movement education program at the bodily-kinesthetic intelligence level of kindergarten children (5-6 age).

Keywords. Bodily-kinesthetic intelligence, movement education, preschool children.

Introduction

Movement education is one of the important aspects of the kindergarten child's educational system, which aims to achieve the maximum evolution and development of children's energies, not only at the physical/motor level, but at the level of the child's personality with all its dimensions and components, deriving this from the important and main rules of the sciences related to the growth of the child's personality, using this to be linked to the urgent desire of children for activity and movement. That is done through a directed and organized practice of movement education activities in the light of a developed curriculum, the child has the right to play, learn and innovate in the light of their abilities and willingness (El Badri, 2012).

Kindergarten is a part of the preschool system. This system is based on introducing the child to society, providing them with socializing skills, and teaching them through play. Play is the use of the body's kinetic energy to bring psychological pleasure. There is no play without mental and physical kinetic energy. Since ancient times, people have considered playing a prominent aspect of childhood and an integral part of it, and that it is a way to unload the excess energy that children enjoy. It also develops mental abilities through cognitive games that stimulate the five senses in children, increase thinking skills, and thus develop kinesthetic intelligence (Al Khalidi & Al Ghurairi, 2015). It is also one of the important stages in which the child is built emotionally, physically, and mentally. Studies conducted in growth have shown that human intelligence lies in the kinesthetic activities done (Al Mousawi, 2016).

There must be interaction among children, and between children and a teacher in order to develop motor, cognitive and social abilities. This development must be appropriate to the characteristics of the child's development, and through movement education

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programs (Kirchner & Fishburne, 1998; Ibrahim et al., 2020; Tsaki & Ziane, 2021).

As the author is a supervisor of field education, he has noticed the weak level of bodily-kinesthetic intelligence of preschool children in Port Said Governorate. He could support his observation by conducting a pilot study, the results of which showed a weak level of bodily-kinesthetic intelligence of this age group under investigation in Port Said Governorate. Then he presented these results through a questionnaire to 7 experts in physical education curricula and methodology, whose results were objective for this observation with an agreement of up to 85.71%.

The author believes that this weak level of bodily-kinesthetic intelligence of preschool children in Port Said Governorate may be due to the lack of use of movement education activities, and reliance on a group of motor activities taught to children using the usual program by using kinetic duties. Therefore, the idea of the current study has been crystalized, which is to examine the effect of a movement education program at the level of bodily-kinesthetic intelligence of preschool children (5-6 age). This proposed program may have a positive effect better than the usual program at the level of bodily-kinesthetic intelligence of the population under investigation.

The author has also supported his observation by reviewing the results of some reference studies characterized by modernity that dealt with examining bodily-kinesthetic intelligence as a dependent variable, such as the studies of Nariman (2015), Al Khalidi & Al Ghurairi (2015), El Sayed (2016), Michelaki (2016) Saber (2018), Ibrahim (2020), Badawi (2020), Hanafi et al., (2020), Boumesjed & Guettaoui (2020). These studies have concluded the positive effect of using the independent variables at the level of bodily-kinesthetic intelligence under these studies and scientific research.

The author has found no research or scientific study that dealt with examining the effect of a movement education program at the level of bodily-kinesthetic intelligence for preschool children (5-6 age) in Port Said Governorate, which has prompted him to conduct the current research. This study should be a scientific addition that may contribute to identifying the effect of a movement education program at the level of bodily-kinesthetic intelligence of children in kindergarten (5-6 age) in Port Said Governorate. It should contribute to disseminating the culture of using movement education programs for preschool children, and reaching practical results based on experimentation, and logical interpretation in the light of reference studies that contribute to determining how much some of the objectives of movement education programs are achieved, according to the determinants of research.

The objective of the study was to identify the effect of a movement education program at the level of bodily-kinesthetic intelligence of children in kindergarten (5-6 age) in Port Said Governorate.

Methods

The study employed an experimental method of two groups, one of them was control and the other was experimental using the pretest and post-test on both groups due to their relevance to the nature of the research.

The research population was represented by preschool children (5-6 age) in the Kindergarten of El Sayeda Khadija Accredited Primary School in Port Said Governorate. They were 115 children during the second semester of the academic year 2018/2019.

The research sample was randomly chosen from the kindergarten children of El Sayeda Khadija Accredited Primary School in Port Said Governorate, during the second semester of the academic year 2018/2019. The total sample size was 80 children, at 69.57% of the research population. They were randomly distributed as follows:

Main sample: It was 40 children; they were randomly distributed into two equal groups, each of 20 children.

Pilot sample I: It was 10 children to conduct the pilot study to identify the level of bodily-kinesthetic intelligence of children of that age group, ensure the objectivity of the author's observation, and identify the research problem, from the same research population and outside the main sample.

Pilot sample II: It was 20 children to find the scientific coefficients of the tests under investigation, from the same research population, and outside the main sample.

Pilot sample III: It was 10 children to ascertain the appropriateness of implementing the proposed experimental program to understand and be aware of the children under investigation, and that the tools used in conducting the main experiment were valid, from the same research population and outside the main sample.

The author has chosen the stage, school, and grade for reasons that include the preschool stage, which is one of the most important stages of building and forming a person's personality and represents the main base that determines how much their preparation is comprehensive and balanced of all aspects of their personality in the future. The problem of the research is the weak level of bodily-kinesthetic intelligence of children of that age group. Material and human capacities are available in the school. The school administration agreed to conduct the experiment under investigation, its cooperation and interaction are expected, and they are aware of the research problem, and its applied importance.

Normality of sample distribution in the variables under investigation

The author has checked the normality of the main sample distribution under investigation by finding the value of the skewness coefficient of growth rates (length, age, weight), and the level of bodily-kinesthetic intelligence of the main sample in the pretest under investigation, which ranged between 0.340 and 1.191, with 0.374 standard error, and all of these values were within ±3. That indicates the children distribution of the main research sample under investigation in those variables is normal.

Invariance of sample in the variables under investigation

The author has made sure of the invariance of the main sample under investigation; by finding the significance of the statistical differences between the pretest mean scores of the control and experimental groups in the growth rates and the bodily-kinesthetic intelligence level. The calculated t-value ranges between 0.158 and 1.217, with statistical significance levels between 0.231 and 0.875, and values >0.05. This confirms that these differences between the two groups are not real and that the control and experimental groups are invariant in the pretest of these variables under investigation.

Tools

Measurement of growth rates: age, height, weight.

Bodily-kinesthetic intelligence testing battery: The author has used a bodily-kinesthetic intelligence testing battery prepared by (Shalash et al., 2007), previously applied by (Saber, 2018; Ibrahim, 2020) to the same research population. It consists of the following tests: Dropping the ball, spinning around the circle, colored ruler, sound and movement, and walking to the circle.

Scientific coefficients of bodily-kinesthetic intelligence testing under investigation

Validity: The author has verified the validity of the bodily-kinesthetic intelligence tests under investigation by using discriminant validity. That was done by applying the tests to the pilot sample II, which was 20 children from the same research population and outside the main sample. The significance of the statistical differences between the mean scores of the higher and lower quartiles was then found. The calculated t-value ranged between 5.007 and 15.088, with a statistical significance level between 0.000 and 0.875, and values< 0.05. This confirms that there are no statistically significant differences between the mean scores of the higher and lower quartiles, and those tests under investigation are valid.

Reliability: The author has used the method of applying the tests and then re-applying them 15 days after the first application to the children of the pilot group II, which was 20 children from the same research population and outside the main sample. The correlation coefficient between the first and second applications was then found. The calculated t-value ranged between 0.525 and 0.931, and with a level of statistical significance that ranged between 0.017 and 0.000, and the values <0.05. That indicates that these tests are reliable.

Movement education program

The author has designed a movement education program, in light of the growth characteristics of this age group, by reviewing specialized scientific references and reference studies. This was done according to the following steps:

Determining and formulating general objectives: That the child can develop the level of the components of motor fitness, perform main movements, and develop the level of bodily-kinesthetic intelligence.

Determining the purposes of the program: That the child can develop the components of motor fitness that the child can develop, main movements that the child can develop the bodily-kinesthetic intelligence.

Foundations of developing the proposed movement education program: a) Motor experiences must be meaningful to children, b) they must suit the children's inclinations, needs, and preparedness, c) Feedback is provided through children's understanding, knowledge, and awareness of the program's objectives, d) the motor experiences and activities provide challenging and fun opportunities for children, e) the practice must be organized and rationing of loads must be rationed, f) opportunities for participation and practice are provided for all children and trial and error are relied on, g) kinetic experiences are linked to school activities and life needs, h) success experience and elements of motivation are provided, i) appropriate medium for motor learning is created, j) security and safety factors are provided, k) material and human resources are provided, and l) making comparisons between children must be avoided,

Program duration: The application time of the program took 8 weeks, 2 lessons per week, a total of 16 lessons, and the lesson time were 40 minutes.

Program content: Based on reviewing scientific references and reference studies, the content of the proposed movement education program included three procedures: introductory part, main part, and final part. The author has considered teaching the two groups of research, control and experimental, adhering to the time distribution and educational content.

Executive research procedures

Pilot studies: The author conducted the first pilot study aiming to identify the level of bodily-kinesthetic intelligence of children of that age group, ensure the objectivity of the author's observation and identify the research problem, from 11.09.2019 to 12.09.2019. The second pilot study was conducted aiming to ensure the availability of scientific coefficients, validity, and reliability of the tests under investigation from 15.09.2019 to 29.09.2019. The third pilot study was conducted by applying one of the lessons of the proposed educational program to find out the suitability of its content to the children's abilities under investigation, and to test the validity of the place and the tools used to implement the program on 30.09.2019. The results of the experiment resulted in the appropriateness of the lesson content to the abilities of the children, and the validity of the place and the tools used.

Pretesting: The author carried out the pretests for the two main research samples in growth rates, age, height, weight, and bodily-kinesthetic intelligence under investigation from 01.10.2019 to 02.10.2019.

Main experiment: The author applied the main experiment from 06.10.2019 to 05.12.2019 to a sample of 40 children divided into two groups of 20 children each as follows:

Group I (control): Using the usual movement education program, which is based on kinetic duties.

Group II (experimental): Using the proposed movement education program.

Post-testing: The author carried out the posttest for the two main research samples in the bodily-kinesthetic intelligence under investigation from 08.12.2019 to 09.12.2019.

Statistical treatments: To verify the objectives of the research and test the hypotheses, the author used the statistical software SPSS Ver. 26 in processing the data under investigation statistically, arithmetic mean, median, standard deviation, skewness coefficient, one-group t-test, and two-group t-test.

Results

Table 1 shows that the calculated t-value of the variables under investigation ranges between 3.731 and 8.282, with a statistical significance level of 0.000 and 0.001, and values <0.05. This confirms that there are statistically significant differences between the mean scores of the pretest and posttest of the experimental group in the bodily-kinesthetic intelligence level in favor of the posttest.

Table 2 shows that the calculated t-value of the variables under investigation ranges between 2.963 and 4.710, a statistical significance level of 0.000 and 0.005, and values <0.05. This confirms there are statistically significant differences between the mean scores of the pretest and posttest of the control group in the level of bodily-kinesthetic intelligence in favor of the posttest.

Table 3 shows that the calculated t-value of the variables under investigation ranges between 2.459 and 4.427, with a statistical significance level of 0.000 and 0.019, and values <0.05. This confirms there are statistically significant differences between the mean scores of the posttests for the experimental and control groups in the level of bodily-kinesthetic intelligence in favor of the experimental group.

Table 1

Significance of statistical differences between the mean scores of both pretest and posttest of the experimental group in the level of bodily-kinesthetic intelligence (n = 20 children).

	Variables	Measurement Unit	Pretest		Posttest		Mean differences	*t*	***p***
			Mean	SD	Mean	SD			
1	Dropping the ball	Cm	13.82	1.0460	11.768	0.614	2.052	7.572	0.000
2	Spinning around the circle	Second	12.587	0.416	10.643	1.062	1.944	7.626	0.000
3	Colored ruler	#	4.050	1.191	5.400	1.095	1.350	3.731	0.001
4	Sound and movement	Second	5.494	0.510	4.366	0.332	1.128	8.282	0.000
5	Walking to the circle	#	2.350	1.089	3.700	0.801	1.350	4.464	0.000

** p < .05*

Table 2

Significance of statistical differences between the mean scores of the pretest and posttest of the control group in the level of bodily-kinesthetic intelligence (n = 20).

Variables	Measurement Unit	Pretest		Posttest		Mean differences	t	*p*
		Mean	SD	Mean	SD			
Dropping the ball	Cm	13.730	1.034	12.673	0.803	1.057	3.612	0.001
Spinning around the circle	Second	12.629	0.422	11.667	0.811	0.962	4.710	0.000
Colored ruler	#	3.500	1.147	4.650	0.813	1.150	3.658	0.001
Sound and movement	Second	5.411	0.389	4.944	0.481	0.467	3.370	0.002
Walking to the circle	#	2.150	0.875	2.900	0.718	0.750	2.963	0.005

** p < .05*

Table 3

Significance of statistical differences between the mean scores of the two posttests of the experimental and control groups in the level of bodily-kinesthetic intelligence (n1 = n2 = 20).

	Variables	Measurement Unit	Experimental group		Control group		Mean differences	t	*p*
			Mean	SD	Mean	SD			
1	Dropping the ball (cm)	Cm	11.768	0.614	12.673	0.803	0.905	4.004	0.000
2	Spinning around the circle	Second	10.643	1.062	11.667	0.811	1.024	3.428	0.001
3	Colored ruler	#	5.400	1.095	4.650	0.813	0.750	2.459	0.019
4	Sound and movement	Second	4.366	0.332	4.944	0.481	0.578	4.427	0.000
5	Walking to the circle	#	3.700	0.801	2.900	0.718	0.800	3.325	0.002

** $p < .05$*

Discussion

The author attributes these results to the use of the proposed movement education program and its content of movement story activities, role-play exercises, and small games under investigation. That positively affected the level of bodily-kinesthetic intelligence of the experimental group's children. The activities suited their tendencies, needs, and preparedness. They provided feedback through understanding, knowledge, and awareness of the program's objectives. They also included kinetic activities that provided challenging and fun opportunities for children. They took into account organizing the practice, rationing the loads, work, and rest. They provided opportunities for participation and practice for all children, relying on trial and error. These motor experiences were linked to school activities and life needs. They took into account providing success experience. They supported the elements of motivation. They achieved the creation of the appropriate medium for motor learning. They provided security and safety factors. They also avoided comparisons between children. These activities were diverse and various, which supported the learning environment enrichment.

These results are consistent that when the child performs any motor skill, many signals from different sources, visual, auditory, or kinesthetic, are gathered, then they make their decisions regarding these signals and then select the response that appears to be the most appropriate for the situation. If the child succeeds in correctly perceiving and understanding verbal, sensory, auditory, visual, or other evidence, this helps the child to quickly make decisions about how to respond or the actual response. That depends on the bodily-kinesthetic intelligence of the child, which depends mainly on one or more types of sensory receptors (Gaber, 2003).

These results agree with some of the results of some reference studies. The results of all these studies have shown the positive effect of using the experimental programs under these studies, including movement education with its various programs in developing the level of independent variables under their research, including bodily-kinesthetic intelligence. There are also statistically significant differences between the mean scores of the pretest and posttest for the experimental groups under their research (Nariman, 2015; Al Khalidi & Al Ghurairi, 2015; El Sayed, 2016; Michelaki, 2016; Saber, 2018; Ibrahim, 2020; Badawi, 2020; Hanafi et al., 2020; Boumesjed & Guettaoui, 2020). Thus, the first hypothesis of the research has been realized, "there would be statistically significant differences between the mean scores of the pretest and posttest of the experimental group in the bodily-kinesthetic intelligence level in favor of the posttest."

The author attributes that there are statistically significant differences between the pretest and post-test for the control group of children in the level of bodily-kinesthetic intelligence under investigation in favor of the posttest to the use of the usual movement education program, which depends on direct kinetic duties, and the content of traditional kinetic activities that the children of this group participated in implementing. The teacher who acts as a mentor and guide for the children was also relied on, they provided feedback to the children and contributed to the improvement of the level of bodily-kinesthetic intelligence of this group's children.

These results agree with some of the results of the reference studies. The results of all these studies have shown the positive effect of using the usual programs

with the control group members on the dependent variables under these researchers. There are statistically significant differences between the mean scores of the pre-test and post-test for the control groups, in favor of the post-test under their research (Nariman, 2015; Saber, 2018; Ibrahim, 2020). Thus, the second hypothesis of the research has been realized, "there would be statistically significant differences between the mean scores of the pretest and posttest of the control group in the bodily-kinesthetic intelligence level in favor of the posttest."

These results are consistent with the fact that movement is the means by which the child acquires control over their body, through sensory information received from the muscles and joints, where this perceptual information depends on the accomplished movement. This enhances the child's sense of their body and contributes to teaching them many motor patterns (El Kilani, 2005). These results are also consistent with what has been indicated that movement is a way for the child to learn about the environment and deal with it, thus developing their ability to innovate, create, imagine and control the surrounding environment and invest it for their benefit. It is one of the important means by which the child expresses themselves. Movement is necessary to revitalize the body and thus the mind develops in a proper manner, as the child's mind does not develop in isolation from the body, for a healthy mind resides in a healthy body (Ibrahim, 2020).

The results of this research agree with the results of some reference studies. The results of these studies confirm there are statistically significant differences between the mean scores of the two posttests for the experimental and control groups in the level of dependent variables under these researches and in favor of the experimental group (Nariman, 2015; Al Khalidi & Al-Ghurairi, 2015; El Sayed, 2016; Michelaki, 2016; Saber, 2018; Ibrahim, 2020; Badawi, 2020; Hanafi, et al., 2020; Boumesjed & Guettaoui, 2020).

The author attributes that the experimental group exceeds the control group to the use of the proposed movement education program and its content of movement story activities, role-play exercises, and small games under investigation. Thus, the third hypothesis of the research has been realized, "there would be statistically significant differences between the mean scores of the two posttests of the control and experimental groups in the bodily-kinesthetic intelligence level in favor of the experimental group."

Conclusions

- The usual movement education program has achieved positive results at the level of bodily-kinesthetic intelligence in preschool children (5-6 age).
- The proposed movement education program has achieved positive results at the level of bodily-kinesthetic intelligence in preschool children (5-6 age).
- The proposed movement education program has realized positive results better than the usual movement education program at the bodily-kinesthetic intelligence level of kindergarten children (5-6 age).

Recommendations

- The proposed movement education program should be used in preschool children (5-6 age).
- The development of the level of bodily-kinesthetic intelligence in preschool children (5-6 age) should be paid attention to, given the paramount importance of this stage and its effect on other subsequent stages.
- Further research should be conducted using movement education programs and other populations and dependent variables.

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