

## Effect of Using Motor Guidance and Three-Dimensional Shapes to Learn the Back Crawl Stroke in Visually Impaired Individuals

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**Abstract:** The current study aims at identifying the effect of a recommended educational program using three-dimensional shapes and motor guidance on learning the back crawl stroke and attitudes towards learning swimming in visually impaired persons. The researcher used the quasi-experimental approach (two experimental groups design). Sample (purposefully chosen) included 16 female students from Al-Nour institute for blind, aged between 9-11 years old who are totally blind, free of other handicaps and free of other chronic or cardiac illnesses. The researcher concluded that three-dimensional shapes contributed positively in learning floatation skill in back crawl stroke and increased the positive attitude towards practicing swimming while motor guidance contributed positively in learning leg kick, arm movements and balance and coordination skills in back crawl stroke and increased the positive attitude towards practicing swimming.

**Key words:** Motor guidance % Three-dimensional shapes % Back crawl stroke % Blind

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### INTRODUCTION

In all fields, handicapped are receiving greater attention in form of health, social and psychological care to dissolve differences between them and normal individuals and to integrate them into the society more effectively. The old view attesting that blinds represent social burden and can only learn in very narrow limits has now changed [1]. Although the visually impaired person can not see well, he/she develops distinct abilities in using other senses like touch, hearing and even smell if and he/she gets the chance to train and qualify he/she can learn any kind of complex skills [2].

In the Holy Quran, God preferred hearing to seeing as it is the sense of attention and calling in the afterlife. The ear never sleeps as it is the link between the person and the world. Many Quran verses prefer hearing to seeing and even mentions hearing first [3].

Both normal and visually impaired pass through the same steps in learning communication skills. But there are differences related to the degree of consistency for these skills due to differences in sensory channels, previous information, social experiences and psychological conditions, as the visually impaired needs to develop more than one alternative to seeing as he/she needs to develop utilization of all the rest of sensory channels [1, 4].

Visual impairment can be divided into two types: (a) totally blind who are legally and educationally blind as they can not see with any optical aids and (b) partially blind who can read words written in magnified letters or using eye-glasses or any other tool for magnification [5]. Visual impairments differ according to its severity, its effects on effective seeing, the damaged part of the eye, severity of injury, time of injury and also, injury healing ability using optical aids and surgical procedures [6].

It is necessary to impose more interest with physical and recreational activities as it plays a major role in physical development, cognition of spatial relations and help in developing direction and movement skills effectively [2, 7]. If the blind person gets the chance to train, he/she can learn various types of sports activities skills [4]. The visually impaired gets too close to normal persons in learning and performance if he/she gets educational material specially adapted to help him/her receiving and expressing information [8, 9]. It is important to provide visually impaired persons with three-dimensional shapes as it represents visual concepts of the curriculum and makes learning more realistic. In addition, teaching should depend on detailed illustration including relative relations between models and originals [10].

Success of visually impaired in practicing sports activities depends greatly on the physical education teacher to give them firm verbal instruction [11].

One study dealt with the effectiveness of using some learning aids on learning swimming in deaf and dumb children [12]. Another study dealt with using fixed and mobile contact devices on the speed of learning front crawl for deaf and dumb [13]. One research group developed and tested the validity of a special curriculum of rape prevention and self-defense skills for visually impaired women [14]. Another research group examined physical and psycho-social characteristics of Judo exercises specially modified for blind and mentally retarded children [15].

Swimming is totally different from other types of sports activities due to its specific environment (water) and psychological, physical and social ability to participate in swimming. Physically handicapped have a long history in swimming and they participated in many challenges like crossing the English Channel. According to researcher's knowledge, only few studies dealt with swimming for visually impaired. This led the researcher to conduct the present study.

**Aim:** The current study aims at identifying the effect of a recommended educational program using three-dimensional shapes and motor guidance on learning the back crawl stroke and attitudes towards learning swimming in visually impaired persons.

#### **Hypotheses:**

- C There are statistically significant differences between the motor guidance group and three-dimensional shapes group in learning the back crawl stroke on the post-measurement.
- C There are statistical significant differences between the motor guidance group and three-dimensional shapes group in attitude scale towards learning swimming on the post-measurement.

#### **Terminology:**

- C **Motor Guidance:** is a method to generate a mental image. It works through guiding touch of the blind person to move his/her body parts during the performance of technical stages in the back crawl stroke (procedural term).
- C **Three-dimensional shapes:** is an aid to help the embodiment of technical stages in the back crawl stroke sequentially for each stage to help the blind person generate a mental image for performance (procedural term).

## **MATERIALS AND METHODS**

**Approach:** The researcher used the quasi-experimental approach (two experimental groups design).

**Sample:** Sample (purposefully chosen) included 16 female students from Al-Nour institute for blind, aged between 9-11 years old who are totally blind, free of other handicaps and free of other chronic or cardiac illnesses. Another sample for pilot studies included 6 female students from the same research community and outside the main sample.

**Equipments and Tests:** The researcher used the following tools and equipments: restameter - medical balance - manometer (for measuring grip strength) - stop watch - graded ruler - measuring tape - floating boards - floats - rescue ropes - three-dimensional shapes.

Referring to related literature [16- 19], the researcher measured age, weight, height and physical abilities (arm strength - right/left fist strength - metatarsus flexibility - shoulder joint flexibility).

The technical performance of back crawl stroke was measured through a form filled by three judges who evaluated each student alone.

Attitudes towards swimming were measured through a questionnaire prepared by the researcher. The questionnaire validity was calculated through internal consistency of the questionnaire items. Its reliability was calculated through test/retest procedure. The questionnaire proved valid and reliable.

Through literature review [12, 20, 21] the researcher decided that the best educational aids to be used are motor guidance and three-dimensional shapes as these two aids help the blind to learn more quickly and effectively.

**The Recommended Educational Program:** The researcher designed and applied a 12-week educational program using motor guidance and three-dimensional shapes to the sample. The program included 24 unites (2 units per week). The first experimental group (motor guidance) used motor guidance with clear verbal instructions, while the second experimental group (shapes) used three-dimensional shapes with clear verbal instructions. The aim of the program was to identify the effectiveness of using these two conditions in learning the back crawl stroke effectively in blind girls.

**Pilot Study:** Pilot study was conducted from September 13 - 2010 to September 16 - 2010 on a pilot sample of 96 girls from the same research community and outside the main sample. Pilot study aimed at identifying the suitability of the chosen shapes and any other difficulties that might face the main application. Pilot study was also used to train assistants on dealing with blind girls in water and calculating the questionnaire's validity and reliability coefficients.

**Pre-Measurements:** Pre-measurements for both groups on all tests were taken from September 18 - 2010 to September 19 - 2010.

**Main Application:** The program was applied to the two experimental groups according to the aforementioned conditions for 12 weeks from September 20 - 2010 to December 15 - 2010 (with one week of from November 15 - 2010 to November 22 - 2010 due to the holidays of Al-Adha Feast).

**Post-Measurements:** Post-measurements were taken for both groups inside Tanta Stadium swimming pool on all variable from December 19 - 2010 to December 20 - 2010.

**Statistical Treatment:** The researcher used SPSS software to calculate the following: Mean - median - standard deviation - correlation coefficient - Cronpach alpha - (t) test - skewness.

## RESULTS AND DISCUSSION

Table 1 indicates statistical significant differences between the post-measurements of the two groups on  $p < 0.05$  on leg kicks, arm movements and breath and coordination in favor of the guidance group and on floatation in favor of the shapes group.

Table 2 indicates statistically significant differences between the post-measurements of the two groups on  $p < 0.05$  on the attitudes scale.

## DISCUSSION

Table 1 shows post-measurements of the two groups on swimming technical test. Results indicated that the performance levels of blind students improved from zero as they started swimming as beginners without any previous idea about swimming until they reached a good level. This is a direct effect of using motor guidance and three-dimensional shapes on the two groups. This is in

agreement with previous studies indicating that success of visually impaired in practicing sports activities depends greatly on the physical education teacher to give them firm verbal instruction and visually impaired gets too close to normal persons in learning and performance if he/she gets educational material specially adapted to help him/her receiving and expressing information [2, 4, 6, 9, 11].

Table 1 indicates that the motor guidance group recorded significantly higher results on leg kicks, arm movements and breath and coordination variables compared to shapes group. The researcher thinks that motor guidance gets the group members closer to each other with direct contact with the teacher. This contact helps transferring information directly to learners as these skills require direct contact because of its complex nature that needs follow up from the teacher so that learners can repeat it faultlessly. Assistants helped group members in directing their body parts by touching the part that needs to be directed after listening to instructions from the teacher. Verbal instructions with motor guidance helped each learner to generate a mental image of her own and this led to the superiority of the motor guidance group on acquiring leg kicks, arm movements and breath and coordination skills. As for floatation, the shapes group recorded significantly higher than the motor guidance group as shapes give a fixed and stable position through touching the shape. This is in agreement with one study indicating that three-dimensional shapes help learners to form specific cognitions [22]. These shapes, in addition to verbal instruction, link hearing with touching in forming the mental image of the skill and make learners generate more realistic images.

The researcher thinks that these differences are due to the use of two different types of generating the missing visual sense in research sample. This is in agreement with several authors who indicated similar results [13, 20, 23].

Table 2 indicated statistical significant differences between the two groups on the swimming attitudes scale in favor of both groups, although motor guidance group recorded slightly higher than the other (shapes) group. This is due to the following: the human being is a whole identity that can not be separated, thus, when the brain recognizes some facts, this does not mean it is not concerned with forming a positive or negative attitude towards such facts as there is a mutual effect between learning and attitudes towards learning. This is in agreement with one study indicating that the brain is the main frame for forming all levels of desired attitudes [24]. Educational aids provide a suitable basis of sensory

Table 1: Difference significance between the post-measurement of the two groups on technical variables (n1 = n2 = 8)

Variable	Measurement	Guidance groups		Shapes group		Median	(t)
		Mean	SD±	Mean	SD±		
Floataction	Point	10.125	0.835	12.875	0.834	2.750	8.719*
Leg kicks	Point	16.000	0.756	11.500	1.195	4.500	11.907*
Arm movements	Point	29.000	1.309	23.875	1.458	5.125	9.787*
Breath and coordination	Point	12.125	0.835	8.875	1.458	3.250	7.238*

(t) table value on 0.05 = 2.131 \* significant on p#0.05

Table 2: Difference significance between the post-measurement of the two groups on the attitudes scale (n1 = n2 = 8)

Variable	Guidance groups		Shapes group		Median	(t)
	Mean	SD±	Mean	SD±		
Attitude towards swimming	96.63	6.428	87.38	7.304	9.25	3.557*

(t) table value on 0.05 = 2.131 \* significant on p#0.05

experiences necessary for learning. As the educational aid led to a positive effect that, in turn, modified behavior and generated learning through acquiring the desired skill, the learner developed a positive attitude towards swimming due it what she felt of improvements on her physical, technical and psychological status.

Swimming, as indicated by several studies, is a fun sport for blinds and visually impaired as it gives them a sense of freedom as the only problems imposed here are keeping on the suitable track and keeping head and face outside water during front and back crawl, as these two strokes are the most suitable strokes for blinds and visually impaired. Success in learning these two strokes is an achievement in itself and an extraordinary success as the blind or visually impaired develops a positive attitude towards sports activities in general and swimming in specific, leading him/her to a more normal life within a society of normal people.

### CONCLUSION

The researcher concludes the following:

- C Three-dimensional shapes contributed positively in learning floatation skill in back crawl stroke and increased the positive attitude towards practicing swimming.
- C Motor guidance contributed positively in learning leg kick, arm movements and balance and coordination skills in back crawl stroke and increased the positive attitude towards practicing swimming.
- C Motor guidance has a more positive effect on learning all swimming skills under investigation except for floatation.

- C Three-dimensional shapes have a more positive effect on learning floatation as they are more consistent with somehow static skills.

### Recommendation

The researcher recommends the following:

- C Using three-dimensional shapes in more static educational conditions in teaching swimming for blinds.
- C Using motor guidance in more dynamic educational conditions in teaching swimming for blinds.
- C Using new teaching aids in teaching and learning other swimming skills.
- C Cooperation between the ministry of education and the supreme council of youth and sports in the field of helping specially needed individuals on all aspects to help improving their sports and mental levels.

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