

Brain Dominance Patterns and Its Relationship with Students Swimming Teaching Skills

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This research aimed at identifying the prevalent brain dominance pattern among third grade students (Education section), and the relationship between students' brain dominance patterns and students' swimming teaching skills. The researcher used the descriptive survey approach as it relevant to research nature. Eighty Students participated in the research represent 84% of total students enrolled in third grade (Education Division). Styles of learning and thinking (SOLAT, Torrance et al, Arabized by Morad 1994) and student/teacher teaching skills evaluation form used as data collecting tools. Results revealed that right-brain dominance is the most prevalent pattern among student/teacher teaching swimming lesson followed by whole-brain dominance pattern and at last left-brain dominance pattern. Right-brain dominance students excelled in planning skill while students whole-brain dominance students outperformed in the implementation, and left-brain dominance students were distinct in personal and social traits. There are positive correlation between right-brain dominance students and all the teaching skills, followed by whole-brain dominance students. There are correlation between left-brain dominance students and personal and social traits only. Researcher recommended conducting further studies to clarify the relationship between brain dominance and student/teacher teaching skills in various sports activities, conducting longitudinal studies to determine the prevalent brain-dominance pattern in each sport activity, and using current research results in evaluating student/teacher swimming teaching skills

Keywords: brain hemispheres, information processing, motor performance.

Introduction

Brain is the mind base, and then the human behavior source, where it affects and does affect by human knowledge as a fundamental cognitive mental activity (Asaad, 1996) in information processing, individuals consistently rely on one brain side more than they rely on the other. This side called dominant side; thus, the concept of brain dominance emerged. This dominance could be expressed in form of a particular method adopted by the individual in learning process. Therefore, educators at different levels have interest in this phenomenon attempting to understand the preferred method of the individual in learning and thinking process and its association with brain hemispheres halves functions. (Al-Zaghlul, 2006).

Teachers' knowledge about brain dominance concepts and learning styles affect his choice of teaching methods depending information type and educational situation. Most of researches confirmed that that brain sides' concepts in teaching in educational unit lead to best achievement and more desirable results (Abdul-Hussein, 2010).

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Abdulqawy (2011) argues that teachers and educators should understand the learning process and identify brain hemispheres functions and their role in educational process. Right brain dominance means individuals' preference for visual skills, emotions, synchronization and intuition, which depends on educational situation's elements. Left-brain dominance means individual's preference skills for verbal, logical, and rational skills, which based on analysis of learning situation elements instead of combining it as the case in right brain dominance.

Abdul-Wahid (2010) explain that brain is functioning in total mode and sometimes in right or left-style, but it is at its best when it works in integrated mode , where both right and left processes are linked.

Many studies conducted in brain dominance, including: a study Mohammed (1999),) Seng (2000), Saleh (2001), Froehlich, leary & Ranson (2003), Ali (2005), Nofal (2007), Bishara & Al-Elwan (2009), Mansour (2011), Oflaz (2001), Abdul Aziz (2014), Hamouda (2015), Al-Sulimani (2012), Mohsen (2011), and Qraan, & Al-Hamouri (2013). These studies differ in terms of objective and variables addressed; some of which focused on demographic variables such as sex, specialty, college and some of which focused on human dominance correlation with other variables; such as educational achievement level, academic specialization, motor-visual synergies, metacognitive what, skills performance level in volleyball and Ballet barre phrase.

Limited by researcher knowledge, there is no study had addressed relationship between human dominance and its relationship with teaching skills of student/teacher. Although Aqua sports teaching methods is of basic syllabuses listed in faculty bylaw and studied by third grade (Education Division). Students are evaluated in teaching skills for teaching swimming lesson in all parts (planning - implementation - evaluation). The researcher conducted a pilot study to verify students' teaching skills in teaching swimming lesson. Three of the faculty staff member formed a committee to evaluate students. The study results revealed t disparity in students teaching skills in teaching swimming lesson. by asking faculty staff in the department about the attention given to learning styles (Human dominance), the researcher got an answer that all students/teacher work in swimming lesson planning, implementation and evaluation together; without taking into account brain dominance styles. Our educational institutions and teaching methods used in it suffer from severe lack of understanding the individual differences among students in general. Student evaluation depend on the extent of students understanding teaching skills theoretical aspects and apply it in practice in lesson implementation. This evaluation without taking into consideration the human dominance styles, although students vary according to their abilities and learning styles and so the brain is the real key to understand aspects of differences. Hence, the idea of this research appeared as an attempt to identify human dominance styles among third grade students (Education Division) and its relation with teaching skills in swimming lesson. The research aims at identify:

- a. The prevalent human dominance styles (Right, Left, Integrated) within third grade students (Education division)

- b. The relationship between human dominance styles (Right, Left, Integrated) for student and their teaching skills

Research hypotheses

- a) There is a prevalent brain dominance style (Right, Left, and Integrated) within third grade students (Education division).
- b) There is significant correlation between human dominance styles (Right, Left, and Integrated) for student/teachers and their teaching skills.
- c) There are statistically significant differences between brain dominance styles in each teaching skill
- d) Teaching skills contribution percentage differ between brain dominance styles.

Definitions

Brain Dominance

It is the activity depends on using brain's right or left half, or both of them, as each half perform certain functions. It is also the of one or both brain sides dominance in processing, analyzing and directing information that drive human behavior. (Abdulqawy, 2011)

The researcher defined as student's dependence on one-brain hemispheres functions in information processing, and measured by marks that student obtain in Torrance learning style scale.

Brain dominance styles:

a) **left-style:** Student is the tendency to be specific in thinking, prefer planned and organized work. Student can discover through remembering information in a verbal manner, and can arrange thoughts in writing in order to reach swimming lesson planning, implementation and evaluation in scientifically sound method.

b) **right-style:** Student tendency to be unspecific in thinking, prefer endless work. Student can discover through remembering spatial information with explaining relations between teaching skills for swimming lesson planning, implementation and evaluation in conjectural method.

c) **Integrated style:** the student tendency to equally, use both left and right style functions in swimming lesson planning, implementation and evaluation.

Swimming teaching skills for the student

It is student ability in lesson planning (identification administrative data, educational objectives wording, and teaching and learning activities selection, determining communication and evaluation methods learning resources). Also lesson implementation (the preparation of learning environment, implementation swimming lesson parts, use of means of educational communication, sound, calling, enhancement, error correction and educational gradation in and out of water). Evaluating learning outcomes (knowledge. Psychomotor, and emotional). Finally; student's ability to self-control, dealing with and consider individual differences during teaching swimming lesson.

Method

Participants

Pilot study sample: Randomly selected from student of the third grade (Education Division) at the Faculty of Physical Education, Alexandria University in 2015/2016 academic year totaled to (12) students represent 13% of the (95) total enrolled students with excluding 3 students due to non-regular attendance. This sample used for study tools standardizing.

Main study sample: Eighty students intentionally selected from students intentional Third Division (Education Division) at the Faculty of Physical Education, Alexandria University for the academic year 2015/2016 represent student 84% of total students enrolled.

Measures

Torrance Brain Dominance Scale

Prepared by Torrance et al in light of results of many research and studies in the nervous system and surgical field on human brain. Arabic version developed and standardized for Egyptian environment by Mourad (1994). Arabic form consisted of 36 phrases each have three alternatives one refers to derivative of right hemisphere functions, and the other refers to derivative of left hemisphere functions, and the third refers to a derivative of both hemispheres style function (integrated style) (Torrance, 1982)

Scoring the scale:

This scale extract three marks for the examiner, mark for each learning and thinking styles (Left - Right - integrated) and student's preferred style is determined according to these marks. For example, if a student got in one phrases (1 - zero - zero), it means that the responses to these words reflect the left style and give zero to right and integrated types. Since the scale contains 36 phrases, the student can get range between (zero - 36) marks in each of the three styles.

Procedure

Standardizing Torrance Human Dominance scale.

- a) **Validity:** confirmed by expert's validity as the scale presented to Psychology experts who acknowledged its suitability to determine the most dominating brain hemispheres for students. The researcher relied that scale applied in many Arab Studies as Mohsen, 2011, Hamouda, 2015, foreign studies Saleh 2001, Chau 2003, and on different samples and in varying time intervals which confirms scale validity.
- b) **Reliability** confirmed using test-retest method with 15 days interval as shown in Table (1).

Table (1) the Correlation Coefficient between Torrance Human Dominance Scale First and Second Applications (n=12)

| Human dominance styles | first application | | second application | | T value | Significance | Reliability coefficient (R) | Significance |
|------------------------|-------------------|-------|--------------------|-------|---------|--------------|-----------------------------|--------------|
| | Mean | SD | Mean | SD | | | | |
| Right | 12 | 5.081 | 11.75 | 4.751 | 0.821 | 0.429 | 0.979 | 0.000 |
| Left | 12.25 | 5.396 | 12.17 | 5.323 | 0.321 | 0.754 | 0.986 | 0.000 |
| Integrated | 10.75 | 6.969 | 10.92 | 6.855 | 1.483 | 0.166 | 0.999 | 0.000 |

Significant at 0.05 level $t = 2.201$, $R = 0.576$

Table (1) results reveal significance of correlation between first and second application, the matter which confirm scale reliability

Teaching skills evaluation form for swimming teacher

To develop teaching skills evaluation form for swimming student/teacher the researcher followed the following steps:

- Determine overall objective of the evaluation form: This form aim at evaluate student/teacher in swimming teaching skill.
- Identify form' main and sub aspects : A questionnaire administrated to curricula, teaching method and swimming experts (appendix 1) to identify the most important skills for effective implementation of swimming lesson. The amendments suggested by exported considered. The final consists of (4) aspects and (11) sub-aspects for teaching skills. The final form components had 80% experts' approval at least.
- Wording teaching performances in behavioral phrases. After determining teaching skills, each teaching skill analyzed to set of behavioral phrases to use it easily in evaluating the student teacher. The Note and evaluate student / teacher performance. The researcher took into account the following criteria while wording the phrases: phrase is clear and short, phrase evaluate one performance only, and sub-skill is linked to main-skill
- Determine form's scoring method: the registration form style. To determine the best scoring method. The researcher surveyed experts' opinion, quantitative method selected. The following scores agreed by experts: (40) total marks distributes as (10) marks for planning aspect, (15) marks for implementation aspect, (8) marks for learning outcomes evaluating aspect, and (7) marks for personal and social qualities aspect. In addition to design a form includes each aspect and its sub-aspects after amendments. This form presented to curricula, teaching method experts in general, and swimming in particular. They confirmed form's suitability for application.

Standardizing the teaching skills evaluation form for swimming teacher

- o **Validity:** confirmed using discriminatory validation that demonstrates test's ability to distinct between high-level and low-level through comparison between distinct and indistinct groups using "T" test as shown in table (2).

Table (2) Mean, Standard Deviation, "T" and the Discriminatory Validity Coefficient between Distinctive and Indistinctive Groups for Teaching Skills Evaluation Form for Swimming Teacher at Faculty of Physical Education in Alexandria

| No. | Teaching skills | Distinctive group n-6 | | Indistinctive group N=6 | | T value | Significance | Discriminatory validity coefficient |
|-----|----------------------|--------------------------|-------|----------------------------|-------|---------|--------------|-------------------------------------|
| | | Mean | SD | Mean | SD | | | |
| 1 | Planning | 7.83 | 1.602 | 5.17 | 2.229 | 2.380* | 0.04 | 0.601 |
| 2 | implementation | 12.5 | 1.643 | 7.5 | 1.225 | 5.976* | 0.00 | 0.884 |
| 3 | Evaluation | 5.67 | 1.633 | 3.17 | 0.408 | 3.638* | 0.01 | 0.755 |
| 4 | personal qualities | 5.33 | 0.516 | 3.33 | 0.516 | 6.708* | 0.00 | 0.905 |
| | teaching skills mark | 31.33 | 3.882 | 19.17 | .317 | 6.593* | 0.00 | 0.902 |

Significant at 0.05 level T significant = 2.228

Table (2) results reveal that there are spastically significant differences in all teaching skills between distinctive and indistinctive groups, the matter, which confirms form's validity.

b- Reliability: Confirmed using test-retest method with 15 days interval on (12) students sample from research society and not included in main sample as illustrated by Table (3)

Table (3) Mean, standard deviation, "T" and the reliability coefficient between first and second application for teaching skills evaluation form for swimming teacher at Faculty of Physical Education in Alexandria (n-12)

| No. | Teaching skills | First application | | Second application | | T value | Significance | Reliability coefficient | Significance |
|-----|----------------------|-------------------|-------|--------------------|-------|---------|--------------|-------------------------|--------------|
| | | Mean | SD | Mean | SD | | | | |
| 1 | Planning | 6.67 | 2.103 | 6.5 | 1.732 | 0.804 | 0.438 | 0.948 * | 0.00 |
| 2 | implementation | 10.5 | 2.844 | 10.92 | 2.644 | 1.820 | 0.096 | 0.961 * | 0.00 |
| 3 | Evaluation | 4.58 | 1.676 | 4.5 | 1.732 | 0.364 | 0.723 | 0.892 * | 0.00 |
| 4 | Personal qualities | 4.58 | 1.165 | 4.58 | 1.240 | 0.00 | 1.00 | 0.876 * | 0.00 |
| | teaching skills mark | 26.33 | 6.344 | 26.5 | 5.992 | 0.692 | 0.504 | 0.992 * | 0.00 |

Significant at 0.05 level t = 2.201, R= 0.576

The matter which confirm form reliability

Results

First hypothesis: There is a prevalent brain dominance style (Right, Left, and Integrated) within third grade students (Education division).

Table (4) shows percentage of human dominance styles within swimming students.

Table (4) Percentage of Human Dominance Styles within Swimming Students at Faculty of Physical Education in Alexandria (n = 80)

| Human dominance styles | Left style | Integrated style | Right Style | total |
|------------------------|------------|------------------|-------------|-------|
| Number | 13 | 33 | 34 | 80 |
| Percentage | 16.25% | 41.25% | 42.5% | 100% |

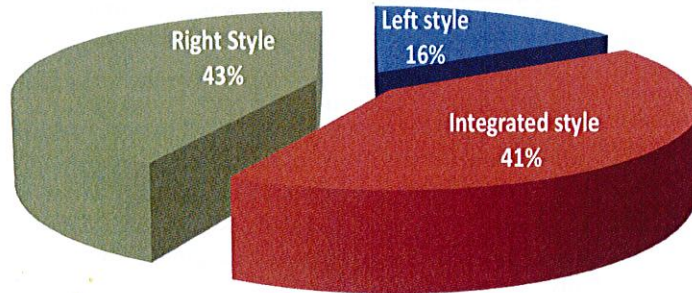


Figure (1) percentage of human dominance styles within swimming students at Faculty of Physical Education in Alexandria

Table (4) and figure (1) results indicate that right brain dominance style was the highest with 42.5% followed by the integrated style by 41.25% and at last left style by 16.25%. This means that most of the students characterized by images remembering and prefer endless works through which they can explore through retrieval of spatial information. They can also handle several things at one time. They characterized with learning through practical demonstration and experiments. These results are in line with Al-Sulimani, 1994, Nicola, 1994, Lavach, 1997, Saleh, 2001, and Al-Otoun study results. This result differ with Nofal, 2007 and Abu EL-Ela, 2011 study results; researcher attributes this difference to learning environments as in Kolb, 1984 and age and grades, as in Mountford, Jones& Turker , 2006, and culture as in Yamazaki, 2005. The researcher argues that right brain dominance does not mean that right hemisphere used fully. While left hemisphere functions is unused but reflect that students get high marks in phrases represent right brain functions more than the other styles. Therefore, this style considered the prevalent style in students' sample.

Second hypothesis: There is significant correlation between human dominance styles (Right, Left, and Integrated) for student/teachers and their teaching skills.

Table (5) shows mean and standard deviation for teaching skills in human dominance styles for swimming students.

Table (5) Mean and Standard Deviation for Teaching Skills in Human Dominance Styles for Swimming Students at Faculty of Physical Education in Alexandria (n=80).

| No. | Teaching skills | Right brain dominance | | Integrated brain dominance | | Left brain dominance | |
|-----|----------------------|-----------------------|-------|----------------------------|-------|----------------------|-------|
| | | Mean | SD | Mean | SD | Mean | SD |
| 1 | Planning | 3.77 | 0.725 | 6.36 | 1.270 | 7.62 | 0.954 |
| 2 | implementation | 6.69 | 0.855 | 11.39 | 1.870 | 11.16 | 1.886 |
| 3 | Evaluation | 3.00 | 1.225 | 4.39 | 1.171 | 4.18 | 1.430 |
| 4 | Personal qualities | 5.69 | 0.480 | 5.32 | 0.827 | 4.84 | 1.133 |
| | teaching skills mark | 19.15 | 1.573 | 27.47 | 3.836 | 27.79 | 4.540 |

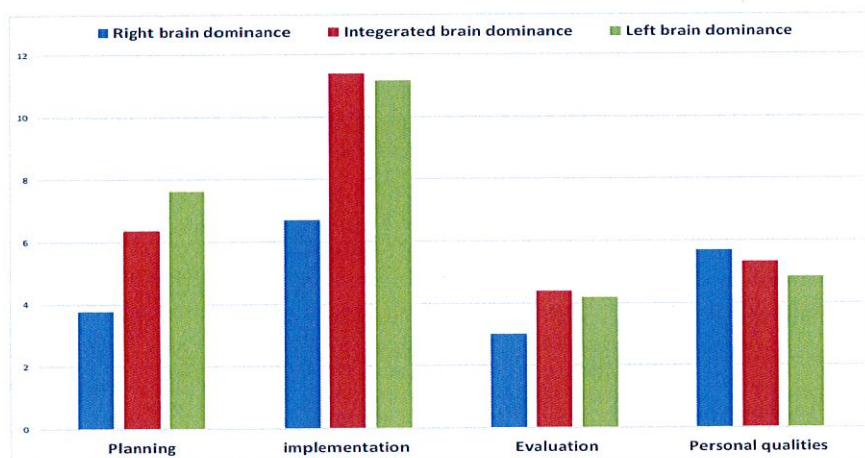


Figure (2) Mean deviation for teaching skills in human dominance styles for swimming students at Faculty of Physical Education in Alexandria

Table (5) and figure (2) reveal that student with right had higher scores in planning skill (7.62, 6.36 and 3.77 from 10 marks for right, integrated, and left respectively). Integrated style was the highest in implementation and Evaluation (Implementation: 11.39, 11.16 and 6.69 from 15 marks for integrated, right, and left respectively) and (Evaluation: 4.39, 4.18 and 3 from 8 marks for integrated, right, and left respectively). Left style was the highest in personal qualities (5.69, 5.32 and 4.484 from 7 marks for right, integrated, and left respectively). Right brain dominance was the highest in teaching skill score (27.79, 27.47 and 19.15 from 40 marks for right, integrated, and left respectively).

The researcher attributes superiority of right brain dominance students in planning skill to their ability to identify and word educational objective in sound scientific form, and their choice of teaching and learning activities. Their determination of educational and technological media communication means to achieve swimming lesson objectives effectively, their ability to select varied evaluation methods and information searching in references and internet.

Superiority of integrated brain style students in implementation, and evaluation skills mean that students have the ability to implement the lesson parts including warm-up, physical preparation, and using variety of tools to help students to perform correctly, considering gradation in skill learning in or out of water. Also using reinforcement in each lesson party and at last diversity in evaluation methods evaluation methods by either observation, tests or registration cards for each part of the lesson in order to identify what achieved from swimming lesson objectives.

Researcher argues that left brain dominance style students outweigh in personal and social qualities skill indicates that students in this style characterized with ability to self-control and responsibility, wisdom in dealing with learners, leadership and dependency and the ability to deliver information with minimal effort.

Third hypothesis: There are statistically significant differences between brain dominance styles in each teaching skill.

Table (6) shows differences significance using the lowest significant difference (LSD) between human dominance styles for swimming students.

Table (6) Differences Significance Using The Lowest Significant Difference (LSD) between Human Dominance Styles for Swimming Students at Faculty of Physical Education in Alexandria in Teaching Skills (n=80)

| No | teaching skills | Brain Dominance styles | Mean | Mean differences | | | |
|----------------------|--------------------|------------------------|-------|------------------|--------------|-------------|--------------|
| | | | | Integrated style | | right style | |
| | | | | Value | Significance | Value | Significance |
| 1 | Planning | left style | 3.77 | .594* | 0.00 | 3.848* | 0.00 |
| | | Integrated Style | 6.36 | | | 1.254* | 0.00 |
| | | Right Style | 7.62 | | | | |
| 2 | implementation | left style | 6.69 | 4.702* | 0.00 | 4.469* | 0.00 |
| | | Integrated Style | 11.39 | | | 0.232 | 0.59 |
| | | Right Style | 11.16 | | | | |
| 3 | Evaluation | left style | 3 | 1.394* | 0.002 | 1.177* | 0.007 |
| | | Integrated Style | 4.39 | | | 0.218 | 0.494 |
| | | Right Style | 4.18 | | | | |
| 4 | personal qualities | left style | 5.69 | 0.374 | 0.225 | 0.854* | 0.006 |
| | | Integrated Style | 5.32 | | | 0.479* | 0.039 |
| | | Right Style | 4.84 | | | | |
| teaching skills mark | | left style | 19.15 | 8.316* | 0.00 | 8.640* | 0.00 |
| | | Integrated Style | 27.47 | | | 0.324 | 0.736 |
| | | Right Style | 27.79 | | | | |

Significant at the 0.05 level

Table (6) results reveal availability of statistically significant differences between left and integrated brain dominance in planning, implementation, evaluation and teaching skills score in favor of integrated style. There are also significant differences between left and right brain dominance in favor of right style in all skills except personal qualities, which was in favor of left style. There are significant

differences between right and integrated brain dominance in favor of right style in planning and in favor of integrated style in personal qualities

Researcher attributes integrated style outweigh in swimming teaching skills (planning, implementation, evaluation) to their thinking styles that combine both brain hemispheres functions. This is in consistent with Elwan, 2006, Mohsen, 2011 results that indicate that brain is doing best when right and left hemispheres work together. Researcher attributes right brain dominance students outweigh in all teaching skills to teaching strategies used by faculty staff members – after developing curricula with cognitive economic field – which depend on mental function for right hemisphere. This result is in line with Lavach, 1997 Saleh, 2001. Researcher return superiority of left style students in personal and social attributes qualities to their ability to self-control and practice leadership, dependence and mastering the art of dealing with learners. This is consistent with what Abdul-Hussein (2010, p62) mentions that learners can express their emotions and adjust and control it.

Fourth hypothesis: teaching skills contribution percentage differ between brain dominance styles.

Table (7) shows contribution percentage for teaching skills in brain dominance styles for swimming students.

Table (7) Contribution Percentage for Teaching Skills in Brain Dominance Styles for Swimming Students at Faculty of Physical Education in Alexandria

| No. | teaching skills | teaching skills percentage contribution % | | |
|-----|--------------------|---|---|------------------------------------|
| | | Left Brain Dominance style n = 13 | integrated Brain Dominance style n = 33 | Right Brain Dominance style n = 34 |
| 1 | Evaluation | 42.1 | 78.9 | 85.6 |
| 2 | Implementation | 50.3 | 12.7 | 8.1 |
| 3 | Planning | 3.9 | 6.2 | 3.5 |
| 4 | Personal qualities | 3.7 | 2.2 | 2.8 |

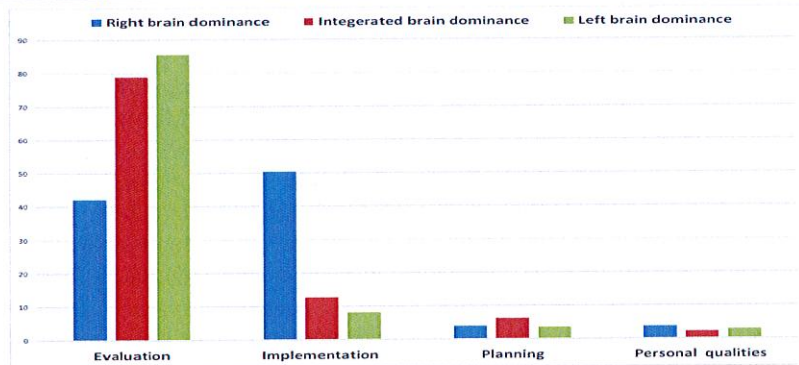


Figure (3) contribution percentage for teaching skills in brain dominance styles for swimming students at faculty of physical Education in Alexandria

Table (8) and figure (3) explain contribution percentage for teaching skills in brain dominance styles, where evaluation had highest contribution in right style (85.6%). Implementation had highest contribution in left style (85.6%). Planning had

highest contribution in integrated style (6.2%). Personal qualities had highest contribution in left style (3.7%) for student / teacher in swimming Faculty of Physical Education in Alexandria.

Researcher attribute superiority of students with right brain dominance in evaluation to their ability to use variety of evaluation methods of every swimming lesson part, such as using simple observation in the warm-up and registration cards in physical preparation and performance observation cards in applied activity; all this helps students to achieve lesson objectives effectively. Researcher attribute excellence of left brain dominance students in implementation and personal qualities skills to their ability to implement swimming lesson including preparation of learning environment and using teaching methods and communication means in an interesting way, using reinforcing and error correction in each lesson part. Finally, researcher attributes superiority of students with integrated style in planning skill to their ability to determine the administrative data, word lesson objectives in procedural behavioral manner, identify tools, teaching aids and methods, and using modern resources and references in order to get information and exercises for achievement of Lesson objectives.

Conclusions

- a) Right-brain dominance is the most prevalent pattern among student/teacher teaching swimming lesson followed by whole-brain dominance pattern and at last left-brain dominance pattern.
- b) Right-brain dominance students exceeded in planning skill while students whole-brain dominance students outperformed in the implementation, and left-brain dominance students were distinct in personal and social qualities.
- c) There are statistically significant differences between left and integrated brain dominance in planning, implementation, evaluation in favor of integrated style.
- d) There are significant differences between left and right brain dominance in favor of right style in all skills except personal qualities, which was in favor of left style.
- e) There are significant differences between right and integrated brain dominance in favor of right style in planning skill and in favor of integrated style in swimming student/teacher personal qualities.

Recommendations

- a) Conducting further studies to clarify the relationship between brain dominance and student/teacher teaching skills in various sports activities
- b) Using current research results in evaluating student/teacher swimming teaching skills
- c) Devote highest evaluation mark for student/teacher in the skill correspond to brain dominance style.
- d) Conducting longitudinal studies to determine the prevalent brain-dominance pattern in each sport activity.

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