



The Effectiveness of Using Brainstorming Strategy and Hypermedia Technique in the Development of Teaching Competence of Primary School PE Teachers

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Abstract:

The aim of the research is to apply a teaching proficiency scale, and to prepare two methods using the brainstorming strategy and the hypermedia technique for developing the teaching competence of primary school PE teachers in Maysan province for the academic year 2017-2018. The researchers hypothesizes that using the brainstorming strategy and the hypermedia technique has a positive influence on the development of teaching competence. The researchers adopted the descriptive survey research method for applying the teaching proficiency scale, and the experimental research method for applying the two methods prepared. The research population is represented by (385) teachers with a work experience of (5-10) years, out of the total sum of (745) physical education teachers in the province divided over (720) primary schools. The research sample consists of (24) teachers who have been selected randomly, and are divided into two experimental groups of (12) teachers each. The implementation of the methods prepared took place over a period of six weeks. The researchers concluded that the proficiency scale adopted enables them indeed of measuring teaching competences, and that both experimental groups resulted in the development of teaching skills, pointing out that the experimental group that used the brainstorming strategy resulted better than the experimental group which used the hypermedia technique.

Keywords: Brainstorming Strategy, Hypermedia Technique, Teaching Competence of Primary School.

1. Introduction

The philosophy behind selecting the suitable teaching style for the development of teaching competences of primary school PE teachers is based on scientific research, enabling teachers to convey their personal experiences to the learners according to a methodology of intellectual and cultural dimensions. The teacher's work experience also has a great and direct influence on the pupils' attitude and behaviour. The development and sophistication observed in today's technology and education are but a result of the proper orientation of teaching methods. Pre-schooling and primary schools are initial in the consolidation of information, the determining of the pupils' proper orientations, and the outlining of mind maps which essentially develop their intellectual and creative abilities. Therefore, the development of the capabilities and experiences of PE teachers in Iraq has become an urgent necessity, which requires those in charge of the educating process to research better alternatives to train teachers on modern methods and programs. To develop the pupils' physical and intellectual skills, current teaching methods need to be updated in such a way that enables teachers to improve their teaching skills, encourages them embrace continuous learning, moving from restricted learning to free learning and from acquiring information to analyzing it. The information technology available today supports the reinforcement of such tendencies in teaching. Therefore it is of great importance to plan such teaching processes, identify its patterns, and encourage the creativity of learning methods through the use of effective strategies like brainstorming and information technology. These strategies contribute to the accomplishment of the self-learning principle through the use of modern tools like hypermedia, and they enable teachers of managing the effective and active teaching process within a technological environment.

The importance of the research lies in the reinforcement of the teacher's role and the development of his teaching abilities by experimenting with two effective methods like the brainstorming strategy and the hypermedia technique. This research is considered to be the first of its kind to be applied using such strategies within the two methods, which eventually contribute to the development of the teacher's creative thinking skills. Studies have proved the efficiency of brainstorming in creative working through the learners' ability of creating and evaluating ideas. Electronic brainstorming has appeared recently. It is a way which enables teachers of making decisions creatively by creating a certain atmosphere within the class room, presenting the program prepared by the researchers, and inferring the most important problems faced during the teaching process. All suggestions that come up to the teachers' minds are written down without being discussed. After collecting all suggestions, the best alternative is selected among the suggestions mentioned through voting. Decisions are made as soon as possible afterwards. Hereby, the teacher has been enabled to convey his theoretical knowledge into practical behaviour, represented by a set of skills according to strategies and practices applied during the pupils' learning and teaching process. On the other hand, the importance of using hypermedia within the teaching process lies in the fact that it provides the learner gradual consolidation through educational input mediums for computer programs. It also provides the learner an educational environment rich in various educational tools within an integrated unit consisting of data and information selected from several sources to form one regular system. "This has been highlighted in the results of the conference of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD 2001), for they introduced the criteria of employment of modern technology in physical education lessons by PE teachers, represented by computer programs, internet services, and modern teaching methods

and techniques, occupying the fourth position of importance, among the ten criteria that an ideal PE lesson should meet" (Rene, 12).

2. Research Method and its Fieldwork Procedure

2.1: Research Method

The researchers adopted the descriptive survey method and the experimental method, for it suits the type of problem to be solved.

2.2 : Research Population and Sample

The research population is represented by (385) teachers with a work experience of (5-10) years, out of the total sum of (745) physical education teachers in the province divided over (720) primary schools. The research sample consists of (24) teachers who have been selected randomly, and are divided into two experimental groups of (12) teachers each. The first experimental group applied the brainstorming strategy, whereas the second experimental group applied the hypermedia technique.

2.3 : Used Instruments and Devices

2.3.1: Data collecting devices

1. Arabic and foreign references
2. Observance
3. Interviews
4. Teaching scale (appendix 1)

2.3.2: Used devices

1. Sport field for physical education
2. Signs
3. Different balls (football, volleyball, basketball, handball)
4. Whistle

2.3.3: Used instruments

1. Laptop (HP, Chinese)
2. Projector
3. Video camera (Sony, Japanese) (1)

2.4: Fieldwork Procedure:

The exploratory experiment took place on (18/11/2017) within the class room and on the sport field of Al-Wathba School, applied on (6) teachers. The purpose of this experiment is to meet the following goals:

- To be introduced to the staff assisting during the experiment, as well as its workout.
- To avoid any mistakes that can possibly occur
- To find out the duration of the brainstorming strategy and hypermedia technique
- To check the usability of the instruments and devices used

The researchers gave on (21/11/2017) an introductory presentation to both groups together by applying the teaching proficiency scale (Sinan, 169). The teaching proficiency scale has been presented to a group of professionals to ensure its validity to be applied on the research sample

which consists of (24) teachers for both experimental groups. During this introductory presentation, the proficiency scale and its implementation have been explained in detail. Afterwards, the first experimental group has two teaching units using the brainstorming strategy, whereas the second experimental group has two teaching units using the hypermedia technique. On (26/11/2017) the researchers implemented the main experiment for the two prepared methods using the brainstorming strategy and the hypermedia technique. The experiment took place over a period of six weeks, with one teaching unit each. Both experimental groups are given their teaching units on the same day each week. The preset program for the experimental groups has been applied as follows:

First Experimental Group:

The teachers of this group used the brainstorming strategy. The group consists of (12) teachers divided into three groups of (4) teachers. Each group has a leader to assure the implementation of this strategy during the teaching unit of (90) minutes. The strategy consists of three stages:

- Video Presentation:
A recorded video of a practical PE lesson (using the attributes available) at a primary school is shown to the teachers using a projector. A second recorded video is shown as well, demonstrating the modern teaching methods and the attributes for the PE lesson available internationally at American primary schools. The teachers are told to brainstorm about the videos they have just seen.
- Suggesting Ideas:
 - The teachers are divided into three groups of (4)
 - All ideas suggested are written down by the leader clearly so that all members understand these ideas.
 - The teachers are given the opportunity to suggest any related ideas they believe to be suitable, without evaluating or commenting on these suggestions.
 - The leaders are told to instruct the group members to point out the oddest teaching skills solutions and alternatives which are rare and unusual, in line with modern educational means.
- Practical Application Lesson:
At this stage of the experiment, the most suitable solutions and alternatives suggested by the teachers during the brainstorming session are selected and adopted in a practical lesson given by one of the teachers.

Second Experimental Group:

The second experimental group, which consists of (12) teachers, adopted the hypermedia technique in two stages during their teaching unit of (90) minutes, as follows:

1. During the first (40) minutes of the teaching unit, the teachers are given an exemplary lesson at the conference hall of the school. Using the hypermedia technique, the teachers are given an educational session, represented by sections of (6) exemplary lessons, recorded on video, given by a number of experienced primary school teachers in Maysan under the supervision of the researchers.

2. The later stage of the experiment takes place at the school yard. The teachers are told to give an integrated modal lesson of (40) minutes to a group of fifth grade pupils, using the same techniques for teaching the same skills as shown in the hypermedia session.

The researchers used the teaching proficiency scale afterwards. It had been put into practice on (04/01/2018) and given to both experimental groups. The researcher used the SPSS program, as well as certain statistical values like the correlation coefficient, the (arithmetic) mean, the standard deviation, the skewness and the T-test for two individual samples.

3. Analysis and Discussion of Research Results

3.1: Analysis of Results of the Skewness in Planning Skills for Both Experimental Groups:

Table 1

(Shows the skewness of the normality distribution ranges for the teaching objectives in planning skills, for both experimental groups)

Variables	Experimental Group	Mean	Median	Standard Deviation	Skewness
Teaching Objectives	First	18.735	18.330	1.720	0.235
	Second	16.010	16.020	1.251	0.007
Content Analysis and Succession Organization	First	19.321	19.281	1.881	0.021
	Second	15.452	15.985	2.001	0.266
Analysis of Learner Characteristics	First	18.100	18.222	2.021	0.060
	Second	15.211	15.980	2.903	0.264
Lesson Planning	First	19.023	19.132	1.886	0.057
	Second	16.462	16.332	1.547	0.084
Determination of Learning Sources and Used Means	First	19.321	19.990	1.764	0.379
	Second	16.112	16.290	2.110	0.084
Determination of Teaching Strategy Elements	First	19.109	19.298	1.886	0.100
	Second	16.023	16.163	2.908	0.048

Table (1) shows that the skewness of the distribution of the sample is less than (1), which implies that the sample has been distributed moderately for there is no inconsistency in the results.

3.2: Results of the T-Value for the Posttest in Planning Skills, for Both Experimental Groups:

Table 2

(Shows the mean, standard deviation, T value, percentage error and significance level for the posttest in planning skills for both experimental groups)

Variables	Measur. Unit	First Exp. Group		Second Exp. Group		T Value	Percentage Error	Signific. Level
		M	SD	M	SD			
Teaching Objectives	degree	18.7	1.72	16.0	1.25	2.567	0.031	Significant
Content Analysis and Succession Organization	Degree	19.3	1.88	15.4	2.00	2.483	0.011	Significant
Analysis of Learner Characteristics	Degree	17.1	2.02	15.2	2.90	1.993	0.008	Significant
Lesson Planning	Degree	19.0	1.88	16.4	1.54	1.840	0.040	Significant
Determination of Learning Sources and Used Means	Degree	19.3	1.76	16.1	2.11	1.899	0.032	Significant
Determination of Teaching Strategy Elements	Degree	19.1	1.88	16.0	2.90	1.938	0.049	Significant

*Note: Significant if equal to or lower than (0.05), Freedom degree = 22

3.2: Results of Skewness in Implementation Skills:

Table 3

(Shows the distribution of the research sample within the normality distribution ranges for the teaching objectives of implementation skills)

Variables	Experimental Group	Mean	Median	Standard Deviation	Skewness
Presentation of Lesson	First	20.750	20.600	1.770	0.084
	Second	14.000	14.100	1.821	0.054
Stimulation of Learner's Motivation and Interest	First	19.722	19.801	1.992	0.073
	Second	16.902	16.992	1.073	0.083
Feedback	First	20.827	20.883	1.837	0.030

	Second	15.538	15.311	1.553	0.021
Connection and Cooperation	First	19.003	19.112	2.100	0.051
	Second	15.000	15.033	1.620	0.203
Classroom Management	First	20.117	20.091	1.876	0.013
	Second	17.027	17.081	1.837	0.029
Individual Differences	First	19.635	19.522	1.930	0.058
	Second	16.520	16.434	1.403	0.061

Table (1) shows that the skewness of the distribution of the sample is less than (1), which implies that the sample has been distributed moderately for there is no inconsistency in the results.

3.4: Results of the T-Value for the Posttest in Implementation Skills, for Both Experimental Groups:

Table 4

(Shows the mean, standard deviation, T value, percentage error and significance level for the posttest in implementation skills for both experimental groups)

Variables	Measur. Unit	First Exp. Group		Second Exp. Group		T Value	Percentage Error	Signific. Level
		M	SD	M	SD			
Presentation of Lesson	degree	20.7	1.77	14.0	1.82	2.465	0.024	Significant
Stimulation of Learner's Motivation and Interest	degree	19.7	1.99	16.9	1.07	1.783	0.048	Significant
Feedback	degree	20.8	1.83	15.5	1.55	2.994	0.007	Significant
Connection and Cooperation	degree	19.0	2.10	15.0	1.62	6.830	0.000	Significant
Classroom Management	degree	20.1	1.87	17.0	1.83	3.038	0.005	Significant
Individual Differences	degree	19.6	1.93	16.5	1.40	4.937	0.022	Significant

*Note: Significant if equal to or lower than (0.05), Freedom degree = 22

3.5: Discussion of Results for Planning and Implementation Skills:

The results shown in table (1), (2), (3) and (4) represent the proficiency scale between the two experimental groups for the planning and implementation skills, as well as the significance of the differences in favour of the first experimental group which adopted the brainstorming strategy. The researchers point out that the success of this experimental group is because of the strategy's effectiveness in stimulating the teacher's creative thinking processes. The teachers are actively involved in the learning process, for they do not merely gain information passively. In fact, they are

stimulated to actively use their skills and thinking strategies in analysing, evaluating and problem-solving (Kawthar, 54). Certain studies pointed out that adopting such strategies "will eventually result in the stimulation of creative abilities like imagination and the creation of ideas within an atmosphere free of critique. This principle is based on the assumption that unrealistic or odd ideas may stimulate better ideas for others" (Mohammed Yasseen, 31). "The development of one's ability of creatively problem-solving, through providing the opportunity to bring up immediately as much ideas as possible, may eventually help in screening the suggested solutions and selecting the most suitable one to solve the problem given" (Zeinab Mohammed, 114). This strategy is considered to be a way of discovering the available possibilities and developing ideas within a group, though asking each member to bring up as much ideas, suggestions and solutions as possible to solve a certain problem (Rene, 213). The brainstorming strategy could be used in teaching and training, for it is based on the principle of enabling learners to think freely and create solutions for a problem presented which requires a non-traditional solution under certain circumstances. It is preferable to assign a member within the group as coordinator, who writes down all ideas suggested (without names)" (Lemia, 76). Eventually the researchers pointed out that this strategy has clearly contributed to the stimulation and generation of creative ideas for teachers during the sessions, which aimed at putting into use the teachers' concentrated thinking to find solutions for open problems within a educational context and a limited time span. As well, these sessions presented the latest developments in teaching strategies, demonstrated by exemplary primary schools in America. A secure atmosphere free from critique is dominant during these gatherings, enabling the learners to bring out ideas for solving problems they could not accomplish on their own.

The researchers denoted that the essential factors which resulted in the group's success is the accuracy of the problems to be solved by the participating teachers, as well as the transparency of the working rules and principles and the fact they were not violated by anyone; every teacher shared his or her ideas without criticizing or commenting. Another factor is the experience of the one in charge of the teaching process and his persuasion of the value of brainstorming as an intellectual tendency in stimulating ideas.

This has been assured by Mohammed Bin Taleb, by stating "the freedom of thinking and evaluation, quantity over quality, and broaden other's ideas" (46), as well as by the study presented by Haydar concerning the essential factors for the brainstorming strategy to succeed (83). The researchers indicate that the reason behind the improvement of the second experimental group, which adopted the hypermedia technique, is the fact that they mastered the application of the prepared method for developing the planning and implementation skills. This technique is considered to be highly integrated, for : it is considered to be one of the most modern educational tools used in general, and its use has increased because of the various possibilities and advantages it offers for providing solutions for many teaching problems, as well as the fact that it contributes to the expansion of its efficiency and effectiveness. It also broadens the cognitive achievement and develops the learners' skills and orientation if designed and put into practice correctly" (Manal, 115). This technique supports presenting different patterns of information and providing a highly integrated electronic environment, enabling the learner to learn efficiently and effectively through electronic links including (dynamic) illustrations, pictures, texts and videos. It also strengthens the ability of acquiring information and interacting with it through determining the speed, time span, and the amount of information that the learners need to utilize it to the fullest extent to meet the expected objectives and tend towards new learning entries (Zeinab Muhammed, 79). Hypermedia is considered to be a collection of multi-media materials represented by text documents, pictures, static and dynamic illustrations, and video fragments concerning a certain topic, organized and interlinked integrally, enabling the learner to shift between data in a non-linear manner to acquire the information needed quickly (Manal, 116). This technique contributed to the presentation of

different information patterns within an highly integrated electronic environment, allowing learners to learn efficiently and effectively through pictures, dynamic illustrations and video fragments (Zeinab Muhammed, 84).

4. Conclusions

In light of the research results and their discussion, the researcher concluded the following:

1. The proficiency scale adopted enables them indeed of measuring teaching competences.
2. Both experimental groups resulted in the development of teaching skills positively.
3. The experimental group that used the brainstorming strategy resulted better than the experimental group which used the hypermedia technique.

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APPENDIX 1: Sinan's Proficiency Scale for PE Teachers:

Dear,

Hereby do we present the elements of the scientific proficiency test for teaching competences. Please fill in the form in full honesty, by checking the suitable option among the five given.

Thank you for cooperating into scientific research.

The researchers

Assistant Prof. Dr. Saeed Ghani Nouri

Lect. Dr. Ali Aziz Dawood

Signature:

Name of Teacher:

Highest Educational Achievement:

Name of School:

Years of Work Experience:

#	Scale Elements	Very Good	Good	Average	Accepted	Poor
First: Planning Skills for PE Teachers						
Teaching objectives:						
The teacher should be able to:						
1	Point out the purpose of the skill					
2	Understand the concept of the skill					
3	Divide the skill into parts					
4	Link between parts of the skill					
5	Apply the skill					
6	Repeat the performance of the skill					
Content Analysis and Succession Organization:						
The teacher should be able to:						
7	Name the selected skill					
8	Give a general notion about the skill					
9	Explain the new skill and link it to previous ones					
10	Explains the skill gradually form easy to more complicated					
11	Presents the skill in a comprehensive way suitable for the learner's level					
Analysis of Learner's Characteristics:						
The teacher should be able to:						
12	Know the learner's age					
13	Know their social status					
14	Determine their performance level					
15	Determine their schooling level					

16	Know their health status					
Lesson Planning:						
The teacher should be able to:						
17	Prepare a lesson plan					
18	Prepare the tools used during lesson					
19	Organize the pupils' positions to make sure all can see and hear the lesson					
20	Determine the teaching technique used					
21	Prepare a year lesson plan					
22	Prepare a semester lesson plan					
Determination of Learning Sources and Used Means:						
The teacher should be able to:						
23	Determine the material to be studied about the skill					
24	Choose the suitable educational tool for each skill					
25	Create useful and interesting activities					
26	Organizing the use of these tools within a time span					
Determination of Teaching Strategy Elements:						
The teacher should be able to:						
27	Use simple terms for the skill					
28	Use words and phrases suitable for the pupils					
29	Not stick to a certain spot at the schoolyard					
30	Prepare surprising activities for the lesson					
Second: Implementing Skills for PE Teachers						
Presentation of Lesson:						
The teacher should be able to:						
31	Explain the required skill briefly					
32	Provide safety rules when applying the skill					
Stimulation of Learner's Motivation and Interest:						
The teacher should be able to:						
33	Attract their attention to the lesson					
34	Make surprising moves continuously					
35	Support and encourage pupils to perform the skill					
Feedback:						
The teacher should be able to						
36	Point out the mistakes made during the lesson					
37	Correct the pupil's mistakes					
38	Give pupils another change to perform the skill					
Connection and Cooperation:						
The teacher should be able to:						

39	Increase the pupils's interaction with the lesson					
40	Increase the pupils' interaction among each other					
41	Link between the skills taught and daily life					
42	Speak clearly and fluently					
Class Room Management:						
The teacher should be able to:						
43	Organize the location of the lesson to be given					
44	Prepare the tools and balls needed					
45	Control and guide the pupils					
46	Use the whistle to control the class					
47	Assign roles to the pupils					
Individual Differences:						
The teacher should be able to:						
48	Determine the pupils' previous knowledge about the skill					
49	Observe the individual differences between pupils					
50	Take individual differences into account when teaching skills					
Evaluation:						
The teacher should be able to:						
51	Determine whether the lesson plan is suitable for the pupils' age and abilities					
52	Determine the extent of his knowledge about the skill					
53	Know his charisma and relation with the pupils					
54	Know his ability of discovering mistakes and correcting them					
55	Know his capability of meeting the teaching objectives of the lesson					