

The effect of flipped learning strategy on handball outcomes for Faculty of physical Education students, Mansoura University

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Abstract

The research aims to identify the effect of the flipped learning strategy on handball learning outcomes (skill, cognitive, affective) for students of the Faculty of Physical Education at Mansoura University. The researcher used the experimental curriculum, and the sample of the research was represented in the students of the second year in the Faculty of Physical Education University Mansoura in the second semester of the academic year 2018/2019 and numbered (94) students were randomly distributed to two groups, one experimental consisting of (47) students were taught with an flipped learning strategy, and the other control consisting of (47) students was taught in the traditional method, and to achieve aim of the study, the researcher designed the electronic course of handball through the website of the Electronic Learning Unit of Mansoura University, and applied the skill tests cognitive achievement test and the attitude scale towards the pre and post for the study groups, and took the duration of (12) weeks for application of the study. The researcher concluded that the use of the flipped learning strategy had a positive effect on improving learning outcomes in handball for students of the second year at the Faculty of Physical Education, Mansoura University.

Keywords: Flipped learning, Handball, learning outcomes, Physical Education

Introduction:

Technological developments in computer science, communication and internet technologies have contributed to doing a qualitative shift in the educational system and encouraging teachers to

employ those techniques to serve the educational process and develop learning styles and its means to improve the quality of learning outcomes and to achieve the needs and interests of students and enhance their motivation,

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which led to the emergence of teaching strategies coping with the continuous changes in modern education technology enabling the student to interact with the content at any time and from anywhere and communicate with the teacher and among them. E-learning, built-in learning, learning in cognitive journeys, and flipped learning.

Alsobaie (2018, 17-18) points out that flipped learning encourages teachers to introduce their curriculum in a flexible, adjustable and attractive manner that increases students' participation and interest, in a suitable educational environment for all using available technological media, where students are introduced to educational content at home by watching pre-recorded videos by the teacher and they attend the classroom to apply and discuss their questions with their teachers and peers.

Roehling (2018, 3-4) mentions that there are four pillars that support flipped learning they are:

- Providing a flexible learning environment that takes into considerations students' attitudes and abilities.

- The shift of learning culture to the transition from focusing on the teacher as being a source of knowledge to the student to become the axis of the educational process and to be an active participant in building knowledge and applying concepts.

- Teachers care about the accurate thinking in all the content parts which are introduced to the students outside the class, and the activities which attract student inside the class to achieve the aims of course.

- Providing professional teachers who set up and organize experience, activities and practice to make the flipped learning strategy successful.

Heredia (2015, 13) believes that flipped learning is a teaching model in which students watch lectures through online videos at home without any time restrictions, participate teaching based on computers outside the classroom, and use interactive group learning activities to apply concepts and practices inside the classroom, giving time for questions and group interaction inside the classroom the next school day.

Rashid (2017, 156) mentions that flipped learning is one of the modern teaching strategies that takes into consideration the abilities, needs and inclinations of learners and helps them to learn quickly away from traditional methods, and relies on the use of education technology and the Internet in a way that allows the teacher to prepare the course through videos, audio files or other educational media for students to see at home before attending the lecture and devote lecture time to discussions and training.

Al-Kahaili (2015, 160) summarizes the stages of the performance of flipped learning in six stages they are:

- Identifying the subject or lesson to be inverted provided that it is valid.
- Analyzing the content into values, knowledge and skills.
- Designing an educational or interactive video that includes scientific material by sound and image in ten minutes.
- Directing learners to watch video online or on CDs at home at any time.
- Applying the learned activities in class time.
- Evaluating the educational and visual material in the classroom using the appropriate evaluation tools.

Flick (2019, 36-40) notes that the flipped learning strategy is a mixed learning model that increases cognitive achievement and improves learning outcomes for students and allows teachers to support their students individually for the difficult parts of the content, which is the current trend, in education that strengthens differentiated education and allows teachers to create their own learning style with unique learning for students, a repeatable and developed strategy that is easy for teachers and increases active participation and student collaboration, quick learning and time for activities and skills training, and students begin watching videos or read about a new concept online before coming to class.

Research problem:

Handball course is one of the practical courses that need to be taught using modern educational strategies to keep pace with the scientific, technical and technological revolution that the world is witnessing today, and one of the reasons that led the researcher to conduct this research is what he observed through his work in the faculty of physical education University Mansoura that some faculty members follow traditional teaching styles without paying attention to the participation of students in the

educational process, which led to the abandon of students from attending lectures, and noticeable neglect in the performance of tasks, assignments and the low level of educational achievement. And negative trends towards the course, which prompted the researcher to think about a teaching strategy that may contribute to the solution of this problem and raise the level of educational and skillful achievement and gain students positive directions towards the course and make them the center of the educational process.

In light of the recommendations of some previous studies of the effectiveness of the strategy of flipped learning, especially in the stage of university education such as Prepose (2015), Abdul Latif (2016), Study Abdul Zahir (2016), El-Shamy Study (2017) and Zaghloul Study (2017), Mahmoud Study (2018), Amin And Balbas Study (2018), Callahan (2018), Albishi (2018), which reached the effectiveness of the flipped learning strategy in developing the level of cognitive achievement, practical skills and attitudes of students towards using this strategy in education and learning.

Since most students spend most of their time on the world wide web of information using modern technologies such as smartphones, laptops, iPads, tablets and others, the researcher realized to use the flipped learning strategy as a modern necessity to adapt modern technologies and integrate them into the educational process to add excitement, pleasure and suspense and increase the motivation of students towards learning and improve the level of cognitive achievement and skills they have in handball, which prompted the researcher to conduct this study to learn about the impact of the flipped learning strategy on the learning outcomes of the learning in the university school of education college. Mansoura.

Research aims:

The research aims to identify the effect of the flipped learning strategy on handball learning outcomes (skill, cognitive, affective) for students of the Faculty of Physical Education at Mansoura University.

The importance of research:

The importance of research stems from the follows:

- The extent of its contribution to achieving learning outcomes in handball for students of the Faculty of Physical Education University of Mansoura.
- To keep up with contemporary educational trends, which call for the employment of technological innovations in education.
- Focusing on the participation of the learner and his activity in the learning process and considering him as the focus of the educational process.
- Highlighting the importance of flipped learning strategy as one of the modern teaching strategies that achieves the uniqueness and independence of education.

Research hypotheses:

- 1- There are statistically significant differences between the means of pre-test and post-test measurements of the control group in handball learning outcomes for students of the Faculty of Physical Education University of Mansoura in favor of post-test measurement.
- 2- There are statistically significant differences between

the means of pre-test and post-test measurements of the experimental group in handball learning outcomes for students of the Faculty of Physical Education University of Mansoura in favor of post-test measurement.

3- There are statistically significant differences between the means of the two post-test measurements of the control and experimental groups in handball learning outcomes for students of the Faculty of Physical Education university of Mansoura in favor of the post-test measurement of the experimental group.

Research concept:

*** Flipped Learning:**

A form of integrated learning in which traditional learning is integrated with e-learning, where students watch lectures on the learning management system through the university's website in their homes or anywhere using computers or mobile phones before the time of the lecture, and devotes lecture time to application and training and discuss the content, activities and assignments of the course.

Research procedures:

*** Procedural definition**

Research methodology:

The researcher used the experimental approach due to its suitability for the nature of this research using one of the experimental designs which is the experimental design of two groups, one experimental and the other control using pre and post-test measurement of both groups.

Research community:

The students of the second year of the Faculty of Physical Education University Mansoura in the second semester of the university year 2018/2019 and the number of them (605) student represented the research community. The researcher believes the exclusion (174) students: (68)

failed students, (23) external students, (6) students of handball players, (11) students with injuries, (66) students who are not regular in attendance, to become the research community after excluding these students (431) student.

Sample search:

The sample was selected in a random intended method from the research community and the sample size is (114) students (26.45%) of the research community was divided into a basic sample of (94) students, a pilot sample of (20) students and a table (1) showing the description of the research community and sample.

Table (1)
Description of the research community and sample

Total research community		Research sample		
Excluded	Post-exclusion research community	Basic sample		Pilot sample
174	431	Experimental Group	Control Group	20
605		47	47	
		114		

Experimental treatment materials:

It included:

First: means of collecting data.

Second: flipped learning strategy.

First: Means of data collection:

1 -Growth rates (age- height - weight).

2-Physical abilities tests for handball skills under research.

3-Skilled tests of handball skills under research.

4-The cognitive test to measure the level of cognitive achievement in handball.

5- The attitude scale towards the handball course.

1- Growth rates:

-Age: (Age is calculated time for the nearest year).

-Height: The height was measured using the restameter (centimeter).

- Weight: Weight measured using a medical scale (kg).

2- Physical abilities tests for handball skills under research: attachment (1)

The researcher identified the physical abilities tests for handball skills under research through scientific references such as Ismaeel and Hassanein (2001, 98-107), Darwish, Marsa, Abu Zeid (2002, 172-197) and previous studies such as El-Shamy study (2015), and Abdul Razaq study (2016) and the tests were as follows:

- Running (30) meters from the high start to measure the speed of transition (second).

- Zigzag running by Barro to measure agility (second).

- Bend the trunk in front of the bottom of the stand to measure flexibility (cm) .

- Throw a handball to the furthest distance to measure the muscle strength of the pointed arm (M) .

- Vertical jump of stability to measure the muscular strength of the two men (cm).

- Shooting at overlapping rectangles to measure accuracy (degree).

3- Skill tests of handball skills under research: attachment (2)

The researcher identified the skill tests of handball skills under research through scientific references such as Ismaeel and Hassanein (2002, 68-179), Darwish, Marsa, Abu Zeid (2002, 140-149) and previous studies such as the study of Kurdi (2014), and the study of Abdul Razaq (2016) and the tests were as follows:

- * Passing and receiving on the wall (30) second (number).

- * Continuous dribbling for (30) Meter in a zigzag direction (second).

- * The support step overhand shot (degree).

- * The accuracy of the shot by jumping high (degree).

- * Various defensive moves (number).

* One-way defense blocking (number).

4- The cognitive test to measure the level of cognitive achievement in handball: attachment (3)

The researcher used the electronic learning achievement test that he designed (2013) attachment (3) and the key to correct it attachment (4). The total score of the test equal to the number of sentences (40) degree (Elsaid, 2013).

5- The attitude scale towards the handball course: attachment (5)

The researcher used the electronic attitude scale that he designed (2018), which was applied on the students of the second year of the Faculty of Physical Education University Mansoura university in the university year 2017/2018, where the scale included (30) phrase divided over three axes, the nature of the course the importance of studying the course, desire and enjoyment

of the study of the course, with Fifth Likert Scale of which (17) positive Phrase, (13) negative phrase (Elsaid, 2018).

Scientific coefficient of physical and skill tests, cognitive test and the attitude scale towards handball course:

1 -The validity of the tests:

The researcher found the validity of the tests used in the research using the validity of distinctive, by applying these tests to two groups, one of which is distinctive, they are the students of the specialty and the faculty team of handball and the second is indistinctive, that is the sample of the pilot study and the number (20) students of the second year of the Faculty of Physical Education University Mansoura, and after the application of the tests, The comparison was performed between the two groups, as shown in table (2).

Table (2)
Differences significance between the two distinct and non-distinct
groups in physical, skill tests, the cognitive test and the attitude
scale towards the handball course N1=N2=20

Tests		Unit of measurement	Distinctive group		Indistinctive group		Mean Difference	T-value
			Mean	±SD	Mean	±SD		
Physical	Running (30) m from the high start	Second	3.70	0.15	4.70	0.34	1	12.05*
	Zigzag running by Barro	Second	23.45	1.43	24.97	1.47	-1.52	3.33*
	Bend the trunk in front of the bottom of the stand	Centimeter	12.10	3.04	5.45	4.27	6.65	5.67*
	Throw a handball to the furthest distance	Meter	26.66	1.83	21.65	3.56	5.01	5.60*
	Vertical jump	Centimeter	46.90	3.51	38.35	4.55	8.55	6.66*
	Shooting at overlapping rectangles	Degree	19.10	2.07	11.30	1.95	7.80	12.25*
Skills	Passing and receiving on the wall (30) second	Number	23.65	1.53	11.45	2.06	12.20	21.23*
	Continuous dribbling for (30) Meter in a zigzag direction	Second	9.34	0.54	21.14	0.94	-2.80	11.57*
	The support step overhand shot	Degree	5.20	0.70	1.55	0.89	3.65	14.48*
	The accuracy of the shot by jumping high	Degree	5.15	0.81	1.25	0.85	3.90	14.82*
	Various defensive moves	Number	26.65	3.34	20.10	1.77	6.55	7.74*
	One-way defense blocking	Number	3.10	0.31	1.75	0.64	1.35	8.52*
The cognitive test		Degree	34.35	1.42	10.50	1.61	23.85	49.69*
The attitude scale		Degree	135.25	4.18	59.10	3.55	76.15	62.09*

* Significant $P < 0.05$ and Table value of "T" at (0.05) and freedom degree (38) = 2.02

It is clear from table (2) that there are statistically significant differences between the two distinct and indistinct

groups in favor of the distinctive group in all the tests under study, as the calculated "T" value is greater than it's

scheduled value at the level of (0.05), which indicates the validity of these tests in measuring what they were set for.

2- Reliability of tests:

The researcher used the Test-Retest method through application on the pilot study sample consists of (20) students from the same research community and outside the basic sample, then reapply by a time difference (7) days of the first application on

the same group and at the same time to standardize the measurement conditions as much as possible, then the coefficient of correlation was calculated to ensure the reliability of physical, skill tests, the cognitive test and the attitude scale towards the course, the first application was on Tuesday, 4/12/2018 and the second application was on Tuesday, 11/12/2018 as shown in table (3).

Table (3)

The correlation coefficient between the first application and the second Application in physical, skill tests, the cognitive test and the attitude scale towards the handball course N=20

Tests		Unit of measurement	The first app		The second app		R-value
			Mean	±SD	Mean	±SD	
Physical	Running (30) m from the high start	Second	4.70	0.34	4.79	0.39	0.70*
	Zigzag running by Barro	Second	24.97	1.47	24.92	1.65	0.77*
	Bend the trunk in front of the bottom of the stand	Centimeter	5.45	4.27	5.90	4.38	0.95*
	Throw a handball to the furthest distance	Meter	21.65	3.56	22.48	2.84	0.85*
	Vertical jump	Centimeter	38.35	4.55	37.70	4.86	0.88*
	Shooting at overlapping rectangles	Degree	11.30	1.95	10.80	1.36	0.82*
Skills	Passing and receiving on the wall (30) second	Number	11.45	2.06	11.80	1.44	0.64*
	Continuous dribbling for (30) Meter in a zigzag direction	Second	12.14	0.94	11.94	0.91	0.81*
	The support step overhand shot	Degree	1.55	0.89	1.70	1.13	0.75*
	The accuracy of the shot by jumping high	Degree	1.25	0.85	1.50	1.15	0.73*
	Various defensive moves	Number	20.10	1.77	20.75	1.74	0.71*
	One-way defense blocking	Number	1.75	0.64	1.95	0.60	0.78*
The cognitive test		Degree	10.50	1.61	10.85	1.39	0.86*
The attitude scale		Degree	59.10	3.55	59.85	2.68	0.84*

* Significant $P < 0.05$ and Table value of "R" at (0.05) = 0.44

Table (3) shows a strong positive correlation between the first and the second applications in the physical,

skill tests, cognitive test and attitude scale towards the course, with the values of the calculated correlation coefficient ranging from (0.64:0.95) and all greater than the scheduled "R" value at the level of (0.05), indicating the reliability of these tests.

Second: Flipped learning strategy:

The researcher activated the electronic handball course, which was designed in the 2017/18 university year, using Moodle system and loaded on server University of Mansoura through the e-learning unit of the university and included a group of educational units, sources, activities and a system of evaluation to follow the progress of students.

The educational content was provided within the strategy of flipped learning for students at home before they come to the lecture by entering the course of the lecture to see the topic of the lecture, which combines texts, images, drawings and educational videos, and during the lecture the new content is strengthened by the practical applications and discussions of students under the supervision of the teacher to become the full lecture time for active learning, where students find sufficient opportunities to deepen the educational content. (Al-Sharman, 2015, p. 160-161)

Time distribution of the content of the educational units of the experimental group: attachment (6)

The handball course was taught using the flipped learning strategy during (12) weeks with two lectures per week, one theoretical and the other practical, time of each one is (120) minutes in total (24) lecture, (12) theoretical lectures, and (12) practical lectures according to the course's description of the basic principles for handball group games, during the second semester of the academic year 2018/2019 from 9/2/2019 until 2/5/2019 as described by the teacher's guide to teach the basic principles of handball group games according to the flipped learning strategy attachment (6).

Pilot study:

It was conducted from 4/12/2018 to 11/12/2018 with the aim of applying the physical abilities tests, skill tests, cognitive test and attitude scale towards the course under research to identify validity and reliability on a sample of (20) students of the second year of the Faculty of Sports Education of Mansoura University, and the results were the validity and reliability of physical tests, skill tests, cognitive test and the attitude scale to apply the basic study sample.

Basic study:

Pre- test measurements:

After confirming the scientific coefficient (validity - reliability) of the tests used in the research, the researcher conducted pretest measurements of the study variables on the experimental and control groups of (94) students in growth rates, physical abilities, skill tests, cognitive achievement test and the attitude scale towards the handball course, from Tuesday, 18/12/2018 to Thursday 20/12/2018.

Normal distribution of the research variables:

The researcher verified the normal distribution of the research sample in the variables (growth rates, physical abilities, skill tests, cognitive achievement test and attitude scale towards handball course) by calculating the coefficients of skewness and kurtosis for all the measurements used in the research to ensure that the basic research sample is moderately distributed, as shown in table (4):

Table (4)

The arithmetic mean, standard deviation, skewness coefficient and kurtosis Coefficient in the descriptive, physical, skillful, cognitive tests and attitude scale towards the course N=114

	Measurements	Unit of Measurement	Arithmetic mean	Standard deviation	Skewness coefficient	Kurtosis coefficient
Descriptive	Age	year	19.66	0.36	-0.38	-1.18
	Height	Cm	174.60	3.42	0.31	-0.48
	Weight	kg	70.90	6.48	0.30	-0.59
Physical	Running (30) m from the high start	Second	4.67	0.41	0.33	0.41
	Zigzag running by Barro	Second	24.99	1.94	0.16	0.29
	Bend the trunk in front of the bottom of the stand	Cm	5.32	5.33	-0.42	0.84
	Throw a handball to the furthest distance	Meter	22.46	3.09	0.05	0.33
	Vertical jump	Cm	38.46	5.30	0.30	0.81
	Shooting at overlapping rectangles	Degree	10.58	3.50	-0.74	0.44
Skills	Passing and receiving on the wall (30) second	Number	11.38	2.26	-0.32	-0.09
	Continuous dribbling for (30) Meter in a zigzag direction	Second	12.74	1.27	0.15	-0.63
	The support step overhand shot	Degree	1.70	0.94	0.18	-0.32
	The accuracy of the shot by jumping high	Degree	1.39	0.90	0.25	-0.31
	Various defensive moves	Number	19.22	2.06	0.20	-0.50
	One-way defense blocking	Number	1.73	0.60	0.18	-0.54
	The cognitive test	Degree	10.34	2.58	-0.14	-0.34
	The attitude scale	Degree	59.05	6.97	-0.17	0.15

The significance limit of the skewness coefficient at the level (0.05) = 0.45

The significance limit of the kurtosis coefficient at the level (0.05) = 0.90

Table (4) shows that the values of Skewness coefficient for descriptive, physical, skillful measurements, cognitive tests and the attitude scale towards the course ranged from (-0.74: 0.33) and it is less than the significance limit of the skewness coefficient. The value of kurtosis coefficient ranged from (-1.18: 0.84) and it is less than the significance limit of the kurtosis coefficient that refer to moderation of the

sample distribution in these variables under research.

Homogeneity of the two research groups:

The researcher performed homogeneity between the two groups (experimental and control) Before applying the search in the physical and skillful tests, cognitive tests and the attitude scale towards the handball course under research, as shown in table (5):

Table (5)
The arithmetic mean, standard deviation and sample homogeneity in variables under research N1=N2=47

Tests		Unit of measurement	Experimental Group		Control group		Levene's Test	
			Mean	±SD	Mean	±SD	F	Sig.
Descriptive	Age	year	19.63	0.39	19.66	0.34	2.03	0.16
	Height	Cm	174.77	3.50	174.40	3.13	0.75	0.39
	Weight	kg	71.06	6.59	70.89	6.97	0.20	0.65
Physical	Running (30) m from the high start	Second	4.68	0.44	4.63	0.41	0.03	0.87
	Zigzag running by Barro	Second	25.31	1.99	24.67	2.05	0.27	0.60
	Bend the trunk in front of the bottom of the stand	Centimeter	5.40	5.47	5.17	5.68	0.02	0.88
	Throw a handball to the furthest distance	Meter	22.80	3.18	22.46	2.77	0.18	0.68
	Vertical jump	Centimeter	38.15	4.72	38.81	6.17	2.10	0.15
	Shooting at overlapping rectangles	Degree	10.72	3.51	10.13	3.97	1.30	0.26
	Passing and receiving on the wall (30) second	Number	11.53	2.22	11.19	2.40	0.60	0.44

Follow Table (5)
The arithmetic mean, standard deviation and sample
homogeneity in variables under research N1=N2=47

Tests	Unit of measurement	Experimental Group		Control group		Levene's Test	
		Mean	±SD	Mean	±SD	F	Sig.
Continuous dribbling for (30) Meter in a zigzag direction	Second	12.76	1.31	12.98	1.28	0.09	0.76
The support step overhand shot	Degree	1.60	1.01	1.87	0.88	1.37	0.25
The accuracy of the shot by jumping high	Degree	1.45	0.90	1.40	0.92	0.06	0.81
Various defensive moves	Number	18.91	1.99	19.15	2.19	0.59	0.44
One-way defense blocking	Number	1.74	0.61	1.70	0.59	0.001	0.99
The cognitive test	Degree	10.21	2.87	10.40	2.65	0.18	0.68
The attitude scale	Degree	58.36	8.27	59.72	6.70	2.38	0.13

Table (5) shows that the homogeneity of the experimental and control groups in all the variables under research. The Levene's test ranged from (0.001: 2.38) with significance levels ranged from (0.13: 0.99) as it is greater than the level (0.05) that refers to the homogeneity of the two groups in these variables.

2- Carrying out the study:

The researcher taught the two research groups in the second semester of the academic year (2018/2019) during the period from 9/2/2019 to 2/5/2019 and for a period of (12) weeks with two lectures per week, one theoretical inside faculty halls

and the other practical inside sports hall of the Olympic village Mansoura university stadium time of each one is (120) minutes as follows:

- The control group was taught using the traditional method (presentation, explanation and model performance).
- The experimental group was taught using an flipped learning strategy, where students were introduced how to enter the electronic handball course at the beginning of the second semester, and before the lecture is determined the part to be taught to students to see the content of the lesson from educational sources and videos on the page of the

course at home, and asks the researcher students to identify the difficult parts to clarify them during the lesson, during the lecture discussions and applications are conducted individually and in cooperative groups and the researcher provides guidance, guidance and immediate feedback to correct errors attachment (6).

3- post-test measurements:

After completing the specified duration of the application, the researcher carried out the post-test measurements of both experimental and control groups in the skill tests, The cognitive test and attitude scale towards the course, on Saturday, 4/5/2019 for the experimental group, Sunday 5/5/2019 for the control group and all measurements were carried out as conducted in the pre-test measurements.

4- Data collection and scheduling:

The researcher collected, scheduled and statistically processed the data after applying the study.

5 -Statistical analysis:

The data were statistically processed using the

Social Science Statistical Package Program (SPSS) to calculate the statistical coefficients used by the research: mean, standard deviation, skewness coefficient, kurtosis coefficient, (t) test for independent and paired samples, Pearson Simple Correlation Coefficient and improvement ratio.

Showing and discussing research results:

Within the limits of the research plan and procedures, the researcher reached through the statistical treatments used for a set of results in the light of the research assignments, the researcher presented them in a table and then interpreted and discussed.

First: Showing results of the first hypothesis:

The researcher calculated the significance of the differences and improvement ratios between pre and post measurements of the control group in the skill tests, cognitive test and attitude scale towards the course under research, as shown in the table (6).

Table (6)

Differences significance between pre and post tests for the control group in skill tests, cognitive test and the attitude scale towards the course N=47

Tests		Pre-test		Post-test		Mean Difference	T-value	Improvement ratio %
		Mean	±SD	Mean	±SD			
Skills	Passing and receiving on the wall (30) second	11.19	2.40	17.28	2.20	-6.09	17.98*	54.42
	Continuous dribbling for (30) Meter in a zigzag direction	12.98	1.28	11.15	1.46	1.83	9.68*	14.1
	The support step overhand shot	1.87	0.88	3.53	0.95	-1.66	10.08*	88.77
	The accuracy of the shot by jumping high	1.40	0.92	2.94	0.99	-1.54	12.27*	110
	Various defensive moves	19.15	2.19	24.36	1.71	-5.21	18.82*	27.21
	One-way defense blocking	1.70	0.59	2.26	0.71	-0.56	5.53*	32.94
The cognitive test		10.40	2.65	24.13	2.48	-1.37	28.79*	132.01
The attitude scale		59.72	6.70	84.98	5.20	-25.26	24.56*	42.30

***Significant at the (0.05) level.**

Table value of "T" at (0.05) and freedom degree (46) = 2.02

Table (6) shows statistically significant differences between both pre and post tests for the control group in the skill tests, cognitive test, and the attitude scale towards the course under research in favor of the post-test where the calculated "T" values ranged from (5.29: 28.79) which are values higher than the scheduled "T" at the level of significance (0.05), confirming the improvement of

the control group in these tests under research.

Second: Showing results of the second hypothesis:

The researcher calculated the significance of the differences and improvement ratios between pre and post measurements of the experimental group in skill tests, cognitive test and the attitude scale towards the course under research, as shown in the table (7).

Table (7)
Differences significance between pre and post tests for the
experimental group in skill tests, cognitive test and the attitude
scale towards the course N=47

Tests		Pre-test		Post-test		Mean Differ- ence	T- value	Improve- ment ratio %
		Mean	±SD	Mean	±SD			
Skills	Passing and receiving on the wall (30) second	11.53	2.22	21.45	1.94	-9.92	24.87*	86.04
	Continuous dribbling for (30) Meter in a zigzag direction	12.76	1.31	10.06	0.84	2.70	12.90*	21.16
	The support step overhand shot	1.60	1.01	4.89	1.13	-3.29	22.17*	205.63
	The accuracy of the shot by jumping high	1.45	0.90	3.98	1.11	-2.53	16.07*	174.48
	Various defensive moves	18.91	1.99	26.30	2.46	-7.39	15.49*	39.08
	One-way defense blocking	1.74	0.61	2.94	0.57	-1.20	10.61*	68.97
The cognitive test		10.21	2.87	33.79	1.97	-23.58	49.05*	230.95
The attitude scale		58.36	8.27	133.11	4.08	-74.75	50.72*	128.08

*Significant at the (0.05) level.

Table value of "T" at (0.05) and freedom degree (46) = 2.02

Table (7) shows statistically significant differences between both pre and post tests for the experimental group in the skill tests, cognitive test, and the attitude scale towards the course under research in favor of the post-test where the calculated "T" values ranged from (11.44: 50.72) which are values higher than the scheduled "T" at the level of significance (0.05), confirming the improvement of the

experimental group in these tests under research.

Third: Showing results of the third hypothesis:

The researcher calculated the significance of the differences and the rate of improvement between the two post-tests of both experimental and control groups in the skill tests, cognitive test and the attitude scale towards the course under research, as shown in the table (8).

Table (8)
Differences significance between post-tests for experimental and control group in in skill tests, cognitive test and the attitude scale towards the course N1=N2=47

Tests		Experimental Group		Control group		Mean Difference	T-value
		Mean	±SD	Mean	±SD		
Skills	Passing and receiving on the wall (30) second	21.45	1.94	17.28	2.20	4.17	9.73*
	Continuous dribbling for (30) Meter in a zigzag direction	10.06	0.84	11.15	1.46	-1.09	4.42*
	The support step overhand shot	4.89	1.13	3.53	0.95	1.36	6.33*
	The accuracy of the shot by jumping high	3.98	1.11	2.94	0.99	1.04	4.81*
	Various defensive moves	26.30	2.46	24.36	1.71	1.94	4.43*
	One-way defense blocking	2.94	0.57	2.26	0.71	0.68	5.15*
The cognitive test		33.79	1.97	24.13	2.48	9.66	20.92*
The attitude scale		133.11	4.08	84.98	5.20	48.13	49.92*

*Significant at the (0.05) level.

Table value of "T" at (0.05) and freedom degree (92) = 1.99

Table (8) shows statistically significant differences between the two post-tests for the experimental and control groups in in skill tests, cognitive test and the attitude scale towards the course under research for the experimental group where the calculated "T" values ranged from (4.42: 49.92) which are higher than the table value of the "T" at the level of significance (0.05), confirming the improvement of the experimental group in these tests under research to a higher degree than the control group.

First: Discussing results of the first hypothesis:

Table (6) shows statistically significant differences between both pre and post tests for the control group in the skill tests, cognitive test, and the attitude scale towards the course under research in favor of the post-test where the calculated "T" values ranged from (5.29: 28.79) which are values higher than the scheduled "T" at the level of significance (0.05), confirming the improvement of the control group in these tests under research.

The researcher interpreted that the

Discussion of the results:

improvement in the post test for the control group to the exposure of students in educational experiences as verbal explanation, model performance and feedback to correct errors by the teacher, practice, application and repetition on the part of students, which led to improved learning outcomes for them.

This is in the same line with study findings of Kurdi (2014), El-Shamy (2015), Abdul Razaq (2016), Abdul Latif (2016) and Heredia (2015), they reported that the traditional method had a positive impact on improving cognitive, skill and emotional learning outcomes.

El-Hayek (2018, 79) emphasizes that teaching using the traditional method (explanation and model performance) leads to the achievement of learning outcomes and familiarity with educational content and reach the required level of performance, the teacher explains and presents the model and then assigns students to perform tasks, assignments and training according to his instructions and he has to provide feedback

and clarify any inquiry to the students.

Thus, the validity of the first hypothesis, which says that: There are statistically significant differences between the means of pre-test and post-test measurements of the control group in handball learning outcomes for students of the Faculty of Physical Education University of Mansoura in favor of post-test measurement.

Second: Discussing results of the second hypothesis:

Table (7) shows statistically significant differences between both pre and post tests for the experimental group in the skill tests, cognitive test, and the attitude scale towards the course under research in favor of the post-test where the calculated "T" values ranged from (11.44: 50.72) which are values higher than the scheduled "T" at the level of significance (0.05), confirming the improvement of the experimental group in these tests under research.

The researcher interpreted this to the fact that the strategy of flipped learning makes the learner watch lectures prepared by the

teacher at home and its models, images, texts, explanations, educational videos and short electronic tests supported by immediate feedback, to become ready for applications and practical trainings with his colleagues and under the supervision of the teacher and the teacher's discussion in all difficulties he faced at home, as the use of more than one sense in learning makes it more enjoyable and interesting, which led to improved level of knowledge and knowledge achievement and increased enthusiasm and interaction during the course.

Both Al-Drawiish and Abdul Alim (2017, 140-141) point out that using flipped learning strategy helps learners acquire knowledge, information and skills by repeating educational content more than once and easily refers to it and makes the learner the focus of The educational process and increases its activity and effectiveness at home and inside the classroom, where the learner interacts with the videos or any educational media prepared by the teacher, as well as the learner is a positive participant for his

colleagues inside the classroom in the implementation of tasks and activities prepared by the teacher to achieve the educational goals of the lesson Under the supervision and guidance of the teacher.

This finding is consistent with the results of the study of Abdul Zahir (2016), Zaghloul (2017), Mahmoud (2018), Amin and Balbas (2018), Alsobaie (2018), Callahan (2018), Albishi (2018) and Snyder (2019), whose results indicated that the flipped learning strategy is a new, effective and more attractive strategy, providing time for activities, practices and skills applications and enhancing a better understanding of students.

El Miedany (2019, 290-291) emphasizes that employing flipped learning strategy makes educational content more attractive and increases the active participation of students and enables the teacher to move from one student to another to provide all the individual support a student needs to clarify or instant feedback and error correction, where students watch videos of recorded lectures or read any

material related to the next day's online learning position at home with the possibility of re-watching and repeating and reviewing materials according to its own speed, and students make use of the lecture time. For active learning tasks, activities, discussions and applications either individually or in groups under the supervision of the teacher.

Thus, the validity of the second hypothesis, which says that: There are statistically significant differences between the means of pre-test and post-test measurements of the experimental group in handball learning outcomes for students of the Faculty of Physical Education University of Mansoura in favor of post-test measurement.

Third: Discussing results of the third hypothesis:

Table (8) shows statistically significant differences between the two post-tests for the experimental and control groups in skill tests, cognitive test and the attitude scale towards the course under research for the experimental group, where the calculated "T" values ranged from (4.42: 49.92) which are higher than the table value of

the "T" at the level of significance (0.05), confirming the improvement of the experimental group in these tests under research to a higher degree than the control group.

This is due to the fact that the flipped learning strategy helped to create an interactive learning environment, increased the demand of students and their enthusiasm to study the modules of the course in a new way by presenting the course in an electronic form including educational videos, electronic tests and discussion forums for students to see at home before the lecture time, to invest lecture time in training, practical applications, discussions and activities to apply and implement what was learned outside the lecture under the supervision of the teacher and correct mistakes and provide immediate feedback, which contributed to improving learning outcomes in handball.

This finding is consistent with the results of the study of Prepose (2015), Abdul Latif (2016), Dusenbury (2016), El-Shamy (2017), Zaghloul (2017), Mahmoud (2018), Amin and Balbas (2018),

Maddox (2018) and Flick (2019), whose results indicated that the flipped learning strategy is an effective strategy in promoting the success and satisfaction of students, improving their achievement and developing their skills.

Abdul Zahir (2016, 193) emphasizes that the flipped learning strategy ensures the optimal use of lecture time in discussion, dialogue and training activities, makes the learner responsible for his learning and increases his motivation to learn and makes the learning process enjoyable for students to use modern techniques in the educational process and provides opportunities for interaction and communication between students and teachers inside and outside the classroom, and gives students an incentive to prepare lessons and prepare before lecture time.

This is consistent with Arcos (2014, 2) that the flipped learning strategy enables students to replay the video several times, so that they can understand new concepts, and enable them to speed up the clip to overcome the parts that have been absorbed, taking into account the individual

differences between students and disappearing the element of boredom, and replacing it with the element of suspense and enjoyment of learning, as well as providing a mechanism to evaluate the absorption of students, the tests and short assignments that help the teacher to recognize the weaknesses and strengths in their absorption of the content.

This result differs with the result of the Heredia study (2015), whose results indicated that there are no statistically significant differences between the degrees of the experimental and control groups in educational achievement, as well as with the result of the Osman study (2016, 39-41) which showed that the achievement of the experimental group was lower than the control group and that there was a negative trend of the experimental group towards flipped learning because they did not have adequate training on the use of technology such as computers, the Internet, and multimedia content.

Thus, the validity of the third hypothesis, which says: There are statistically significant differences between the means of the two post-test

measurements of the control and experimental groups in handball learning outcomes for students of the Faculty of Physical Education university of Mansoura in favor of the post-test measurement of the experimental group.

Conclusions:

1- The use of the flipped learning strategy affected positively on the learning outcomes in handball for the students of the second year at the Faculty of Physical Education University of Mansoura.

2- The use of the traditional method affected positively on the learning outcomes in handball for the students of the second year at the Faculty of Physical Education University of Mansoura.

3- The flipped learning strategy outweighs the traditional method of improving the learning outcomes in handball for the students of the second year at the Faculty of Physical Education University of Mansoura.

Research recommendations:

1- Using the flipped learning strategy in teaching handball skills for the students of the second year at the Faculty of

Physical Education University of Mansoura.

2- Expanding the use of the flipped learning strategy in teaching other courses to students of the Faculty of Physical Education University Mansoura University, to maximize the benefit of learning time .

3- Employing the possibilities of the e-learning management system available at the e-learning unit of Mansoura University in the teaching of courses and including them for the strategy of flipped learning.

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