A Proposed Framework for Employing Flipped Learning Strategy in Developing the Programming Skills of Students Computer Teachers

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ABSTRACT
Modern educational trends emphasize the need to keep pace with the educational systems to the requirements and needs of the age, as well as the requirements of the future expected to occur, and the methods of modern education in order to prepare people to live in this world.

Flipped Learning is a modern technology solution to address the weakness of traditional learning and to develop the level of students' thinking skills. Inverted learning is a teaching strategy that involves the use of technology to take advantage of learning in the learning process so that the teacher can spend more time interacting, Chapter instead of lecturing

In this research researcher found a sample of 50 students study preparing of computer teacher field at the facility of specific education at Damietta University that found difficulties in learning programing, then she apply the flipped learning with them to improve their levels in programming skills, the consistent flipped learning model is proposed by incorporating the highlights of versatile and remote correspondence innovations into the flipped classroom model to give a manual for scientists and instructors to create powerful flipped learning exercises and plans for helping understudies learn flawlessly crosswise over settings.

Keywords
E-learning (EL) Flipped learning – Flipped classroom – Learning Theories – Instruction Design- (ID)-inverted classroom – Learning Strategy.

1. INTRODUCTION
Recently, the idea of training has significantly changed from educator focused guidance to various student focused learning modes. With such a change, educators assume the jobs of information suppliers, as well as learning advertisers who urge understudies to develop learning effectively. The flipped classroom has turned out to be a standout amongst the most accentuated and inventive showing procedures as of late. It ousts the immediate educating in customary courses and spotlights on driving understudies to apply information and to accomplish more elevated amount learning destinations.

The idea of the flipped classroom was proposed by Bergmann and Sams(2012). They recorded class addresses and gave the recordings online to empower understudies to watch and survey the showing substance all the more helpfully. With such a system, critical outcomes were acquired, which propelled them to additionally utilize it (i.e., teaching by means of online recordings) previously classes. Along these lines, understudies could get ready for classes by viewing the recordings and could in this way frame the essential information before class. Thus, more in-class exchange or practice could be led to connect with understudies in additional inside and out learning and help them clear up any misguided judgments (Bergmann and Sams 2012).

There are differing meanings of the flipped classroom. A standout amongst the most widely recognized is "Recording in-class exercises to pass on a course: Students watch the video previously the class and utilize the class time to fathom complex ideas, answer questions, and understudies are urged to learn effectively and also make bonds with day by day lives" (Stone 2012).

Notwithstanding, different researchers trust that the method for self-learning before class isn't just kept to recordings or the Internet. For whatever length of time that legitimate learning substance and appropriate direction are offered to the understudies, comparable learning targets could be accomplished (Kim et al2014).

The flipped classroom is a learning structure that may in some cases assume an imperative job in mixed learning (Baepler, Walker and Driessen,2014).

2. FLIPPED LEARNING CONCEPT
Flynn (2015) portrays a flipped learning approach executed in a progression of science courses. The exercises in this precedent guide dominatingly to the Identifying quadrant of the lattice, showing a guided structure and unsurprising understudy obligations (Flynn, 2015, p. 207). Online exercises, as short recordings and pre-class tests, were utilized to survey understudies information of the early on ideas, therefore tending to bring down dimensions of Structure of Observed Learning Outcomes .

The outcomes got from the pre-class tests educated the class exercises (Flynn, 2012) enabling the teachers to illuminate understudies 'confusions of specific ideas. The in-class learning exercises were intended to address the more elevated amounts of SOLO and Bloom so understudies occupied with more profound learning.

This included critical thinking assignments, a classroom reaction framework, think-match share, and anticipate watch clarify exercises. This structure expanded understudy commitment and communication with the course content as they built their own insight with one another and through the discourse with the educators. Extra learning exercises were accessible outside of the class time, for example, instructional

exercises, dialog gatherings, and discussions to address further inquiries from understudies. The week after week structure of the courses finished with an online task to survey the learning results accomplished by the understudies for every module.

The educational objective of flipped learning are often addressed based on the Taxonomy of academic Objectives projected by Bloom (1994) and changed by Anderson and Krathwohl (2001). There are six levels knowledge, comprehension, application, analysis, synthesis, and evaluation.. As shown in Figure 1

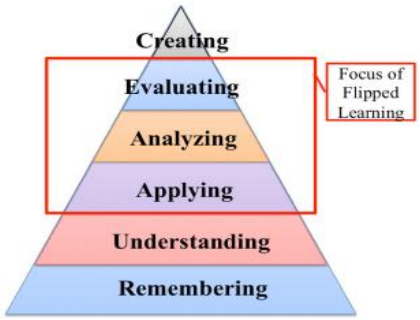


Fig 1: Educational Processes of in-class activities for flipped learning

3. PRINCIPLES AND STRATIGIES FOR FLIPPED LEARNING

Wong and Looi (2011) showed that the accomplishment of versatile innovation upheld consistent adapting intensely relies upon educators' learning plans. They accentuated that it is essential to draw in understudies in an "enculturation process" to adjust their unique convictions, dispositions, and learning techniques to the status of adapting flawlessly by considering versatile innovation bolstered learning exercises as a major aspect of the formal educational modules. This infers instructors ought to create instructing plans to urge understudies to learn in casual and out-of-school settings; all the more essentially, the understudies need to figure out how to apply what they have realized in school to manage genuine issues and also examine those issues identified with their every day beneficial encounters in the formal educational modules. Appropriately, there are a few standards for teachers **To create consistent flipped learning:**

(1) Engaging understudies in self-learning at home: Teachers need to give understudies instructional materials, for example, instructional recordings, previously the class time. The instructional substance in the recordings is basically intended for understudies to pick up information at the remembering and grasping dimensions.

(2) Designing in-field learning exercises to urge understudies to apply what they have figured out how to genuine issues and also gathering data from day by day beneficial encounters. The in-field learning undertakings mostly center around taking in the information at the applying, investigating, and assessing levels.

(3) Designing in-class learning exercises to draw in understudies in higher request thinking dependent on what they have gained from the instructional recordings and what they have watched or gathered from the field trips or their every day beneficial encounters. The in-class learning exercises may concentrate on the applying, analyzing, assessing, or notwithstanding making dimensions, contingent upon the target of the course unit.

(4) Encouraging distributed and peer-to-instructor communications in all learning spaces, that is, home, school, and other certifiable spaces. (5) Mobile and remote correspondence advances are utilized to consistently associate oneself learning at home, investigation and application in the field, high-arrange thinking errands in the class, and distributed and peer-to-educator collaborations over these learning spaces.

4. CHARACTERISTICS AND CHALENGES OF THE FLIPPED LEARNING

Stone (2012) focused on that instructors need to try additional endeavors so as to meet the normal results of the flipped classroom. Understudies' sentiments and learning status

can be generally acknowledged by teachers through flipped learning. Drawing together the thoughts of various researchers, the accompanying attributes of the flipped classroom are proposed (Abeysekera and Dawson2014; Bishop and Verleger 2013; Kim et al.2014):

(1) Changes in the use of class time: Those instructing substance that were generally educated through direct guidance and can be comprehended by understudies themselves are given in different structures, for example, video, for understudies to learn outside the classroom. Also, in-class dialog, undertakings, and critical thinking are incorporated into the class to enable understudies to apply what they have realized and to develop their expository and making a decision about capacities.

(2) Changes in the utilization of time outside the class: The time used to do homework is moved to the class time. Diverse methods for self-adapting, for example, watching recordings, are planned before the class time.

(3) The time outside the class time is intended for understudies to pick up information at the recalling and understanding dimensions.

(4) Peer connection, student– educator cooperation, and critical thinking abilities are underlined in class. Understudies gain information at the applying, dissecting, and assessing levels.

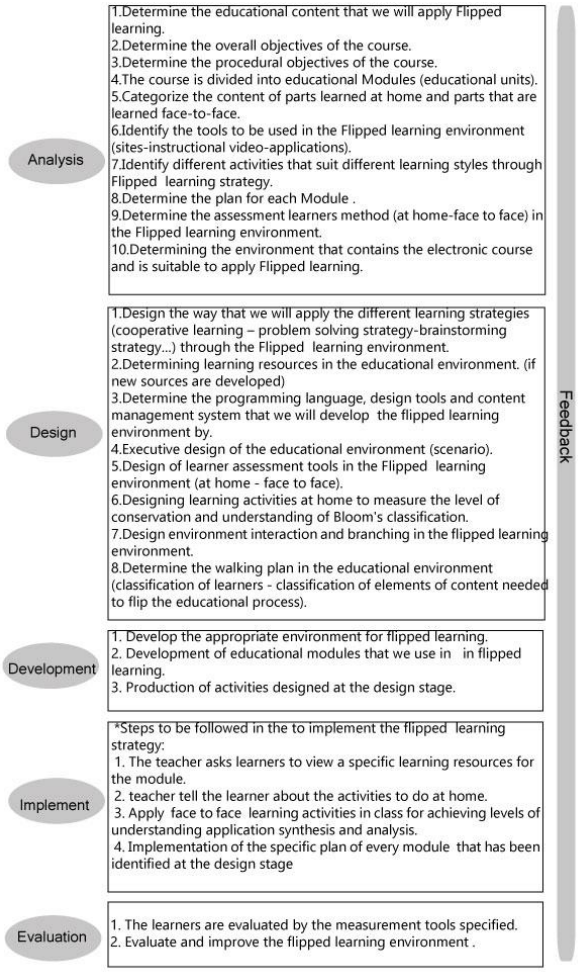
(5) Technology is utilized, particularly video. While a few researchers have contended that innovation is certainly not an important component for self-learning before class time, unquestionably, it is the most straightforward approach to exhibit instructors' guidance of the learning substance. In addition, educators can deal with the video and showing materials for understudies all the more advantageously through showing stages or other online frameworks, and have association with understudies when class. In this manner, innovation benefits the usage of the flipped classroom.

To put it plainly, the flipped classroom is an educational methodology which moves the learning substance instructed by educators' immediate guidance to the time before class so as to expand the odds for the understudies and instructor to communicate. There fore,teachers would have more opportunity to control the learning exercises and unravel understudies 'issues so as to advance the learning impacts. The pioneers of flipped learning contend that the execution of the flipped classroom can bring impacts of flipped adapting,

however it isn't ensured. Educators 'planning is the key component. A few educators have effectively utilized a few techniques to flip the class, for example, giving understudies a chance to learn outside the class, offering video cuts as beneficial materials, and developing the understudies' critical thinking capacities. Be that as it may, more necessities should be met to accomplish flipped learning. At the end of the day, "flipped learning" is a more elevated amount and stricter meaning of the "flipped classroom." In this paper, the two wordings are not entirely recognized. The accentuation is on the association what's more, great usage of the flipped classroom to accomplish the genuine impacts of flipped learning. There are numerous instances of receiving the idea of the flipped classroom in instructive settings (e.g., Chao et al.2015; Fautch 2015; Hung 2015).

5. METHODOLOGY

The researcher looked at the models of educational design then devised a model of educational design compatible with the Flipped learning environment and created the appropriate educational environment walking the steps of the this instructional design model.



Flipped learning environment design Model by Mona Aboelinien 2019

6. RESULTS AND STATISTICS

The application of this environment was on sample of students of the Faculty of Specific Education department of preparing computer teacher in the 4th year. Measurement tools that researcher used were :

1. note card
2. Self-regulation scale of learning

To measure the relationship between the level of programming skills of students and the ability to self-regulation and the extent of the impact of flipped learning environment.

6.1 Results of The first hypothesis

states that "there are no statistically significant differences at the level ($\propto \leq 0.05$) between the mean scores of the experimental group students and the control programming skills before using the flipped learning strategy."

To verify this hypothesis, the Mann-Whitney Test was used to compare the mean scores of the experimental and control groups in the tribal observation. The results were as shown in Table 1:

Table (1): Mann-Whitney Test results of the pre-observation comparing the experimental control and the control groups in observation of programming skills

Research tool	Study groups	Mean	S.D	Mann-Whitney Test	
				Z	P-value
Observation of programming skills	Experimental group	4.67	1.99	1.36	0.18
	Control group	3.67	1.50		

Table (1) shows the results of the Mann-Whitney Test to indicate the differences between the average scores of the experimental group and the control group students in the tribal observation of the programming skills. The average score of the students in the experimental group (4.67) and the students of the control group (3.67) The value of "Z" (1.36) and the significance level (0.18), indicating that there are no statistically significant differences between the two groups before using the strategy.

The following diagram shows this:

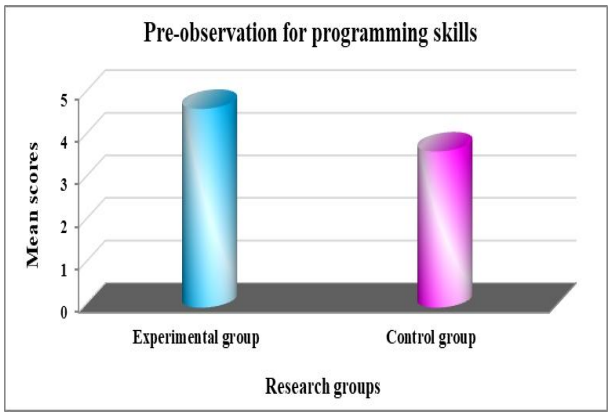


Fig 2: Shows the mean scores of both experimental and control groups in the pre-observation of programming skills.

Table 1 and the results and Figure 2 shows the first hypothesis verification research.

6.2 Results of the second research hypothesis

The second hypothesis states that "there are no statistically significant differences at ($\propto \leq 0.05$) between the mean scores of the experimental and control group students in the self-regulation scale before using the flipped learning strategy."

To verify this hypothesis, the Mann-Whitney Test was used to compare the mean scores of the experimental and control groups in the tribal application. The results were as shown in Table 2:

Table (2): Mann-Whitney Test results of the pre-test comparing the experimental control and the control groups in self-regulation scale.

Research tool	Study groups	Mean	S.D	Mann-Whitney Test	
				Z	P-value
Self-regulation scale	Experimental group	27.53	3.89	1.59	0.11
	Control group	29.20	2.18		

Table (2) shows the results of the Mann-Whitney Test to indicate the differences between the average scores of the experimental group and the control group students in the pre-application of the self-regulation scale. The average scores of the experimental group (27.53) and the students of the control group (29.20) "Z" (1.59) and significance level (0.11), indicating that there are no statistically significant differences between the two groups before using the strategy.

The following diagram shows this:

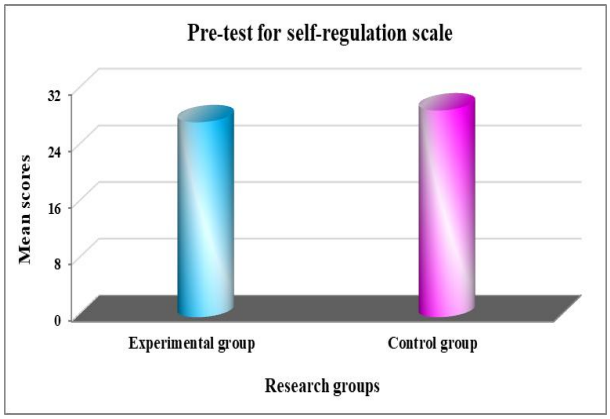


Fig 3: Shows the mean scores of both experimental and control groups in self-regulation scale in pre-test.

Table 2 and the results and **Figure 3**shows the second research hypothesis verification.

6.3 Results of the third hypothesis of research

The third hypothesis states that "there are no statistically significant differences at ($\propto \leq$ 0.05) between the average scores of the experimental and control students in the programming skills after the use of the inverted learning strategy."

To verify this hypothesis, the Mann-Whitney Test was used to compare the mean scores of the experimental and control groups in the post-observation. The results were as shown in Table 3:

Table (3): Mann-Whitney Test results of the post observation comparing the experimental control and the control groups in observation of programming skills.

Research tool	Study groups	Mean	S.D	Mann-Whitney Test	
				Z	P-value
Observation of programming skills	Experimental group	17.80	1.70	4.34	0.001
	Control group	13.33	1.72		

The table shows (3) "Mann-Whitney Test" test results for the significance of differences between the mean scores of students of the experimental group and control group students in the observation posteriori side performative skills programming, with average scores of the experimental group students (17.80) and the control group students (13.33), amounted the value of "Z" (4.34) and the level of significance (0.001), which indicates that there are statistically significant differences between the two.

The following diagram shows this:

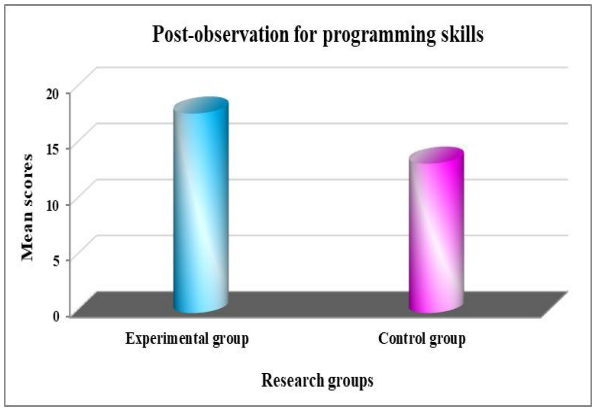


Fig 4: Shows the mean scores of both experimental and control groups in the post-observation of programming skills.

Table 3 results and **Figure 4** shows not to check the third hypothesis for research and verify the existence of alternative hypothesis statistically significant differences in favor of the experimental group students.

6.4 Results of the fourth hypothesis of research

The fourth hypothesis states that "there are no statistically significant differences at ($\propto \leq$ 0.05) between the average scores of the experimental group students in the tribal and remote observations of programming skills "

To validate this hypothesis has been used "Wilcoxon Signed Ranks Test" test to compare the mean scores of students in the experimental group notes tribal and dimensionality, and the results

Table (4): Wilcoxon Signed Ranks Test results comparing the pre vs. post observation means for the experimental group in observation of programming skills.

Research tool	Observation	Mean	S.D	Wilcoxon Signed Ranks Test	
				Z	P-value
Observation of programming skills	Pre	4.67	1.99	3.42	0.001
	Post	17.80	1.70		

The table shows (7) "Wilcoxon Signed Ranks Test" test results for the significance of differences between the mean scores of students of the experimental group in notes tribal and dimensionality side performative skills programming with an average degree of observation tribal (4.67) and the average degree of observation posteriori (17.80), as the value of " Z "(3.42) and the significance level (0.001), indicating that there are statistically significant differences between the two observations..

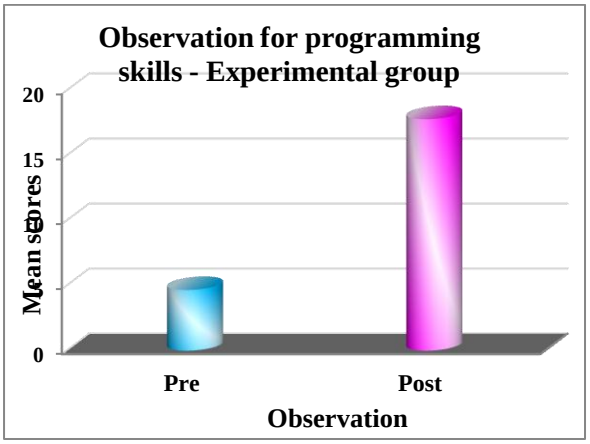


Fig 5: Shows the mean scores of the pre vs. post observation means for the experimental group in observation of programming skills.

Table 4 and the results and Figure 5 shows that the fourth hypothesis is not achieved and the alternative hypothesis is achieved with statistically significant differences between the two observations in favor of the remote observation.

6.5 Results of the fifth hypothesis of research

The fifth hypothesis states that "there are no statistically significant differences at($\propto \leq 0.05$) between the mean scores of the experimental and control group students in the self-regulation scale after the use of the inverted learning strategy."

To verify this hypothesis, the Mann-Whitney Test was used to compare the mean scores of the experimental and control groups in the remote application. The results were as shown in Table 5:

Table (5): Mann-Whitney Test results of the post-test comparing the experimental control and the control groups in self-regulation scale.

Research tool	Study groups	Mean	S.D	Mann-Whitney Test	
				Z	P-value
Self-regulation scale	Experimental group	62.67	3.62	4.68	0.001
	Control group	50.20	2.08		

Table (8) shows the results of the Mann-Whitney Test to indicate the differences between the average scores of the experimental group and the control group students in the remote application of the self-regulation measure. The average score of the students of the experimental group (62.67) and the students of the control group (50.20) "Z" (4.68) and significance level (0.001), indicating that there are statistically significant differences between the two .

The following diagram shows this:

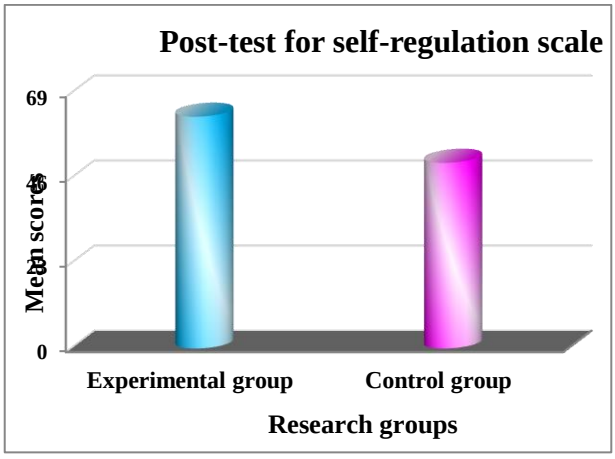


Fig 6: Shows the mean scores of both experimental and control groups in self-regulation scale in post-test.

From Table (5), its results and the figure 6, not to check the fifth hypothesis for research and verify the alternative hypothesis statistically significant differences in favor of the experimental group students.

6.6 Results of the sixth hypothesis of research

The sixth hypothesis states that "there are no statistically significant differences at ($\propto \leq 0.05$)between the mean scores of the experimental group students in the tribal and sub application of the self-regulation scale for the benefit of the remote application."

To validate this hypothesis, the Wilcoxon Signed Ranks Test was used to compare the average scores of the experimental group students in the tribal and tertiary applications. The results were as shown in Table(6)

Table (6): Wilcoxon Signed Ranks Test results comparing the pre vs. post test means for the experimental group in self-regulation scale.

Research tool	Test	Mean	S.D	Wilcoxon Signed Ranks Test	
				Z	P-value
Self-regulation scale	Pre-test	27.53	3.89	3.41	0.001
	Post-test	62.67	3.62		

Table (6) shows the results of the Wilcoxon Signed Ranks Test to indicate the differences between the average scores of the experimental group students in the tribal and sub-application of the self-regulation scale. The average score of the application was 27.53 and the average of the application of the second dimension was 62.67. (3.41) and significance level (0.001), indicating statistically significant differences between the two applications.

The following diagram shows this:

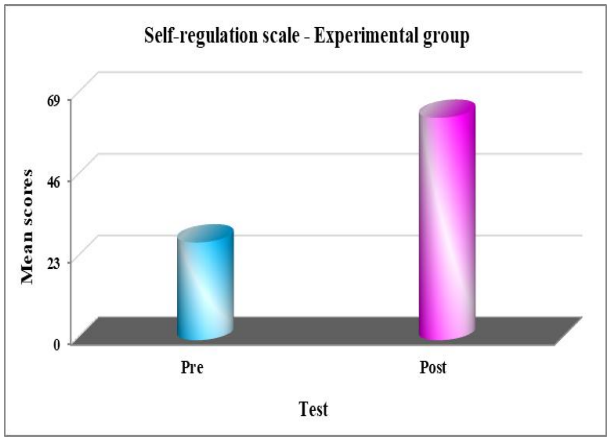


Fig 7: Shows the mean scores of the pre vs. post test means for the experimental group in self-regulation scale.

Table 6, its results, and the figure 7 Not to check the sixth hypothesis for research and verify the existence of alternative hypothesis statistically significant differences in favor of the post test**.**

6.7 Results of the Seventh Hypothesis:

The Seventh Hypothesis states: "The flipped learning strategy achieves 0.6 0.6 effectiveness in developing the programming skills of students and computer teachers." In order to test the validity of this hypothesis, the efficiency ratio equation was used for MacGujian. MacGujian determined the ratio (0.6) to judge the effectiveness of the strategy. The results were as shown in Table (7):

Table (7): Shows the effectiveness of the inverted learning strategy in developing the programming skills of the experimental group.

Search tools	Observation/Test	Mean	High score	Effectiveness ratio
Observation of programming skills	Pre	4.67	20	0.86
	Post	17.80		
Self-regulation scale	Pre	27.53	69	0.85
	Post	62.67		

Table 7 shows the effectiveness ratios of the inverted learning strategy (0.86, 0.85) for the observation card and the self-regulation scale respectively, which are higher than

MacGujian's rate of judgment on the effectiveness of the strategy (0.6). This means that the inverted learning strategy Which was used by the researcher was effective and led to the development of programming skills of students computer teachers.

Table (7) shows the achievement of the seventh hypothesis of research.

7. CONCLUSION

The flipped learning model is becoming a popular way to increase the interactive. When using the flipped learning model, both of learners and and instructors need to make more efforts to prepare materials and videos before a lesson, lecture, class or

session takes place in comparison to the traditional learning model. The effort put in is worth the while because the flipped learning model has been proven to increase the retention of knowledge learned and make valuable class time more worthwhile for learners. And the researcher think that flipped learning will be the default learning way in the future.

8. ACKNOWLEDGMENTS

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