

# Studying the Impact of Web-Based Learning (Weblog) With a Problem Solving Approach on Student's Reflective Thinking

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**Abstract**—The aim of this research is studying the effect of web-based learning (weblog) by problem solving approach on English Literature student's reflective thinking, who study in Islamic Azad University of Ardebil. Required data for this study was gathered through reflective thinking questionnaire -designed by Kember et al on the basis of Mazziro's Theory- in pretest and posttest form, for the two experimental and control groups each consisting of 15 students. Analyzing the gained data showed that there was significant difference between the two experimental and control groups regarding the level of thinking about the three categories of understanding, reflection, and critical reflection, and it was significant in T-test at level 0.05 and this shows that the weblog based learning affects on the development of student's reflective thinking.

**Index Term**—Web-based learning, Weblog, Problem solving, Reflective thinking

## I. INTRODUCTION

The basic characteristic of human being is his/her thinking power, and education is the process that develops thinking process in human beings. The importance of thinking is so much that one cannot live a human style life without it. Thus, the aim of each educational system is to cause individuals to be as thinkers. In this direction, to be interested in development of reflective thinking abilities is not a new phenomenon in educational environments. The origin of this interest is traced back to Plato's Academic and its sample can be seen in Socrates conversations and after them great teachers such as Aristotle, Kant, Russell, Dewey et al have also referred to the importance of thinking. Bertrand Russell (1926) says, "We must teach children how to think and consider it as the subject of our teaching." [39]. John Dewey, the 20<sup>th</sup> century educator, also referred to the importance of thinking and considers encountering it or a problem bearing situation as its beginning. In his book, "How We Think", he says, "The beginning of thinking is doubt, ambiguity, or puzzlement. Thinking doesn't come into existence by itself and it doesn't take place on the basis of "general principles"; but there is always a certain thing that motivates thinking. If we ask a child (or even an adult person) who has not experienced any problem in his life – a problem that motivates, disturbs, and discomforts him/her, to think- it will be of no use[31]." Although all teachers have referred to necessity and importance of thinking and they have less referred to

the presentation of a basic method to develop thinking. Different strategies have been put forward to develop thinking process: reflective practice, critical analysis, and problem solving are among those strategies[47]. The term "reflective thinking" was put forward for the first time by John Dewey about education. He believes that reflective thinking is the process of wonderment solving that begins with a learning experiment [24]. Following John Dewey, different thinkers such as Shon, Pugach, Patronis, Lee, Rodgers, Urgan Habermas and ... engaged in thinking in this ground and even thinkers such as Kember et al (2000) engaged in creating equipments to measure the level of reflective thinking in university on the basis of Mezirow's theory that has also been affected by John Dewey thoughts [22]. This creation was previously taken place using equipments such as Cornell's critical thinking test (CCTT) and the Watson - Glaser Critical Thinking Appraisal (WGCTA). These equipments usually measured the ability to solve the well-organized problems and were not able to solve the ill-organized problems. Mezirow approves Dewey's view on reflective thinking and points out that critical thinking is a valid evaluation[22]. Mezirow names seven levels for critical thinking. From the view point of Mezirow, the first three levels are subsets of what he considers as a non-reflective thinking and they are habitual action, understanding, and introspection. Although these categories may in some part include thinking, too, they do not contain critical thinking and non-reflective by nature. Habitual action is the practice that has once been learned previously and through repeating it has been changed to an activity that is done automatically or with less care. Cycling or driving can be considered as samples for habitual action. At thinking level understanding that relates to cognition, introspection relates to our feelings or thinking.

Four other levels are defined as levels of reflective action. Its three first levels are content, process, and a combination of the two. The last level, thinking about premises, shows the highest level of reflective thinking. Mezirow defines reflective thinking as "Reflective thinking is criticizing the content-related suppositions or problem solving process. Criticizing the grounds or premises, regarding the making and offering a problem, are different from problem solving. Offering the problem contains creating riddle-like situations and developing the questions related to its validity" [29]. Mezirow, then, divides reflective thinking into three categories of content, process and thinking about the premise. Mezirow assumes reflective

thinking about content in thinking about what we understand, think, feel, or do in accordance with it. From the viewpoint of Mezirow, thinking about the process is mostly related to our method of thinking, and he assumes reflective thinking about the process as evaluating “How an individual acts the practices of understanding, thinking, feeling or acting and measuring effectiveness in doing them?”

Reflective thinking in premise is considered as the highest level of reflective thinking because it is through this thinking that we can change our frame of meaning and this kind of thinking leaves open the possibility for changing the point of view. Mezirow believes that in this kind of thinking we are aware that why we understand, feel, or act [23].

The subject of reflective thinking is not a new one that has been put forward in education literature. But, in our country lack of proper understanding of educational authorities about thinking, has caused the methods that have been recognized as influential in creating reflective thinking, such as problem solving [21], to be ignored or it has caused us to choose a way that is not influential in creating such a skill [35]. Therefore, studying subjects of this kind is also felt at university level because university is a place for developing high level thinking skills and this need is felt together with creating technologies such as internet that provides information in its massive form for the students and in this way it is possible for them to recognize the purities from impurities on the basis of reflective thinking. Smythe's research [47] shows that in busy classes, students have less chance to think, so thinking take place mostly outside the classroom, specially where the relationship with students of the same age and doing homework together can take place. Internet provides such a situation by taking away the spatial and chronological barrels in a traditional classroom and the research made by people promise continuous increase in using internet by youngsters and adolescents and also their positive approach to this modern technology [1]. Research has conducted in Iran in 1381 also reports a rate of 41% for high school students access to internet and according to this research 78% of the teachers consider internet as a reliable educational equipment [14]. Research has conducted by Hong, Ridzuan, and Kuek (2003) showed that university students make positive approach towards using internet in learning process [32]. Internet facilities and equipments whose number is being increased continuously add up to enrichment of this virtual environment (internet). One of these equipments is weblog. Though it is not a long time that weblog has come into existence, it has gained special popularity for itself. In Iran the first weblog began its work since Shahrivar, 1380 and nowadays millions of people make use of it so that [www.blogfa.com](http://www.blogfa.com) is one of Persian weblog services in Iran and it began its work since 1380 and now it has more than one million members. One of the factors that have caused considerable popularity for weblogs is their specifications. Quick creation, feasible utility, and lack of need to special software and knowing about special skills are among weblog specifications. Different people use weblog for different purposes but these equipments can be used in education, too. It is used for enrichment of learning situation. “Followers of construction theory believe that university professors and students should discover, produce and instruct knowledge and scientific realities in participation with each other” [44]. Also

in modern age “students should learn how to think, decide, justify about the affairs in its proper way instead of collecting scientific realities within their minds.” [44]. Regarding the made researches it seems that weblog provides such an opportunity for students. As a modern technology, weblog helps human beings mental development by providing problem bearing and riddle-like situations. Weblog writing makes it possible for us to share our thoughts at the world level. Opinions and feedbacks that will result in these thoughts at the web level can make people review their experiences and this leads to both deep learning and comprehensive reflective thinking [43]. In the first conference about weblog, Wrede [2] presented an article bearing the title of “weblog and discourse” and he claimed that Weblogs can be used as equipments at the service of higher education and research. He said that weblogs are capable of :

- developing the reasoning power
- being protective and supportive equipments for teaching and learning
- yielding profits for educational organizations

Wrede emphasizes to this point that “there is not any special teaching style that is presented by weblogs unless weblog encourages learners to study, express, criticize, participate and share freely.” He continues that, “If there is an approach in teaching process that encourages learners to produce knowledge and express their opinions freely, then weblogs will be able to be helpful” [2]. Stiler and Philleo's research [48] in this regard showed that, in comparison with previous terms, the depth of students' thinking level has significantly been increased by writing in weblog. Writing things and text contents in weblog makes weblog writer to think reflectively and critically about his/her research. In addition to the writing and thinking process, weblog increases relationship with friends and teachers, too. Williams & Jacobs [52] came to this point from their research that weblog provides more freedom for students, the amount of their learning from their coequals becomes more than their learning from books and teachers. Weblog increases the power of participation and relationship among the students and finally weblogs are able to become reactive technology in reality. Ganley [18] and Robertson & Whiting [36] in their research found out that reflective and critical thinking skills of their students improved widely when they knew about the access of all people who were connected to internet to their subjects. In their research, Yung Xi and Peria Sharma [53], concerning the use of weblog, found out that most of the students consider their experience with weblog as positive and tend to it with the reason that weblog creates a ground for their thoughts and interpretations to be organized and this helps their learning and thinking. Also, weblog provides a wide communicative learning environment in which they can make relationship with outside of the classroom. Also, by using weblog students enjoyed discovering this new kind of technology and considered it as an equipment that they will be able to use it in their future works. In this research, the researcher by studying such a foreground follows the aim “Does the web-based learning with approach to the problem solving help the reflective thinking development of the students at different levels of thinking or not (considering the reflective thinking theory of Mezirow)?” In order to follow this

aim, the researcher puts forward the following questions in his research:

- Considering the average grade at the level of “habitual action” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?
- Considering the average grade at the level of “understanding” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?
- Considering the average grade at the level of “reflection” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?
- Considering the average grade at the level of “critical reflection” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?

## II. METHODOLOGY

### A. Participants

The participants comprised 30 bachelor's degree students of English language in the third academic year at the Islamic Azad University, Ardabil Branch, IRAN. All students were had a same courses and same teachers. 15 students – who had some facilities such as computer and access to internet as well as skills with using computer and using internet - worked with weblog and internet during the term, and put their course assignment on the blog but the other 15 students worked with paper (traditional assignment). A series of brochures for the purpose of having knowledge about using internet was offered to students of working with weblog and internet and the required guidance was also made during the educational term.

### B. Questionnaire

Data gathering equipment in this research is questionnaire for reflective thinking that has been provided by Kember et al. (2000) on the basis of John Dewey's and Mezirow's theories [26]. “This questionnaire is designed to be used in university programs” [29]. This test consists of four levels habitual action, understanding, reflection and critical reflection. The whole test consists of 16 questions with 5-degree Likert Scale. Since this test has been designed on the basis of the existing literature in this ground, it has been approved by experts regarding its validity, and its reliability has also been studied in previous research using Coefficient alpha and it has separately been identified for each level. By filling in the questionnaire by 265 students, the following results were gained for the rate of  $\alpha$  at following levels: Habitual action 0.621, understanding 0.757, reflection 0.631, and critical reflection 0.675 [22].

### C. Procedure

In the first day of term, all the participants were asked to fill out a questionnaire as a pre-test. The 15 students were then introduced to work with internet and weblog. After that, during the term these trained 15 students worked with computer and internet and made a blog for writing and putting their assignment on it. The other 15 students write their assignment on the paper. Finally, at the end of the term, the participants were asked to do a post-test. The post –test was the same as the pre-test. The post-test was to test whether the using blog (weblog) and internet would lead to a positive effect on students' reflective thinking.

In this research descriptive statistics methods such as average and standard deviation were used for data analyzing. Also, inferential statistics was used to study the research hypothesis as described below. Since grades obtained from the test were quantitative and continuous and the under testing feature (reflective thinking) had also normal distribution, parametric statistical tests were used and since there were two independent groups of experimental and control, the two-way T-test was used for independent groups to study the difference rate between them. Statistical calculations were done using statistical software spss 12. Also, the final term results were used to study the educational advancement and the results of the two groups were compared using the T-test of independent groups.

## III. FINDINGS

First question – the first question of the research is “Considering the average grade at the level of “habitual action” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?”

Result from comparing the post-test and pre-test of control and experimental groups showed that although, regarding the average grade the two groups were different from each other, using T-test, this difference was not significant and obtained differences were not considerable. Calculated T-test was obtained with freedom rate of 28 (-1.86) which is less than the T-test of the table at significance level of 0.5 (2.05). Therefore, Null hypothesis( $H_0$ ) is approved here and we find out that, in pre-test and post test, the two groups don't have significant difference regarding habitual action. So, answering to this question of the research cannot be positive.

The second question of the research is “Considering the average grade at the level of “understanding” of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?”

TABLE I.  
COMPARING THE POST-TEST GRADES OF EXPERIMENTAL AND CONTROL GROUPS AT THINKING LEVEL OF HABITUAL ACTION

Significance rate	Freedom degree	t	average	number	groups
%7	28	-1.86	9.46	15	Experimental group
			11.20	15	Control group

STUDYING THE IMPACT OF WEB-BASED LEARNING (WEBLOG) WITH A PROBLEM SOLVING APPROACH ON STUDENT'S REFLECTIVE THINKING

TABLE II.  
COMPARING THE POST-TEST GRADES OF EXPERIMENTAL AND CONTROL GROUPS AT THE LEVEL OF UNDERSTANDING

Significance rate	Freedom degree	t	average	number	groups
0.000	28	3.99	18.40	15	Experimental group
			16.73	15	Control group

Table 2 shows the significance of the two groups of control and experimental at level of understanding. The obtained T-test (3.99) is greater than the T-test of the table (2.76) at significance level of 0.001. This means that with certainty rate of 0.99 we can say that the obtained results are real and not due to the chance and error. Therefore, answering to this question is positive and since the two groups were identical from each point of view, unless from the viewpoint of independent variable, so we can say that considering the average grade at the level of "understanding" of the reflective-thinking test, students who have learned through web-based way of learning beside the traditional one, are different from those who have learned only through traditional way of learning, and the average grade of the experimental group students is greater than that of control group students.

The third question of the research is "Considering the average grade at the level of "reflection" of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?"

TABLE III.  
COMPARING THE POST-TEST GRADES OF EXPERIMENTAL AND CONTROL GROUPS AT THE LEVEL OF REFLECTION

Significance rate	Freedom degree	t	average	number	groups
0.03	28	2.16	18.60	15	Experimental group
			17.66	15	Control group

T-test resulted from comparing the two groups at reflection level in pre-test shows that the differences of the two groups are significant because the calculated T-test (2.16) with freedom degree of 28, greater than the T-test of the table (2.04) is at significance level of 0.5. Therefore, with certainty rate of 0.95 we can say that the two groups are different from each other and since the two groups are the same in all circumstances, except for independent variable, the obtained change is due to exertion of independent variable in experimental group and it is concluded that web-based learning, with problem solving approach has been effective on "reflection" of the students.

The fourth question of the research is "Considering the average grade at the level of "critical reflection" of the reflective-thinking test, are students who have learned through web-based way of learning beside the traditional one different from those who have learned only through traditional way of learning?"

The two groups are different from each other from the viewpoint of rate of enjoying critical reflection regarding the T-test because the calculated T-test (2.17) with freedom degree of 28 and greater than the T-test of the table

(2.04) is at significance level of 0.5. Therefore, with certainty rate of 0.95 we can say that the difference between the two groups is not due to the chance and error, but independent variable can be the cause of this difference. Consequently, the answer for this question of the research is positive and there is difference between the two groups regarding the rate of critical reflection. Considering the average, experimental group's average is greater and consequently, web-based learning has been influential.

TABLE IV.  
COMPARING THE POST-TEST GRADES OF EXPERIMENTAL AND CONTROL GROUPS AT THE LEVEL OF CRITICAL REFLECTION

Significance rate	Freedom degree	t	average	number	groups
0.03	28	2.17	17.46	15	Experimental group
			16.06	15	Control group

IV. DISCUSSION AND CONCLUSION

Perhaps the emergence of internet at the present century and its entrance into the field of education can be one of the few opportunities that are influential to help the education and especially mental development of pupils and students. Of course, nowadays it is seen that internet is increasingly used in education in advanced countries and education has also been influenced by internet and has been changed into different forms such as virtual universities, electronic teaching, and integrative education. Entrance of these technologies into the field of education has made it necessary for thinking and reflective thinking to more be paid attention to because in today's world each moment human being's knowledge is being increased and now, we can neither store all those data into our minds nor there is necessity to do so. In order to recognize the purities from impurities, development of reflective thinking should be widened among human beings. One must accept what is acceptable according to the evidences and reasons and refuse what doesn't bear sufficient reasons.

Results from this research that show the influence of using weblog in reflective thinking development, are compatible with those of Campbell research [6]. In his research, Campbell also came to the point that using the weblog beside the classroom, increases students' creative skills and their analytical thinking. It also makes it possible for students to act more reactively with other students and improves educational function. This very result from the research is compatible with those of Williams and Jacobs research [52]. In their research, Williams and Jacobs came to the point that using weblog increases the students' learning rate and also their deliberation towards their classmates. Other results were also obtained from this research that were compatible with the results of other ones. Classroom was the place where students participated in it most of the time and their motivation was also increased there. Of course, these results were not measured using special equipments and this, also, was not the aim of the research. However, these affairs were seen during the term from the side of students and they can be the subject of other researches. Results from this research are also compatible with those of Stiler and Philleo's research [48]. Their research had showed that in comparison with students who had not used weblogs, both the depth, and

domain and wideness of the students' thinking had been increased in weblog classes and in this research the occasions two, three, and four of it approved this issue. Results from this research are also compatible with the results of Yung Xie's and Priya Marsha's research [53]. They found in their research that most of the students consider their experiences with weblog as positive and they are inclined towards it. Following the reason that weblog provides an environment for students in which they can organize their thoughts and interpretations, and this helps them to learn and think. Weblog also provides a wide communicative learning environment for students in which they can make relations with outside the classroom. Furthermore, students enjoyed the discovery of this new technology and considered it as an equipment that they would use in their future works. Results from Robertson's and Withing's research [36] are also compatible with those of this research. In their research, they had found out that using weblog considerably improves students' reflective and critical thinking. There are some new points in this study that were not in the previous researches. By looking at the researches conducted before, everybody could easily understand that all of them speaking thinking in general. Our research separated thinking into four categories (habitual action, understanding, reflection and critical reflection) and showed that using weblog could have different effect on different categories. It showed that using weblog had a positive effect on understanding, reflection and critical reflection, but had a negative effect on habitual action.

Finally, it should be told that emergence of internet and its use in education should be taken as good fortune and one must take the most advantage of it in the field of learning and education because this technology has caused spatial and epochal restrictions to be disappeared and has provided the possibility for learning at every age and everywhere. Also, using this equipment being in relation with teacher and professor is not restricted to the classroom either and this relation is always present even if they are far away from each other, and this facility provides students with thinking and for life learning.

Regarding the results from this research that shows the usefulness of internet in education, the following suggestions are offered:

Concerning the students' affairs:

- it is suggested to offer a short term course for students to know about internet and how to use it.
- it is suggested to make the ground ready by providing computer sites in universities for students and by offering facilities for them to be connected to internet from their homes and spending less money.

Concerning the affairs of university and professors:

- it is suggested to offer a short term course for professors to know about internet and its educational use.
- it is suggested for each educational group to create at least an educational weblog to guide the students and to offer the required data to the students.

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STUDYING THE IMPACT OF WEB-BASED LEARNING (WEBLOG) WITH A PROBLEM SOLVING APPROACH  
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