

# Scrutinizing the Impact of Facilitated Learning Strategies (Inquiry-Based Instruction and Differentiation) On Memory: The Case of Iranian EFL Students

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## Abstract

Language learning has gained significant popularity among the researchers. Incorporation of suitable methods, approaches, techniques, and strategies into the learning environment by teachers, who are more accountable for the success of all students, is strongly believed to be the building block for effective learning. Focusing on two strategies, inquiry-based instruction and differentiation, the current study intends to find out if the implementation of such strategies pave the way for effective learning in which the memory can be developed. To do so, participants of the current study were determined as 81 Iranian EFL students who received different treatments through a quasi-experimental design. The statistical analyses were performed using the paired t- test. Findings of the study represented that inquiry-based instruction has a positive effect on the memory of Iranian intermediate EFL students. Also, it was found that differentiation technique has a positive influence on the memory of Iranian intermediate EFL students. Results of the study have several implications and suggestions for language teachers, supervisors, and students.

**Keywords:** Differentiation, Inquiry-based instruction, Iranian EFL learners, Memory

## 1. Introduction

In recent years, several studies have been undertaken to address the substantial significance of learning a foreign language. The consensus over these studies is that many factors are at work to develop flawless language programs, and the quality of language is believed to be the major factor which directly impacts the way individuals interact with their environment. What is crucial for qualified language education is to consider the individual differences, interest, talents, and skills (Akyol, 2006; Chun & Plass, 1997). Accordingly, it is proved that individuals are said to perform differently when it comes to the language acquisition. Different individuals take part in learning environment with varied skills, knowledge, and experience. In this regard, teachers play a great role in observing the extent to which the learning conditions fulfill students' needs (Cox, 2008; Levy, 2008; Farris, 2005; Adami, 2004). Thus, one can argue that creating suitable education settings to students, designing teaching activities, getting aware of the most effective method required for teaching, and applying different teaching approaches to teaching process are the main responsibilities of teachers whose aim is to increase the quality of language learning (Coyne, Kaméenui, & Simmons, 2004; Chapman & King, 2003). To this end, a number of strategies are liable to be practiced by language teachers in order to facilitate the understanding of language and achievement on the part of students with a focus on responding to students' needs, various interests, and readiness level. These strategies are important to be integrated with language teaching process which is "forward-looking, quantitative rather qualitative, based on evaluation, multidimensional for the content, process and product, student-centered, and mixture of large, small group and individual teaching" (Tomlinson, 2001, p. 5).

The studies conducted in the field of facilitated learning represent that the differentiated instruction approach is successful, particularly in reading-writing teaching and mathematics and biology (Chen, 2007). Additionally, the differentiated instruction approach is defined as an effective approach in development of language skills and recommended to be used (Tobin & McInnes, 2008, p.3). In the class

where this approach is applied, students develop their reading and comprehension skills appropriate for their own learning features (Chapman & King, 2003).

## **2. Review of Literature**

### **2.1 Inquiry-based Instruction**

One can define the inquiry-based work “the process of learners' creating meaningful and useful knowledge from knowledge at-hand by asking questions, drilling, and analyzing the knowledge” (Perry & Richardson, 2001, p. 15). In the learning environments where inquiry based learning takes place, students perform the experiments and activities individually or in groups, and thus it is made sure that knowledge becomes more meaningful and permanent. In this process, students try to respond to the problems to be answered or solved with their research which they construct through active participation (Tatar & Kuru, 2006). Researchers (Holfstein, Nahum & Shore, 2010; Aydoğdu & Ergin, 2008) showed in their study that students performed better when they received the inquiry-based instruction. Additionally, it was found that language learners hold a positive attitude toward the implementation of ask-and-answer procedure which assisted them develop independent thoughts, understand the learning concepts, and form a group atmosphere with more fun.

The use of inquiry-based work has yielded several advantages such as students' recognition of the problems pertinent to the experiment, identifying the sub problems, collecting the data necessary for the solution of the sub-problems, and reaching conclusions by analyzing the data that they obtain so as to test their assumptions in the case of experiments to be done by means of inquiry. The key to the aforementioned strategy is that students are the key components of learning since they engage themselves in a process where they need to monitor their own learning and control for the requirements, the fulfilling of which pave the way for effective learning and increased understanding (Powers, 2008; Tomlinson, 2001). Gaining additional knowledge in this way ensures continuous efforts for seeking solutions to the problem raised in the language learning setting. The study performed by Ergin, Şahin, Pekmez and Ongel Erdal (2005) emphasized that students are expected to decide as to what different systems can be, to design their own experiment, and to collect and analyze their own data (cited in Aydoğdu & Ergin, 2008).

### **2.2 Differentiation**

The implementation of differentiation strategies has been widely reported to be an important factor for effective individual learning (Anderson, 2007; Broderick, Mehta-Parekh, & Reid, 2005; Carolan & Guinn, 2007; Douglas, Burton, & ReeseDurham, 2008; King-Shaver, 2008; Lewis & Batts, 2005; Sherman, 2009; Tomlinson, 2000a, 2000b, 2005; Witzel & Riccomini, 2007; Wormeli, 2011). To define, differentiation is designing lesson plans “to meet the needs of a range of learners; includes learning objectives, grouping practices, teaching methods, varied assignments, based on student skill levels, interest levels, and learning preferences” (King-Shaver, 2008. p. 215). Most of the teachers employ different tools and approaches to adjust their language presentation to various learning style held by the students in classroom setting. Putting into other words, effective differentiation encompasses three main dimensions, namely, (1) differentiating the content, (2) modifying the process or activities, and (3) offering product options (Tomlinson, 2000). What is important is that tasks assigned to individuals or groups and contents to be presented should be justified so as to meet the learners' objectives and needs, respectively. In addition, differentiating strategy is composed of three main elements, namely, flexible grouping, cooperative learning in pairs or groups, and tiered instruction (Bailey & Williams-Black, 2008).

### **2.3 Memory**

In the language learning setting, memory plays a vital role in retaining and retrieving the information stored. The main task of the memory is to monitor “ongoing cognitive processes and actions, engaging selective attention to relevant representations and procedures, and suppressing irrelevant, distracting ones” (Hambrick, Kane, & Engle, 2005, p. 215). Corresponding areas in which the memory engages pertain to “the online storage and processing of verbal tasks, visuospatial tasks, or tasks imposing both verbal and visuospatial, or other, demands” (D'Esposito, 2007, p. 65).

Memory undergoes the influence of the tasks assigned in the classroom setting and the degree to which they are complicated or facilitated by any means. In other words, when it comes to initiating and

proceeding the simple tasks in learning environment, the memory is not obliged to retrieve the representations while in the context of performing more complex tasks and assignments, there is a huge burden on the shoulders of memory to both process and retrieve the information (Barrouillet & Camos, 2001). As Oberauer, Wilhelm, and Wittman (2003, p. 12) put it, task complexity can vary across a number of dimensions including “response length, syntactic complexity, and propositionality. Essentially, higher working memory loads will be imposed by tasks requiring more use of meaningful ideas, assembled in syntactically complex sentences, and discussed at length”.

There are several strategies, namely, visualization, cooperative learning, technology use, professional development, inquiry-based instruction, and differentiation, which facilitate the learning conditions and should be take into consideration by language teachers with an aim to increase the effectiveness of their teaching career and better language achievement on the part of students. The two latter strategies, i.e. inquiry-based instruction and differentiation, are considered in the present study to determine whether the use of these strategies contribute to effective language learning among the students. Particularly, the current probe is after addressing the impact of the afore-mentioned strategies on the memory among Iranian EFL students and evaluating the applicability of these strategies to enable students’ active participation in learning process as well as studying in small groups individually or in pairs through the involvement of teacher and by means of the students’ inquiry.

### 3. Method

As the purpose of the present study was to examine the feasible impact of facilitated learning strategies on memory, following research hypotheses were developed:

H<sub>0</sub>1: The inquiry-based instruction does not have any significant effect on the memory of Iranian intermediate EFL students.

H<sub>0</sub>2: The differentiation strategy does not have any significant effect on the memory of Iranian intermediate EFL students.

Participants of the current study were 81 intermediate EFL learners educating at Shahre Zabane English Institute. The present study followed a quasi-experimental design based on which the participants were randomly assigned to two experimental groups and one control group in order to receive the pertinent instruction.

### 4. Results

Having administered the pretest and posttest to different groups, the data were collected to be analyzed via the SPSS software. To do so, Kolmogorov-Smirnov test was run primarily to determine the type of variables distribution. The results of the afore-mentioned test ( $P > 0.05$ ) proved the normal distribution of variables, thus the hypotheses were examined through the use of paired-sample t-test with an aim to study the feasible effect of each technique on the memory.

#### 4.1 Hypothesis 1

Null Hypothesis: The inquiry-based instruction does not have any significant effect on the memory of Iranian intermediate EFL students.

Alternative Hypothesis: The inquiry-based instruction has a significant effect on the memory of Iranian intermediate EFL students.

**Table 1.**

*Paired- Samples T-Test Regarding the Effect of Inquiry-based Instruction On the Memory of Iranian Intermediate EFL Students*

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)	
			Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
Posttest	3.66667	1.68705	.32467	2.99929	4.33404	11.293	26	.000
Pretest								

As the table shows, the level of significance for the test is less than 0.05 (0.000) which indicates that null hypothesis is rejected and alternative hypothesis is confirmed. Putting into simpler terms, findings of the

afore-mentioned table suggest that the inquiry-based instruction has a significant effect on the memory of Iranian intermediate EFL students. It is worth mentioning that 95% confidence interval (2.99929, 4.33404) is a positive value which emphasizes the positive effect of inquiry-based instruction on the memory of Iranian intermediate EFL students.

#### 4.2 Hypothesis 2

Null Hypothesis: The differentiation instruction does not have any significant effect on the memory of Iranian intermediate EFL students.

Alternative Hypothesis: The differentiation instruction has a significant effect on the memory of Iranian intermediate EFL students.

**Table 2.**

*Paired- Samples T-Test Regarding the Effect of Differentiation Instruction On the Memory of Iranian Intermediate EFL Students*

	Paired Differences				t	df	Sig. (2-tailed)	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
posttest1 - pretest1	4.77778	1.88788	.36332	4.03096	5.52460	13.150	26	.000

Results of the aforementioned table represent that p value is less than 0.05 (0.000), thus rejecting the null hypothesis and accepting the alternative hypothesis. In other words, it is safe to conclude with 95% confidence interval (4.03096, 5.52460) that differentiation instruction has a positive effect on the memory of Iranian intermediate EFL students.

#### 5. Discussion and Conclusions

It was revealed that differentiated instruction approach had positive effects on students' memory development. In literature, differentiated instruction is quite effective on enhancing the students' interests and attitudes towards the lessons. It was found out that the students' academic success interest in the lesson, learning levels and their participation to the lesson were enhanced in the class in which the differentiated instruction application was carried out. (Beecher & Sweeny, 2008; Fahey, 2000). Related to this, the findings of the study were parallel with the findings of Avcı, Yüksel, Soyer and Balıkcıoğlu's (2009) study, which concluded that the differentiated instruction increased the students' interest in the lessons. Moreover, it coincides with Chen's (2007) finding that the students had positive attitudes towards the lesson. Likewise, McAdamis's (2001) finding that the differentiated instruction increased the students' motivation and interests in the lesson showed similarities with the findings of the study. Moreover, according to Burn's study, the teachers considered that differentiated instruction increased the students' interests and participations to the lesson and thus it provided the students' interaction and established opportunities with the students to learn at their own speed. This finding also coincides with the finding of the current study.

Also, according to the statistical results, it was found that inquiry-based instruction improved the memory of language learners. This is supported by the findings obtained in earlier research studies concluding that inquiry based activities promote students' motivation and memory (Crawford, 2000; Holbrook & Kolodner, 2000; Marx et al., 2004; Tuan et al., 2005; Madden, 2011). In a similar vein, Gibson and Chase (2002), and Shimoda, White and Frederiksen (2002) also concluded that inquiry based activities were influential in students' having positive attitudes towards language learning.

#### References

- Adami, A. F. (2004). Enhancing students' learning through differentiated approaches to teaching and learning: A Maltese perspective. *Journal of Research in Special Educational Needs*, 4 (2), 91–97.
- Akyol, H. (2006). *Yeni programa uygun Türkçe öğretim yöntemleri*. Ankara: Kok Yayıncılık.
- Anderson, K., M. (2007). Differentiating instruction to include all students. *Preventing School Failure*, 51 (3), 49-54.
- Avcı, S. Yüksel, A. Soyer, M., & Balıkcıoğlu, S. (2009). The cognitive and affective changes caused by the differentiated classroom environment designed for the subject of poetry. *Educational Sciences: Theory & Practice*, 9 (3), 1069-1084.

- Aydogdu, B., Ergin, O. (2008). Fen ve Teknoloji dersinde kullanılan farklı deney tekniklerinin öğrencilerin bilimsel süreç becerilerine etkileri. *Ege Eğitim Dergisi*, 9(2), 15-36.
- Bailey, J. P., Williams-Black, T. H. (2008). Differentiated instruction: Three teachers' perspectives. *College Reading Association Yearbook*, 29, 133-151.
- Barrouillet, P., Camos, V. (2001) Developmental increase in working memory span: Resource sharing or temporal decay? *Journal of Memory and Language*, 45, 1–20.
- Beecher, M., Sweeny, S. M. (2008). Closing the achievement gap with curriculum enrichment and differentiation: one school's story. *Journal of Advanced Academics*, 19 (3), 502-530.
- Broderick, A., Mehta-Parekh, H., & Reid, D. K. (2005). Differentiating instruction for disabled students in inclusive classrooms. *Theory Into Practice*, 44(3), 194- 202.
- Carolan, J., Guinn, A. (2007). Differentiation: Lessons from master teachers. *Educational Leadership*, 64(5), 44-47.
- Chapman, C., King, R. (2003). *Differentiated instructional strategies for reading in the content areas*. California: Carwin Pres, Inc.
- Chen, Y. H. (2007). *Exploring the assessment aspect of differentiated instruction: college EFL learners' perspectives on tiered performance tasks*. (Unpublished doctoral dissertation). The University of New Orleans.
- Crawford, B.A. (2000). Embracing the essence of inquiry: New roles for science teachers. *Journal of Research in Science Teaching*, 37(9), 916-937.
- Chun, M. D., Plass, J. L. (1997). Research on text comprehension in multimedia environments. *Language Learning & Technology*, 1 (1), 60-81.
- Cox, S. G. (2008). Differentiated instruction in the elementary schools. *Educ Dig*, 73 (9), 52-54.
- Coyne, D. M., Kaméenui, E. J., & Simmons, D. C. (2004). Improving beginning reading instruction and intervention for students LD: Reconciling “all” with “each”. *Journal of Learning Disabilities*, 37 (3), 231-239.
- Crawford, C., Brown, E. (2003). Integrating Internet-based mathematical manipulatives within a learning environment. *Journal of Computers in Mathematics and Science Teaching*, 22(2), 169-180.
- D'Esposito, M. (2007) From cognitive to neural models of working memory. *Philosophical Transactions of the Royal Society of London. Biological Sciences*, 362, 761–72.
- Douglas, O., Burton, K. S., & Reese-Durham, N. (2008). The effects of the Multiple Intelligence teaching strategy on the academic achievement of eighth grade math students. *Journal of Instructional Psychology*, 35(2), 182-187.
- Fahey, J. (2000). Who wants to differentiate instruction? We did. *Educational Leadership*, 58, 70-72.
- Farris, P. J. (2005). *Language arts. Process, product and assessment*. Fourth edition. Long Grove, Illinois: Waveland Press Inc.
- Gibson, H.L., ve Chase, C. (2002). Longitudinal impact of an inquiry-based science program on middle school students' attitudes toward science. *Science Education*, 86, 693-705.
- Hambrick, D. Z, Kane M.J., & Engle, R.W. (2005) The role of working memory in higher-level cognition. In R. Sternberg and J.E. Pretz (Eds.), *Cognition and intelligence: Identifying the mechanisms of the mind* (pp. 104–121). . New York: Cambridge University Press,
- Hofstein, A., Nahum, T., & Shore, R. (2001). Assessment of the learning environment of inquiry-type laboratories in high school chemistry. *Learning Environments Research*, 4(3), 193-207.
- Holbrook, J., Kolodne, J. (2000). Scaffolding the development of an inquiry-based classroom. *Fourth International Conference of the Learning Science*, 16, 221-227.
- King-Shaver, B. (2008). Differentiated instruction: The new and not so new. *California English*, 13(4), 6-8
- Levy, H. M. (2008). Meeting the needs of all students through differentiated instruction: helping every child reach and exceed standards. *The Clearing House*, 81 (4), 161-164.
- Lewis, S., Batts, K. (2005). How to implement differentiated instruction? Adjust, adjust, adjust. *Journal of Staff Development*, 26(4), 26-31.
- Madden, K.R. (2011). *The use of inquiry-based instruction to increase motivation and academic success in a high school biology classroom*. (Master Thesis). Montana State University, Bozeman, Montana.
- Marx, R.W., Blumenfield, P.C., Krajcik, J., Fishman, B., Soloway, E., Geier, R., & ve Revital, T. (2004). Inquiry-based science in the middle grades: Assessments of learning in urban systematic reform. *Journal of Research in Science teaching*, 41(10), 1063-1080.
- McAdamis, S. (2001). Teachers tailor their instruction to meet a variety of student needs. *Journal of Staff Development*, 22(2), 1-5.

- Oberauer, K., Süß H.M., Wilhelm, O., & Wittman WW (2003) The multiple faces of working memory: Storage, processing, supervision, and coordination. *Intelligence* 31: 167–93.
- Perry, V.R., Richrdson, C.P. (2001). *The New Mexico techmaster of science teaching program: an exemplary model of injury-based learning*. 31<sup>st</sup> ASEE/IEEE Fronteries in Education Conference, Reno.
- Powers, E. A. (2008). The use of independent study as a viable differentiation technique for gifted learners in the regular classroom. *Gifted Child Today*, 31 (3), 57-65.
- Sherman, S. (2009). Haven't we seen this before? Sustaining a vision in teacher education for progressive teaching practice. *Teacher Education Quarterly*, 36(4), 41-60.
- Shimoda, T.A., White, B.Y., & Frederiksen, J.R. (2002). Students' goal orientation in learning inquiry skills with modifiable software advisors. *International Science Education Journal*, 88, 244-263.
- Tatr, N., Kuru, M. (2006). The effect of inquiry-based learning approach in science education on academic achievement. *H.U. Egitim Fakultesi Dergisi*, 31, 147-158.
- Tobin, R., McInnes, A. (2008). Accommodating differences: variations in differentiated literacy instruction in grade 2/3 classrooms. *Literacy*, 42 (1), 3-9.
- Tomlinson, C. A. (2000a). Reconcilable differences? Standards-based teaching and differentiation. *Educational Leadership*, 58(1), 6-11.
- Tomlinson, C. A. (2000b). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Tomlinson, C. A. (2005). Traveling the road to differentiation in staff development. *National Staff Development Council*, 26(4), 8-12.
- Tuan, H.L., Chin, C.C., Tsai, C.C., & Cheng, S.F. (2005). Investigating the effectiveness of inquiry instruction on the motivation of different learning styles students. *International Journal of Science and Mathematics Education*, 3, 541-566.
- Witzel, B. S., Riccomini, P. J. (2007). Optimizing math curriculum to meet the learning needs of students. *Preventing School Failure*, 52(1), 13-18.