

# **Portfolio Assessment and the Enhancement of Higher Order Thinking through Multiple Intelligence and Dialogic Feedback**

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**Received:** July 25, 2014; **Accepted:** April 28, 2015

## **Abstract**

The current emphasis on higher order thinking skills (HOTS) has inspired many EFL educators to explore the impact of merging different pedagogical teaching and assessment strategies on the enhancement of thinking skills. Responding to such a growing need to investigate the effect of diverse teaching strategies on HOTS, the present study aimed to explore the impact of the integration of portfolio assessment (PA), multiple intelligences (MI), and dialogic feedback (DF) on development of HOTS. Forty participants in two intact advanced classes were randomly assigned to control and treatment groups, receiving writing-based portfolio assessment (WBPA) and MI-oriented portfolio assessment with dialogic feedback (MIWBPADF), respectively. In the experimental group, the participants' MI was initially measured and the data were used as a basis for grouping learners with the same dominant intelligence type in the same group. The participants in the MI-oriented portfolio assessment with dialogic feedback group received activities compatible with their dominant intelligence. The results of MANOVA revealed that the experimental group outperformed the other group with regard to their higher order thinking skills. The findings underscore the necessity of taking learners' intelligences as a criterion for task selection and delivering feedback dialogically as instructional techniques for the enhancement of HOTS. This study has implications for teaching higher order thinking in EFL contexts.

**Keywords:** portfolio assessment, higher-order thinking skills, multiple intelligences, dialogic feedback

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## **INTRODUCTION**

Cultivating students' higher order thinking skills (HOTS) has been a great concern of the modern formal education (Halpern, 2007). It is argued that students should develop such skills while engaged in academic learning because they help students to make purposeful, self-regulatory judgments (Lewis & Smith, 1993), deal with challenges in this contemporary world where knowledge is changing so rapidly, and use their talents quickly (Tsui, 2002). Besides, higher order thinking skills enable students to evaluate other's arguments to resolve conflicts in complex situations (Newmann, 1990).

The significance of HOTS encouraged many researchers to investigate the possible ways of enhancing higher cognitive skills in the curriculum. Despite such myriad of research on higher order thinking skills, little substantiated knowledge on effective instructional approaches comes from research on HOTS (Tsui, 2002), indicating the necessity of further research studies to explore the impact of specific teaching strategies on the development of HOTS. Thus, this study examined the possible effect of the integration of portfolio assessment (PA), multiple intelligences (MI), and dialogic feedback (DF) on development of higher level thinking skills.

## **LITERATURE REVIEW**

### **Higher Order Thinking**

Higher-order thinking, in essence, occurs when an individual takes new information, stores it in memory, interrelates and/or reorganizes it, and then extends this information to achieve a purpose or to find possible answers in confusing conditions (Lewis & Smith, 1993). Consequently, higher-order thinking challenges the individuals to "interpret, analyze, or manipulate information because a question to be answered or a problem to be solved cannot be resolved through the routine application of previously learned knowledge" (Newmann, 1990, p. 45).

Nonetheless, following the shift of emphasis in foreign language education from teacher-centered to learner-centered pedagogy, EFL educators and educational institutes have concentrated on teaching higher cognitive skills (Ennis, 1989) through incorporating instructional approaches and triggering how to think rather than what to think (Tsui, 2002). Parallel with this paradigm shift, language pedagogy has

witnessed a significant rise in inspecting teaching and assessment practices which may stimulate thinking in learner-centered classrooms. Yet, little substantiated knowledge on effective teaching and assessment strategies comes from research on higher level thinking skills since the number of studies are inadequate (Tsui, 2002).

Finding effective means of teaching and assessing the skills associated with higher order thinking is a difficult task, and yet these skills are among the essential components of a high quality education (Tsui, 2002). Among diverse teaching strategies, writing assignments are likely to be efficacious in enhancing higher order thinking skills since writing, at the core of which lies thinking, provides opportunities for students to critically think in order to connect ideas from different internal and external sources (Emig, 1983; Halpern, 2007). As such, writing-based portfolio assessment can be an appropriate strategy to meet the fundamental objective of stimulating HOT (Genesee & Upshure 1996; Hamp-Lyons & Condon, 2000).

## **Portfolio Assessment**

Portfolio assessment, as one of the most popular types of alternative assessment methods, inspires self-evaluation through reflection on growth (Hamp-Lyons & Condon, 2000). Such sort of critical analysis and reflective thinking promote students' engagement and responsibility. Hence, portfolio assessment can be considered a method of enhancing higher level thinking skills, since it can be used to record intellectual growth which subsequently leads to a reflective and critical thinking process (Genesee & Upshure 1996).

The potential well-known advantages of portfolio assessment have motivated teachers to embrace portfolios in their EFL classrooms. Portfolios provide information on what students know, what they can do, and students' progress over time (Genesee & Upshure 1996). Moreover, portfolio implementation paves the way for considering the individuality of each student, and so it may foster intrinsic motivation and responsibility (Hamp-Lyons & Condon, 2000).

Regarding the findings of the previous studies, it was found that portfolio implementation enhances learner autonomy and facilitates the learning process. For example, Banfi (2003) who explored the impact of portfolio assessment on advanced language students' improvement of linguistic, academic, and professional skills concluded that ongoing

feedback along with the gradual development in the course of the portfolios allowed for considerable degrees of improvement in a relatively shorter time. Also, this approach improved students' degree of satisfaction at the results and their enjoyment in the process. Furthermore, Banfi (2003) found portfolios ideal for enhancing learner autonomy. Likewise, Yang (2003) advised the effect of portfolio on learner autonomy and concluded that portfolios are effective in upgrading students' awareness of learning strategies, facilitating the learning process, and enhancing self-directed learning.

What makes portfolios highly beneficial and persuasive in the context of foreign language learning are the four essential features of a diachronic framework, an accommodation of learner variation, a notion of learning as an active process, and a component of critical reflection (Genesee & Upshure 1996).

Higher-order thinking skills can be fostered in learner-centered classrooms in which students are actively involved and motivated (Halpern, 2007). Hence, to make the process of teaching as learner-centered as possible, Gardner's (1999) theory of multiple intelligences (MI), which considers eight different potential pathways of intellectual ability in learning, can be merged with portfolios to enhance HOTS because individuals learn more when instruction, assessment, and activities are in line with their dominant intelligences (Gardner, 1999).

Thus, implementing Gardner's (1999) theory of multiple intelligences into teaching strategies augments the learning of higher level thinking skills. The theory of multiple intelligences, as proposed by Howard Gardner (1999), refers to a kind of learner-centered philosophy which considers multiple dimensions of thinking for people, namely, linguistic, spatial, musical, interpersonal, intrapersonal, kinesthetic, mathematical, and naturalistic intelligences (Christison, 1996). Each dimension of thinking embraces certain characteristics which lend themselves to specific professions (Gardner, 1999). Accordingly, in educational settings, instructional strategies that meet the needs of each intelligence should be used (Armstrong, 2003). Among different teaching strategies, MI-oriented writing-based portfolio assessment can be implemented in a way to offer different ways of learning for learners with different abilities through different writing activities designed for each type of intelligence. For instance, for the writing topic "endangered species", the participants whose inclined intelligence is linguistic can write about whether zoos or animals in captivity help or hinder

endangered animals. The participants strong in special, naturalist, and mathematical intelligence can be required to rank the locations in Iran in which the endangered species can be persevered, write about different types of environmental problems that have led to endangered species, and write similarities and differences among endangered species, respectively.

More importantly, portfolios nurture the conditions for making the students aware of their strengths and weaknesses through self/peer-assessment, reflection and ongoing feedback. Such on-going feedback on students' work to chronicle development which is a major factor in the enhancement of HOTS, (Banfi, 2003; Barnhardt, Kevorkian, & Delett, 1998; Yang, 2003) can be delivered in a dialogical and contingent two-way process (Nicol, 2010) to enable the students to become more critical and reflective (Carless et al., 2011).

Self-assessment and peer dialogue make learners engaged with the process of feedback and facilitates the development of HOTS; hence, feedback should be conceptualized as a dialogical and contingent two-way process that involves coordinated teacher–student and peer-to-peer interaction as well as active learner engagement (Nicol, 2010). According to Nicol (2010), dialogic feedback suggests an interactive exchange in which interpretations are shared, meanings negotiated and expectations clarified. Dialogic approaches to assessment can guide students on what is good performance by facilitating discussions of quality in relation to specific assignment tasks, and also support them in developing enhanced ownership of assessment processes (Carless et al., 2011).

Likewise, Paul (1992) argues that fostering dialogue can be a method of enhancing critical thinking, since dialogue makes it possible for students to take other's perspective into account in order to assess the truth of claims. Also, Wegerif (2007) confirms that open dialogues can be the basis of a new approach in teaching and learning of higher order thinking skills.

In a learner-centered classroom, learning is not a simple acquisition process based on teacher transmission, but is a process based on students' active involvement in the construction of knowledge and skills through discussion with others (Nicol, 2010). In order for learning to occur, students must do something with the transmitted information such as analyzing, asking questions, having discussion with others, connecting it

with prior information, and using the information to change future actions (Carless et al., 2011; Nicol, 2010).

As such, the use of dialogic feedback can make the classroom environment more learner-centered and appealing to students, which in turn, might lead to the enrichment of higher level thinking skills. Accordingly, instructional strategies which provide the conditions for dialogic teaching, like having dialogic feedback, are expected to promote students' higher order thinking skills.

The flexibility of portfolios in allowing for frequent opportunities to practice authentic language use in learner-centered contexts (Delett et al., 2001) on one hand, and their practicality and efficiency in embracing dialogic feedback (Carless et al., 2011) on the other hand, made dialogic-based portfolio assessment a fertile soil for reinforcing higher order thinking skills. Therefore, merging portfolios with multiple intelligences and dialogical feedback in a learner-centered pedagogy might promote higher level thinking skills.

While several empirical research avenues have examined the application of portfolios in EFL instructional and evaluative contexts, the literature on the relative contribution of portfolios to higher order thinking skills is scanty and inconclusive. As the process of writing provides opportunities for students to connect ideas from different internal and external sources, and think critically about ideas (Emig, 1983), Sorrell, Brown, Mary and Kohlenberg (1997) tried to study how writing portfolios could be used to provide evidence of critical thinking. Findings showed that writing portfolios can increase evidence of critical thinking outcomes.

In another study, Liu, Zhuo, & Yuan (2004) used a networked portfolio system together with peer assessment to explore their effects on higher order thinking skills. The authors argued that such network portfolio system not only helped teachers assess students' higher-order thinking skills but also helped students train their higher level thinking skills such as critical and analytical thinking.

Wang and Wang (2012) investigated the impact of e-portfolios on HOTS. As ontological schemata can provide a visible map for e-portfolios, they used such ontological approach to organizational schema of e-portfolio to see its impacts on HOTS. The researchers of this study focused on the semantic aspects of e-portfolios for fostering higher-order thinking and concluded that the use of organizational schemata of e-portfolios increases the instances of higher order thinking skills. To teach



HOTS, Barak and Dori (2009) explored the effectiveness of integration of four modes of assessment into a hybrid graduate course which combined face-to-face classroom discussions with online activities, interrelating teaching, learning, and assessment on the enhancement of HOTS. The results showed that the students in the experimental group who received portfolio assessment performed better than the control group in terms of their ability to (a) ask complex questions, (b) provide solid opinions, (c) present consistent arguments, and (d) demonstrate critical thinking.

Likewise, Iranian teachers and educators have addressed the effect of portfolio assessment on different components of HOTS. Faravani (2006) explored the impact of reading based portfolio assessment on critical thinking, achievement, and reading comprehension. The results of her study revealed that portfolio assessment not only boosted students' critical thinking but also their schema-based reading achievement as well as reading comprehension. In another study, Atai and Nikuinezhad (2006) attempted to discover how portfolio assessment contributes to Iranian students' metacognitive reading strategy, which is a sub-component of HOTS, and their motivation for reading as well as their attitudes toward portfolio-based reading assessment. The results of their study revealed that portfolio assessment developed students' autonomy and metacognitive abilities. In another study,

As assessment techniques and instructional strategies accommodating the various learning styles and individual differences can better foster learning and thinking (Buch & Bartley, 2002), many EFL researchers attempted to apply Gardner's theory of Multiple Intelligences to language teaching programs. For example, Green and Tanner (2005) in a study scrutinized some applications of MI theory to the online training of English language teachers and concluded that designing activities around MI theory helped the learners to engage and learn better. Also, Zhu (2011) explored the feasibility of combining the basic concepts of MI theory with the practice of college English teaching in order to improve the quality of teaching as well as the comprehensive qualities of students. He concluded that MI is a useful tool for planning language learning activities as it may insure that students can handle in the presence of challenge. When learners see what they can do, this has a positive effect on their self-esteem and can lead to enhancing success in language learning.

Nevertheless, there have been sparse studies on the relative contribution of MI theory to the enhancement of HOTS. In a study, Zobisch (2005) examined whether or not teaching critical thinking based on the theory of multiple intelligences increases participants' critical thinking comprehension. The results showed that the more MI instructional techniques used, the greater critical thinking comprehension achieved. That is, presenting course materials through a variety of MI instructional techniques can enhance critical thinking. In another study conducted by Christison (1996) on applying MI Theory in TEFL teacher education programs, she claimed that integrating MI with teaching programs lead teachers and learners to think creatively and critically in second language pedagogy.

In order to reinforce higher order thinking skills in portfolio-based classrooms, feedback can be delivered in a dialogical and contingent two-way process (Carless, Salter, Yang, & Lam, 2011; Nicol, 2010). Despite the importance of dialogic feedback and the teaching of higher order thinking skills to EFL learners to whom such skills are invaluable to their futures as they help them deal with a multitude of challenges in this contemporary world (Tsui, 2002), few studies have been done to scrutinize the effectiveness of dialogic feedback on the improvement of higher order thinking skills. Frijters, Dam, and Rijlaarsdam(2008) investigated the effects of dialogic and non-dialogic pedagogy on the enhancement of critical thinking skills. The results indicated that the dialogic learning condition, compared to the non-dialogic, resulted in a more positive effect on the critical thinking competencies of the students. In another study conducted by Benesch (1999), she tried to develop a dialogic relationship with her EAP students and made the classroom a place in which teachers and students challenge and question norms and assumptions through discussion. The results showed that dialogue can help students think critically and explore not only their own views but also the views they have not been previously exposed to.

## **PURPOSE OF THE STUDY**

The educational systems with an exclusive overemphasis on verbal-linguistic and logical-mathematical intelligences leave no place for individual differences and so they are in direct contrast with the principles of learner-centered progressive educational philosophy dominating education in developed societies (Armstrong, 2003; Gardner,



1999). Drawing on Maftoon, YazdaniMoghaddam, Gholebostan, and Beh-Afarin (2010), most ELT textbooks used in Iran primarily deal with lower order thinking skills (LOTS), defined as the kind of thinking involved in recalling information, or in applying information or concepts to familiar situations and contexts (Resnick, 1987), due to the incongruence between book contents and students' interests, needs, their everyday life and experiences. Therefore, as Armstrong (2003) puts, we need to concentrate more closely on neglected intelligences as they might be the particular strengths of some students who had difficulties in successfully making their way through heavily linguistic schools. Hence, inspired by recent research findings, the present study set out to examine the impact of the integration of dialogic feedback and multiple intelligences with writing-based portfolio assessment on the enhancement of Iranian EFL learners' HOTS in writing. The following research question was formulated:

Does the integration of multiple intelligence-oriented portfolio assessment with dialogic feedback enhance Iranian EFL learners' higher and lower order thinking skills?

## **METHOD**

### **Participants**

A total of 40 female Iranian EFL students, within the age range of 20 to 30, studying general English in advanced levels of A1 and A2 at Jihad Daneshgahi, a private language institute in Karaj, Iran participated in this study. Based on the information elicited from the students upon registration in language courses, the participants had mixed backgrounds, some coming from extremely affluent families and some from working class families. Also, they had completed their high school diplomas and some of them had bachelor and master degrees.

### **Instrumentation**

Three instruments were employed to obtain the data namely, writing tests, multiple intelligence checklist, and higher order thinking skills rubric.

#### ***Writing Tests***

To ascertain the initial homogeneity of the participants in HOTS and LOTS, a writing test, selected from the writing section of the TOEFL called TWE, and titled as “Which one do you prefer? To be well educated and have enough money to afford living with or to be less educated and rich” was used. The same writing test was used as posttest for measuring HOTSs and LOTSs at the end of the study.

### ***MI Checklist***

Having randomly grouped the participants, the researchers administered Christison’s (1999) Multiple Intelligences checklist, which was designed and validated based on Gardner’s theory of Multiple Intelligences, to the MIWPADF group to identify the participants’ dominant intelligences and to group them accordingly. Christison’s (1999) MI checklist has eight different intelligences (linguistic, logical- mathematical, spatial-visual, bodily - kinesthetic, musical-rhythmic, naturalistic, interpersonal and intrapersonal intelligences). Each section of the test contains 6 items related to any of these intelligence types. Based on the rubric provided by Christison’s (1999), the participants were instructed to read each item and write 0 if they disagreed with the statement, write 2 if they strongly agreed, and write 1 if they were somewhere in between. Then, the score for each intelligence type was calculated. The section which showed the highest score was regarded as the test taker’s dominant intelligence type. Those participants with similar dominant intelligences were grouped to work on the tasks together.

### ***Higher Order Thinking Skills Rubric***

The third instrument utilized in this study was the higher and lower order thinking skills rubric adapted from Legare (2002). The rubric was designed and validated based on key theorists’ and researchers’ definitions of HOTS and LOTS together. It integrates the concepts and definitions of HOTS and LOTS as provided by contemporary theorists and researchers. For instance, judgment and interpretation construct a category of HOTSs because, based on key scholars’ definition, they refer to abilities of identifying conclusions, reasons and assumptions (Ennis, 1989); developing and defending a position on an issue; defining terms in a way appropriate for the context (Ennis, 1989); and making contributions relevant to prior discussion (Newmann, 1990). Consequently, derived from such definitions, any statement which seeks

to defend a position taken on an issue, connects to and furthers the discussion, and defines terms in a way appropriate for the context can be indicator of judgment and interpretation, a subcomponent of HOTSS.

### ***Instructional Materials***

The first teaching material and the main course book used in the classes tilted "*Summit 2*" from "*Top Notch*" series (Saslow & Ascher, 2007). The second teaching material, which was added to their main course materials, was a list of MI-oriented argumentative writing topics taken from the book titled "*Multiple Intelligences: the Thematic Approach*" by R.I. C. Publications (2004). This course book was designed by a group of Australian teachers as a classroom resource for applying the theory of multiple intelligences to allow students to use their dominant intelligences to aid understanding and to work on their weaknesses. Although the titles of writing assignments were the same in all groups, the assignments only matched students' dominant MI in the MI-oriented writing based portfolio assessment with dialogic feedback group. For instance, for the topic of 'endangered species', those with high linguistic intelligence were required to write about whether zoos or animals in captivity help or hinder endangered animals. The participants with high special, naturalist, and mathematical intelligence were asked to rank the locations in Iran in which the endangered species can be persevered, write about different types of environmental problems that have led to endangered species, and write similarities and differences among endangered species, respectively.

### **Data Collection Procedure**

At the onset of the study, the advanced EFL participants in two intact classes were randomly assigned to experimental and control groups. The students in the experimental group were exposed to MI-oriented portfolio assessment with dialogic feedback (MIWBPA) whereas the subjects in the control group received writing-based portfolio assessment (WBPA). In the experimental group, the participants' MI was initially measured and the data were used as a basis for grouping learners with the same dominant intelligence type in the same group. The participants in the MIWBPA group received activities compatible with their dominant intelligence. However, the students in the control group received writing based portfolio assessment and their dominant MI was

not taken into account in the selection and administration of the activities. Hence, the selected activities were assigned and performed indiscriminately. That is to say, all the participants were grouped regardless of their dominant intelligences and wrote about a single topic each session. For example, one session a linguistic-based, and in another session, a spatial-based writing topic was given to the students. Therefore, each session, the participants in the control group practiced a specific kind of MI-oriented writing topic. In addition, the first session started by the teacher's presentation of the principles of argumentative paragraph writing.

Moreover, in both experimental and control groups, the timing of treatment for implementing each portfolio, which required 2 sessions of the course to be completed, was the same: 10 minutes for brainstorming and discussion; 30-35 minutes for writing argumentative paragraphs; 35 minutes for reflection, revision, self/peer assessment and feedback. Consequently, the number of writing-based portfolio assignments was only 4 due to the fact that they required time to be constantly expanded, reviewed, assessed, cleaned, and stored and that they were added to their main course materials.

In the control group, the teacher divided the learners into groups, each containing 5 subjects. Having discussed the writing topic in each session, the members in each group started to write an argumentative paragraph individually. After that, the writing assignments were collected and evaluated based on Wang and Liao' (2008)' writing scoring criteria by the teacher who was among the experienced male teachers holding an M.A. degree in TEFL in Jihad Daneshgahi Institutes—Karaj branch. Then, each participant was required to think about the teacher's evaluation, revise the draft based on teacher's comments, and then return the writing assignment to the teacher.

The same portfolio procedure was followed in the experimental group except for the consideration of students' dominant MI and type of feedback. In the experimental group, the same teacher divided the learners into groups, each containing 5 subjects with the same dominant intelligence type. The same portfolio procedure was followed in the experimental group except for the consideration of students' dominant MI and type of feedback. In the experimental group, the same teacher divided the learners into groups, each containing 5 subjects with the same dominant intelligence type. The research manageability made the researcher consider the second dominant intelligence type for some

students in order to have the same number of participants with the same dominant intelligence type in each group. Also, the second dominant type of intelligence was considered for the participants with musical intelligence. As the basis of grouping in the experimental group was participants' dominant intelligences, the researcher found only four intelligences of linguistic, mathematical, visual-spatial, and interpersonal dominant.

Besides, the process of feedback delivery was dialogical through utilizing interactive cover sheets and sample papers to be critically discussed and evaluated. Interactive cover sheets were attached to the front of the student's assignments. Each participant had to write about the particular aspect of writing assignment on which he/she would like feedback. Then, in the next session, based on the teacher's evaluation of writing assignments, each participant had to mull over the evaluation, correct the form, revise it, and then return the writing assignment to the teacher. Moreover, having evaluated the assignments, the teacher randomly selected 1 or 2 papers which were not corrected to display on the visualizer. The participants were required to interact with peers in their group to discuss the case. After group discussions, there were whole class discussions. The teacher encouraged and required the students to ask questions, criticize, or make suggestions about the writing displayed on the visualizer. The teacher as a facilitator used questioning method to respond to students questions in order to force them to think.

### **Data Analysis**

The researchers analyzed the research data via a multivariate ANOVA (MANOVA) to investigate the effect of merging multiple intelligence oriented writing activities and dialogic feedback with portfolio assessment on the enhancement of Iranian EFL learners' higher and lower order thinking skills.

## **RESULTS**

The research question of this study addressed the probable impact of MI-oriented WBPA with dialogic feedback on the higher and lower thinking skills of Iranian EFL learners in writing. To answer this question, the researchers first used Pearson correlations to ensure the inter-rater reliability for the two raters on pretest and post test of categories of HOTS and LOTS. The inter-rater reliability indices on the categories of

JI, MP, IM, ST, and VR, in pretest were .86, .77, .80, .86, and .89 and in the posttest were .88, .93, .88, .88, and .88 respectively ( $p = .000 < .05$ ). Therefore, significant agreements were found between the two raters.

The assumptions of interval data, independence, normality, and homogeneity of variances were also verified before running the multivariate ANOVA (MANOVA). The test of normality assumption as measured through the ratios of skewness and kurtosis over their respective standard errors are displayed in Table 1.

**Table 1:** Testing normality assumption of variances of groups in pretest and posttest of higher and lower order thinking skills

Group		N	Skewness		Kurtosis		Statistic	Std. Error	Ratio
			Statistic	Std. Error	Statistic	Std. Error			
WBPA	HOTPRETEST	20	.510	.512	1.00	-.390	.992	-0.39	
	NONHOTPRETEST	20	.049	.512	0.10	-1.034	.992	-1.04	
	HOTPOSTTEST	20	-.233	.512	-0.46	-.681	.992	-0.69	
	NONHOTPOSTTEST	20	.712	.512	1.39	-.042	.992	-0.04	
	Valid N (listwise)	20							
MIWBPADF	HOTPRETEST	20	.257	.512	0.50	-1.168	.992	-1.18	
	NONHOTPRETEST	20	.786	.512	1.54	1.189	.992	1.20	
	HOTPOSTTEST	20	.337	.512	0.66	.338	.992	0.34	
	NONHOTPOSTTEST	20	-.095	.512	-0.19	-.570	.992	-0.57	
	Valid N (listwise)	20							

As Table 1 indicates, the ratios of skewness and kurtosis over their respective standard errors are within the ranges of  $\pm 1.96$ . Thus, it can be concluded that the assumption of normality is met. Furthermore, to ascertain the homogeneity of groups in terms of higher order and lower order thinking skills in pretest, the statistical techniques of descriptive statistics (Table 2) and MANOVA (Table 3) have been utilized.

**Table 2:** Descriptive statistics of the pretests of higher and lower order thinking skills

HOT's	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Higher Order	WBPA	16.550	.630	15.275	17.825
	MIWBPADF	17.350	.630	16.075	18.625
Lower Order	WBPA	24.750	.885	22.958	26.542



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MIWBPAF 22.250 .885 20.458 24.042

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As Table 2 indicates, the experimental group (MI-oriented writing-based portfolio assessment with dialogic feedback) and the control group (writing-based portfolio assessment) show slight differences in the mean scores on higher order ( $M = 16.55$  vs.  $17.35$ ) and lower order ( $M = 24.75$  vs.  $22.25$ ) thinking skills. However, to probe the significance of groups' differences, the researchers submitted the results to the multivariate ANOVA (MANCOVA) to ascertain the groups' homogeneity in terms of the entry knowledge.

**Table 3:** Multivariate ANOVA on the pretests of higher and lower order thinking

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.991	1953.973	2	37	.000	.991
	Wilks' Lambda	.009	1953.973	2	37	.000	.991
	Hotelling's Trace	105.620	1953.973	2	37	.000	.991
	Roy's Largest Root	105.620	1953.973	2	37	.000	.991
	Root						
Group	Pillai's Trace	.097	1.997	2	37	.150	.097
	Wilks' Lambda	.903	1.997	2	37	.150	.097
	Hotelling's Trace	.108	1.997	2	37	.150	.097
	Roy's Largest Root	.108	1.997	2	37	.150	.097
	Root						

As Table 3 illustrates, there are not any significant differences between the means of the two groups on the pretest of higher and lower order thinking skills ( $F(2, 37) = 1.99$ ,  $P > .05$ ,  $\text{Partial } \eta^2 = .097$ ). Based on these results, it can be concluded that the two groups were homogenous in terms of the entry knowledge prior to the main study.

Having calculated the groups' homogeneity on the pretests of higher order and lower order thinking skills, the researchers submitted the indices obtained from posttests of HOTS and LOTS to multivariate MANOVA tests. Table 4 illustrates the descriptive statistics.

**Table 4:** Descriptive statistics: Groups' posttest of higher and lower order thinking

HOT's	Group	Mean	Std. Error	95% Confidence Interval
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				Lower Bound	Upper Bound
Higher Order	WBPA	18.850	.563	17.711	19.989
	MIWBPADF	22.700	.563	21.561	23.839
Lower Order	WBPA	22.200	.986	20.205	24.195
	MIWBPADF	16.950	.986	14.955	18.945

The results of descriptive statistics demonstrate noticeable differences in the mean scores of higher order and lower order thinking skills in both groups. The experimental group, multiple intelligence based portfolio assessment with dialogic feedback, achieved higher mean score in higher order thinking skills (22.7) than the writing-based portfolio assessment or control group (18.85), while the control group's mean score in lower order thinking (22.20) was higher than the experimental group (16.95). To compare the significance of the groups' mean scores on the post tests of higher order and lower order thinking, a multivariate analysis of ANOVA was run, the results of which are presented in Table 5.

**Table 5:** Multivariate ANOVA on the groups' posttest of higher and lower order thinking skills

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.997	5511.469	2	37	.000	.997
	Wilks' Lambda	.003	5511.469	2	37	.000	.997
	Hotelling's Trace	297.917	5511.469	2	37	.000	.997
	Roy's Largest Root	297.917	5511.469	2	37	.000	.997
Group	Pillai's Trace	.383	11.496	2	37	.000	.383
	Wilks' Lambda	.617	11.496	2	37	.000	.383
	Hotelling's Trace	.621	11.496	2	37	.000	.383
	Roy's Largest Root	.621	11.496	2	37	.000	.383

As Table 5 indicates, there are significant differences between the means of control and experimental on the posttest of higher and lower thinking skills,  $F(2, 37) = 11.49$ ,  $P < .05$ ,  $\text{Partial } \eta^2 = .38$ . Therefore, based on these results, it can be concluded that the research question was answered positively indicating the positive impact of writing-based portfolio

assessment and MI-oriented writing based portfolio assessment with dialogic feedback on Iranian EFL learners' higher and lower order thinking skills.

## **DISCUSSION**

The research question of the present study probed the effectiveness of the integration of dialogic feedback and multiple intelligences with writing-based portfolio assessment on the enhancement of higher and lower order thinking skills. The findings of the study showed significant group differences between the experimental and control groups in their development of higher and lower order thinking skills.

Multiple intelligence-oriented writing assignments and dialogic feedback made the process of portfolio assessment more humanized as they not only allow the teachers to evaluate the writing assignments but also they encourage learners to become aware of the gradual process of learning where assessment and instruction intersect. Therefore, when students participate in the scoring of writing assignments and when the activities are aligned with their dominant intelligence type, instruction becomes more learner-centered resulting in the enhancement of responsibility and autonomy, supporting Yang's (2003) results. This in turn may enhance the chance of using higher order thinking skills in writing assignments as a learner-centered pedagogy is prerequisite to the enhancement of higher cognitive skills (Halpern, 2007; Paul, 1992; Tsui, 2002).

Moreover, developing a sense of trust on students which is inherent in self-assessment, peer dialogue, and dialogic feedback in dialogic-based portfolio assessment make learners motivated, responsible, and engaged through critically thinking on the process of learning. This supports Carless et al.'s (2011), Paul's (1992), and Wegerif's (2007) claim that dialogic approaches to assessment enhance higher thinking skills as they make it possible for students to understand what good performance is through a critical discussion and to take other's perspective into account to assess the truth of claims.

Engaging the participants in activities which are compatible with their dominant intelligences can augment the facilitative role of writing-based portfolio assessment and help them achieve higher levels of thinking. Although few studies have explored the impact of MI-oriented tasks on the higher order thinking ability of the EFL learners, the

findings are in line with Zobisch's (2005) study investigating the impact of MI on enhancing English learners' higher order thinking skills. Zobisch (2005) posits that presenting course materials through a variety of MI instructional techniques can enhance critical thinking. Similar results were also obtained by Christison (1996) who published a paper on applying Multiple Intelligences Theory in TEFL Teacher Education Programs. She claimed that integrating MI Theory in these programs lead teachers and learners to think creatively and critically in second language pedagogy on the one hand, and help learners to enhance their strengths and overcome their weaknesses on the other. Besides, MI theory offers EFL teachers a way to examine their best teaching techniques and strategies in light of human differences. Therefore, the application of MI theory will enable EFL/ESL teachers to deal with the great diversity in and among the learners, develop learners' intelligences and individualized learning environment.

Our findings also confirm the results of Walker's (1987) who found that children and adult baseball experts with low general intelligence learn more from a baseball passage than do baseball novices with high general intelligence. In other words, the complexity of the reasoning of the low-IQ experts was far greater than that of the high-IQ novices. Walker (1987) argued that domain-specific knowledge appears to be much more important in determining good thinking and performance on a given task than general intelligence. Similarly, in another study, Ceci and Liker (1986) who investigated decision-making rules of highly expert gamblers at the racetrack found that the experts who appeared to be operating at low levels of intellectual functioning were capable of complex classification and reasoning processes when the stimuli were very familiar to them. It can be implied that learner may perform better in higher order thinking skills when their interests and dominant MI are taken into consideration.

Hence, to speed up the teaching of higher order thinking skills, teachers must ensure that learners are engaged with tasks in line with their dominant intelligence type since they have mastered more critical information in the area of their interest. That is, when teachers provide opportunities for learners to perform tasks aligned with their intelligences, the learning experience might be more appealing, enabling them to resort to whatever resources they have to complete the task. Such learning experience which is in line with individuals' general tendencies may bring about higher level thinking skills and more meaningful

learning experiences because they strive to perform the task at hand based on whatever they have in their repertoire.

Moreover, when learners are working on tasks compliant with their dominant intelligence type, there will be less unrelated facts in their working memory while processing information and so they can better relate and organize the new information to the existing one as they have more background knowledge. This strengthens the possibility of occurrence of higher order thinking skills since such skills, as Lewis and Smith (1993) posit, happen when individuals take new information, store it in memory, interrelates it, and then extends this new information to find possible answers in confusing conditions.

The findings related to dialogic feedback, which argue feedback delivery in a dialogic way can contribute to the enhancement of higher level thinking skills, are compatible with the research findings of Frijters et al. (2008) who investigated the effects of dialogic and non-dialogic pedagogy on the enhancement of critical thinking skills. They found that the dialogic learning condition, compared to the non-dialogic, resulted in a more positive effect on the critical thinking competencies of the students.

The findings of the study were also compatible with those of Sarah Benesch's (1999) who explored recent debates about the teaching of critical thinking and concluded that dialogue can help students think critically and explore not only their own views but also the views students that have not been previously exposed to. Benesch tried to develop a dialogic relationship with her EAP students and made the classroom a place in which teachers and students challenge and question norms and assumptions through discussion.

In congruence with the findings of the present study, Polite and Adams (1997) found dialogues, especially relevant and real life dialogues, effective in promoting higher order thinking, appropriate conflict resolution strategies, and enhanced interest in learning. Besides, Daniel (2005) reported a high degree of higher level thinking gains when a 'dialogue' is established among pupils.

In addition, unconscious thinking and problem solving occur in the working memory (Gagné, Yekovich, & Yekovich, 1993), which has a limited capacity, teachers are advised to apply different instructional strategies to prolong information in the working memory. Hence, the more teachers allow learners to think about information in the working

memory, the more likely they are to transfer that information into long-term memory. This in turn, strengthens the possibility of development of higher order thinking skills. Thus, active processing, discussing or thinking about new information, such as dialogue and dialogic feedback, discussion, and practice, are essential learning strategies for achieving higher cognitive skills. Therefore, it can be implied that the integration of dialogic feedback and multiple intelligences with writing based portfolio assessments can reinforce the development of higher order thinking skills.

Moreover, the educational system in Iran, representing a top-down approach, mostly focuses on details and rote learning and does not teach students how to think. Most teachers, educators, and students are not familiar with the concept of higher-order thinking skills due to lack of a systematic and effective program for merging higher order thinking skills with the curriculum. It seems that the deficiency of public schools and universities in satisfying students' ever-increasing need to learn higher-order thinking skills can be compensated for by the use of an MI-oriented writing-based portfolio assessment with dialogic feedback which spotlights the individual's needs, learning styles and learning strategies.

Besides, as higher-order thinking is an organic part of culture and develops in social interactions, the utilization of dialogic feedback along with MI-based portfolio assessment seems to be helpful in accustoming learners to use higher-order thinking skills in their interactions, negotiations with peers or their teacher.

To recapitulate, the use of MI-oriented writing-based portfolio assessment along with dialogic feedback enabled the participants in the present study to achieve higher degrees of thinking skills. The integration of MI and dialogic feedback facilitated the teaching of higher level thinking skills. However, the facilitative role of portfolios should not be ignored and can be substantiated in terms of the stages of individual and group work discussion, revision, reflection, and peer/self assessment. In teaching higher cognitive skills, the aforementioned processes trigger critical and reflective thinking, which may boost higher order thinking skills.

## **CONCLUSION AND IMPLICATIONS**

This study set forth to explore the impact of a multiple intelligence-based portfolio assessment along with dialogic feedback on the Iranian EFL



learners' enhancement of higher order thinking skills in writing. The results of this study revealed that engaging students in an area of intellectual strength and providing dialogic feedback in learner-centered contexts results in more instances of HOTS and less evidences of LOTS in writing assignments.

The findings have pedagogical implications for educators, English teachers, and course designers. Based on the results of the present study, it seems essential to consider learners' strong intelligences before specifying a particular type of material to be covered in classrooms. In light of MI, instruction, assessment, grouping and activities can embrace all learning styles by teaching students to think in ways that are meaningful to them. To reinforce students' learning of HOTS, the findings suggest that teachers should fashion instruction based on students' preferences and consciously apply a staple of different MI-based course materials together. Besides, the findings recommend course designers to incorporate MI in developing coursebooks, as not all students learn and think in the same manner.

More importantly, teachers should not only develop a sense of trust on students in assessments and provision of feedback but also provide conditions for learners to participate in the classroom dialogue as critical thinking and dialogue are linked. Fostering dialogues paves the way for students to consider other students' perspectives to assess the truth of their claims. Hence, instructional formats which utilize dialogue features like dialogic feedback are expected to promote the students' active learning and higher-order thinking skills simultaneously. The questions that the students pose and their attempts in finding the correct response in activities that are in line with their dominant intelligence may stimulate further thinking. Therefore, dialogic feedback and multiple intelligences are potentially adequate instructional strategies for stimulating higher order thinking.

To explore the fruitfulness of MI-oriented portfolio assessment with dialogic feedback in speeding up the learning of higher order thinking skills, further investigations focusing on the other skills of reading, speaking, and listening need to be conducted. This study can be also replicated on different age and gender groups. Finally, further studies can address the effect of MI-oriented portfolio assessment along with dialogic feedback in diverse educational, cultural, and socioeconomic contexts.

## Bio-data

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