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Research Paper

The Effect of Multiple Intelligence-Oriented Thematic Clustering on Advanced EFL Learners' Vocabulary Learning

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Abstract

Burgeoning research in applied linguistics has underscored the interplay among individual, cognitive, and social variables that can delineate the ultimate attainment in various areas including vocabulary learning and the need to explore how innovative conflation of these dimensions may promote learning outcomes. The present quasi-experimental study examined the impact of Thematic Vocabulary Instruction (TVI) with and without Multiple Intelligence-oriented tasks on advanced EFL learners' vocabulary learning and scrutinized probable differences among individual learners with varying intellectual propensities. Thus, a stratified homogeneous sample of 80 advanced EFL learners was selected and randomly assigned to four groups; the first and the second experimental groups (EG1 and EG2) received TVI with tasks compatible and incompatible with their dominant intelligence, respectively. The third experimental group (EG3) received TVI focused on coursebook exercises and the control group (CG) received non-thematic instruction based on textbook exercises. A parallel vocabulary test was administered to measure the participants' vocabulary learning. The research data were analyzed via the Kruskal-Wallis and Mann-Whitney tests and revealed that the EG1

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significantly outperformed the other groups and intrapersonally-intelligent learners significantly underperformed their peers in the EG1. The findings underscore the significance of taking individual differences into account and offer a number of pedagogical implications.

Keywords: Individual Differences, Multiple Intelligence-Oriented Tasks, Multiple Intelligences, Thematic Clustering, Vocabulary Learning

Developments in the field of psychology and the findings from various research inquiries have unraveled the multifaceted nature of learning and the interplay among a wide range of variables that come into play to delineate learning accomplishments. Learning is now envisaged as a cognitive meaningful endeavor in which the content to be learned should be adequately contextualized so that the learner can establish a link between the input and already-existing material in his repertoire to uptake the information. This process, according to Ellis (2015), involves semantic processing and contributes to comprehension. Yet, as suggested by Schmidt (1992) and Swain (1995), what facilitates learning and recall of information for further use is engaging learners in learning tasks and activities that entail syntactic processing and drawing learners' attention to formal features while using the language. The effectiveness of any curriculum, hence, is reliant on the extent to which it promotes comprehension of meaning-focused input and engages learners in the production of meaning-focused output (Nation & Newton, 2009) through semantic processing and task-supported syntactic processing (Ellis, 2015). Syllabus designers, according to Swan (2005), have to resolve three problems of selecting appropriate content that appeals to learners, employing effective presentation techniques that can maximize uptake, and engaging learners in adequate practice activities that warrant learning and application of the learned information for receptive and productive purposes. What compounds the intricacy of the tripartite syllabus design procedure, however, is the need to tailor each of these stages to the learners' needs and characteristics by selecting needs-based content, employing learner-friendly presentation, and practice techniques that can intrigue learners.

Vocabulary is an indispensable language component learners require at all levels of proficiency and rigorous scrutiny of vocabulary selection and presentation techniques have accentuated the benefits of Semantic and Thematic Clustering (SC, TC) (McCarthy, 1990). SC endorses the selection of words from a common conceptual domain organized within a semantic field based on interwoven relationships like synonymy and hyponymy (Wharton & Race, 1999). That is, according to Semantic Field Theory, the mind classifies vocabulary by making connections in meaning which are called semantic fields (Channell, 1981). The conceptual supremacy of SC, initially substantiated in Semantic Field Theory (Hashemi & Gowdasiaei, 2005; Wharton & Race, 1999), was empirically called into question as hindering rather than facilitating the learning process, based on Distinctiveness Hypothesis and Interference Theory which emphasized the debilitative effect of lexical similarity in the learning of new words (Finkbeiner & Nicol, 2003; Underwood, 1957). Consequently, the use of SC as a vocabulary presentation technique began to wane, making way for TC that derives from semantic frames (Tinkham, 1997). TC is a vocabulary selection and presentation technique in which different parts of speech of words are employed to trigger both cognitive and linguistic processes and boost vocabulary learning. Subsequent inquiries have borne out that presenting thematically-clustered words can enhance vocabulary learning (e.g. Al-Jabri, 2005).

What may reinforce the effectiveness of TC presentation techniques can be the use of practice tasks that match various learner characteristics. Although the use of tasks is recommended for learners at all proficiency levels, advanced EFL learners, according to Swan (2005), maybe engaged in performing appropriately designed needs-based tasks which can redirect their attentional resources to meaningful communication after formal features have been noticed. In response to this pervasive requirement, the focus in teacher education has rightly shifted to task design as the most essential skill an effective teacher should develop. An incipient concern in task design is the extent to which individual differences should be taken into account to augment outcomes.

A wide range of affective and cognitive variables such as learners' learning styles, strategies, and intellectual propensities may influence the effectiveness of the tasks selected. The diversity originates from the pluralistic nature of human cognition (Armstrong, 2000; Gardner, 1999) and has inspired attempts to tailor instruction to learners' characteristics among which are dominant intellectual propensities which according to Multiple Intelligence Theory (MIT), can maximize learning outcomes by engaging learners in tasks compatible with their dominant bits of intelligence (Armstrong, 2002; Gardner, 1999). Thus, MIT can offer an innovative method of designing tasks to promote vocabulary learning.

Literature is replete with studies delving into thematic and SC, vocabulary learning tasks, and multiple intelligence theory. Zargosh, Karbalaei, and Afraz (2013) investigated the impacts of TC on monolingual and bilingual EFL learners' vocabulary learning and the extent to which meaningful context or thematic grouping could influence learning. The findings confirmed the effectiveness of TC in promoting both groups' learning, with bilinguals surpassing the monolinguals. Rostam Shirazi, Talebinezhad, and Shafiee (2015) compared the impact of SC, TC and haphazard clustering on vocabulary learning and recall of 50 EFL learners. They reported a statistically significant difference in the immediate posttest in favor of TC over haphazard and SC. Moreover, the impact of SC on Iranian

EFL learners' vocabulary learning at an advanced level was explored by Savojbolaghchilar and Ahour (2017) who found no significant effect from SC. More recently, Sarioğlu and Yildirim (2018) compared the effect of presenting semantic, thematic and unrelated vocabulary sets in a natural classroom setting. The results verified the positive immediate and delayed effects of all three clustering types on the recognition and production of the target words.

Aside from the type of vocabulary presentation, the use of tasks to enhance learning has also been well-researched. In addition to the plethora of inquiries focused on tasks in both ESL and EFL contexts, Iranian researchers have explored the use of tasks in teaching vocabulary as well. Sarani and Farzaneh Sahebi (2012) investigated and confirmed the effect of task-based teaching on Persian literature ESP students' learning of technical words. Likewise, Maftoon and Sharifi Haratmeh (2012) examined the relative effects of tasks with varying involvement loads on 127 university students' vocabulary knowledge. The results indicated both involvement load and input/output-orientation of tasks as decisive parameters in task effectiveness.

The application of MIT in pedagogical contexts has also intrigued researchers. Anderson (1998) utilized the MI approach and memory enhancement tools to maximize the learning of vocabulary by 100 seventh and eighth-grade Latin students in an upper-middle-class with kinesthetic, verbal-linguistic, interpersonal, and visual-spatial intelligences. The results revealed improved learning. MIT has also been scrutinized in relation to students' preferences of various courses (Wiseman, 1997); self-esteem (Rosenthal, 1998), and motivation (Gohlinghorst & Wessels, 2001). The findings indicated that the choice of theoretical science versus applied courses was related to differences in participants' multiple intelligence profiles and that the use of MI in the classroom could raise learners' motivation and self-esteem.

More recently, researchers have tried to explore how basing features of the learning process on learners' intellectual tendencies may impact instructional outcomes. Hanh and Tien (2017) reported that adapting homework based on Vietnamese university students' visual, linguistics, inter-personal and intrapersonal intelligences could significantly influence their vocabulary learning, creativity and enthusiasm toward vocabulary learning. Likewise, Šafranj (2018) confirmed the significant impact of teaching activities like visual presentations and mind-mapping matched with students' dominant spatial-visual intelligence on their achievement in ESP courses.

In the context of Iran, researchers have examined MI in relation to language learning strategies and L2 proficiency (Roohani & Rabiei, 2013) and reported a significant positive relationship with the highest correlation between intrapersonal intelligence and cognitive strategies, and the lowest one between naturalist intelligence and affective strategies.

MIT has also been enquired in relation to vocabulary learning. Fardad, Koosha, and Shafiee (2015) correlated 88 ELT students' MI scores, their gender, and their vocabulary knowledge and found a slight positive correlation between MI scores and vocabulary knowledge regardless of gender. More recently, Jouzdani and Biria (2016) explored the relationship between interpersonal and intra-personal intelligences and vocabulary learning strategies employed by Iranian EFL learners. The results revealed the supremacy of intra-personal learners on using more strategies and their propensity towards the strategies that were in line with their dominant intelligence. Furthermore, the relationship between linguistic intelligence and recalling semantically and categorically-related words was scrutinized by Shakouri, Sheikhy Behdani, and Teimourtash (2017). The results revealed a significant correlation between the participants' linguistic intelligence and their recall of lexical items.

MIT has also been investigated with regard to the effect it could exert on various features of learning. In a quasi-experimental study, Panahi (2012) examined the effect of picture-based instruction and reported spatially-intelligent learners could significantly outperform the other groups. Soleimani, Moinnzadeh, Kassaian and Ketabi (2012) investigated the impact of MI-oriented instruction on learners' attitudes and learning at Kermanshah Azad University. They reported significant impacts on both attitudes and learning outcomes. Tasks designed based on EFL learners' dominant intelligences have also been found effective in enhancing EFL learners' accuracy of speech (Hamidi & Seifoori, 2014) and English major undergraduate students' writing (Zeraatpishe, Seifoori & Hadidi, in Press).

As evident in the literature review, a potential research area awaiting further scrutiny is exploring the extent to which the use of MI-oriented vocabulary learning tasks can mediate the impact of TC techniques at advanced levels of proficiency where the learners are in need of incrementally expanding their lexical resources and simultaneously maintaining their interest. This research gap, along with the paramount need for vocabulary enrichment at an advanced level, provided the impetus for the present interdisciplinary study which relies on both psychology and applied linguistics to promote learning outcomes. The significance of such a study is attributed to the insights it may offer into the possibility of individualizing English pedagogy in general and vocabulary learning in particular via utilizing pedagogic tasks compatible with the learners' dominant intelligences. Furthermore, the findings from the present study may offer practical suggestions concerning vocabulary presentation and practice at advanced levels. Such implications are of paramount importance with regard to the needs of numerous IELTS and TOEFL applicants who plan to sit standardized tests in which vocabulary plays a key role. The following research questions were formulated:

1. Does the thematic clustering of vocabulary with MI-oriented tasks have any significant differential impact on advanced EFL learners' learning?
2. Do groups of participants with various intellectual tendencies differ significantly in their vocabulary learning based on MI-oriented tasks?

Method

Participants

The participants in this quasi-experimental study included a homogenous sample of 80 advanced female students out of 118 EFL learners, ranging in age from 20 to 45, who had been selected based on a stratified sampling procedure. They had enrolled to take part in TOEFL preparation courses at a language institute established by the researcher in Tabriz, Iran. Those applicants whose scores fell within 1 SD above and below the mean of their proficiency test were selected to participate in the study.

Further, the participants' dominant intelligences were identified through the administration of the Multiple Intelligence Inventory and the information was employed in forming intellectually homogeneous groups. Owing to cultural restrictions imposed on the institute, musical, bodily/kinesthetic, existential or naturalistic intelligence types could not be attended to and those participants whose dominant intelligences were one of these were grouped based on their second dominant intelligence. All 80 participants could thus be assigned to five intelligence groups (verbal, visual-spatial, logical-mathematical, interpersonal and intrapersonal). As the founder of the institute, one of the researchers had the authority to assign class members. Therefore, we first assigned the members of EG1 and EG2 so that each could include five homogenous groups. Hence, the members of these groups were assigned purposefully to include an equal number of participants sharing the same dominant intelligence to work together on tasks that were compatible (EG1) or incompatible (EG2) with their intellectual tendencies. Other participants were randomly assigned to the EG3 and received TC vocabulary instruction based on the coursebook exercises with no supplementary tasks, and to the CG to receive non-thematic vocabulary instruction based on coursebook exercises. Each group comprised of 20 participants.

Instruments

Four different instruments were employed to collect the data including (a) a modified TOEFL test, (b) the MI inventory, (c) a vocabulary knowledge scale, and (d) a teacher-made and piloted multiple-choice vocabulary posttest.

The Proficiency Test

Various versions of already validated paper-based TOEFL Tests (PBT) were considered and the structure and reading comprehension sections of one of the tests were randomly selected to assess the potential participants' proficiency level. It was a 90-item multiple-choice test comprising a 40-item structure section and a 50-item reading comprehension section. The test was initially administered to a group of 20 applicants sharing the characteristics of the target group. The reliability of the test was computed through KR-21 and found to be 0.78. The test was initially administered to 118 applicants (M=66.43, SD=11.81), but 80 homogeneous test-takers whose score fell within 1SD of the mean were selected (M=66.20, SD=3.41). The testing procedure, including the giving of instructions, time restrictions, and testing conditions, was kept constant for all participants. The test was administered in 80 minutes.

The MI Inventory

In order to identify the participants' dominant intelligences, we employed the 90-item Multiple Intelligence Questionnaire (McKenzie, 1999) as part of the placement procedure. It consists of 9 sections each comprising 10 items. The scale had previously been piloted in previous research studies in the same context rendering a range of 0.85 to 0.90 for internal consistency (Al-Balhan, 2006; Razmjoo, 2008; Razmjoo, Sahragard, & Sadri, 2009). In the present study, the Cronbach's alpha coefficient was found to be .78. Furthermore, an item-by-item analysis was also run and the reliability was found to be above .65 for all the items which is considered an acceptable internal consistency (see Appendix A).

The Vocabulary Knowledge Scale

The Vocabulary Knowledge Scale (VKS) is a 5-point self-report scale developed by Wesche and Paribakht (1996) which allows students to specify whether they have not seen the word (I), seen it but cannot remember the meaning (II), have seen and can guess the meaning (III), know the meaning (IV), can use it communicatively (V). This instrument served as a content specification tool. The test content was based on the words selected to be presented during the course and those words that were unknown for all of the participants were selected as the course content (see Appendix B).

The Posttest

A 77-item teacher-made and syllabus-based multiple choice posttest was developed based on the guidelines for the test development process (Bachman & Palmer, 1996) to measure the participant's vocabulary learning. As previously stated, the test was initially piloted on a similar group of 20 students, and a reliability index of .77 was reported using KR-21. Prior to the course, we administered the test to identify the already known words and omit them from the test. The results showed that only 17 items were known by the participants which were omitted. The 60- item test was employed as the vocabulary posttest to check the participants' learning of the words at the end of the course.

Materials

The participants were TOEFL candidates who had already studied the Touchstone series along with the People, Places, and Things series to reinforce their listening skills. Hence, the *400 Must-Have Words for the TOEFL* (Stafford-Yilmaz & Zwier, 2005), which is a thematically clustered vocabulary coursebook, was selected to enhance their lexical knowledge. Each chapter of the book is based on a topic that is followed by some exercises.

To promote the use of the presented lexical items, we designed MI-oriented tasks based on the course content (see Appendix C). The task design stage was informed by similar insights from Gardner (1999) and Armstrong's (2000) suggestions and frameworks concerning varying intellectual groups. For instance, Armstrong (2002) suggests that brainstorming, large and small group discussions, lectures, manuals, storytelling, word games and writing activities to name a few, can help linguistically intelligent learners perform better. Hence, in designing the tasks for that intelligence type, we tried to think of a scenario in which the new words could be used via some of the above-mentioned techniques. The content validity of the tasks was also confirmed by two experts in language teaching and testing.

Procedure

Prior to the study, The TOEFL proficiency test and the MI inventory were administered as placement tests to 118 TOEFL applicants out of whom a homogeneous sample of 80 was selected. Applicants sharing the same dominant intelligences were further assigned to EG1 and EG2 groups, as already described. In the first session, we administered the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996) to ascertain the novelty of the words to be taught.

From the second session on, the ten-session treatment started which was focused on vocabulary enhancement. The course content comprised 60 words taken from the 400 Must-have Words for the TOEFL coursebook (Stafford-Yilmaz & Zwier, 2005). The treatment comprised 10 sessions, each extending for 90 minutes and focused on 6 new words.

The selected words were presented following Doff's (1988) presentation guidelines for teaching meaning, form, and use of the words. That is, first the meaning of a given word was presented visually or situationally using a variety of techniques such as pictures, context clues, and mother tongue equivalents for rare abstract words. Further, pronunciation, spelling and formal features like parts of speech and stress patterns of the words were presented and finally, questions were asked to stimulate the participants to use the newly-presented words. Vocabulary presentation would take the first 15 minutes of each session. It was followed by a 15-30-minute practice time that was utilized differently in the groups using pre-planned pedagogic tasks or coursebook exercises depending on the orientation of the group. The difference among the groups was related to the type of practice they received after the vocabulary presentation.

During the practice phase, the participants in the EG1 sharing the same dominant intelligence were grouped to work on the coursebook exercises and further to perform pedagogic tasks that matched their dominant intelligence. More specifically, after the researcher finished teaching the words, she asked the groups to do the coursebook exercises which took about 15 minutes. After that, the tasks were distributed among the group members and each group was asked to follow the instruction given. The teacher who was one of the researchers was walking and observed the groups performing the tasks and offering help when needed. The task completion phase took about 15 minutes. An example of a task can be found in the attachment.

The same presentation procedures were employed in the EG2 and the participants proceeded with coursebook exercises in the first phase of the practice stage. Further, ten of the tasks employed in EG1 were randomly selected to be administered in the groups of participants that had been formed based on the learners' dominant intelligences. Care was taken to involve the groups in tasks that were not compatible with their dominant intelligences.

The EG3 shared thematic instruction with EG1 and EG2 but differed with respect to the grouping criteria. The participants were grouped randomly without considering their intelligence types to work on only coursebook exercises for 15 minutes. Finally, the CG received conventional instruction with no focus on TC and did the coursebook exercises individually during the 15-minute practice phase of vocabulary teaching.

The treatment in the experimental groups and the placebo in the CG went on for 10 successive sessions by teaching 6 words each session. At the end of the 11th session, the vocabulary posttest was administered to find out the effect of the treatment.

Results

The data analysis began with checking the normality of the TOEFL test and vocabulary posttest scores, as presented in Table 1.

Table 1.

Test of Normality of the Groups' TOEFL and Vocabulary Posttest Scores in

		Kolmogorov-Smirnov[a]		
	Groups	Statistic	df	Sig.
TOEFL	EG1	.102	20	.20*
	EG2	.153	20	.20*
	EG3	.142	20	.20*
	CG	.153	20	.20*
Learning	EG1	.14	20	.20*
	EG2	.18	20	.07
	EG3	.21	20	.01
	CG	.10	20	.20*

According to Table 1, the assumption of normality was confirmed for the TOEFL scores (p=.20>.05) in all four groups, for the vocabulary scores in the EG1, EG2, and CG (p=.20>.05, p=.07>.05, p=.20>.05, respectively), but the vocabulary scores were not normally distributed in the EG3 (p=.01).

Next, an ANOVA test was run to check the significance of the differences between the groups based on their TOEFL scores.

Table 2.

Analysis of the Groups' TOEFL Scores

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	13.20	3	4.40	.37	**.77**
Within Groups	903.60	76	11.88		
Total	916.80	79			

According to Table 2, there was no significant difference among the groups in terms of their TOEFL test scores (F (3, 76) =.37, *p* =.77> .05) which means that groups were homogeneous at the onset of the study considering their general proficiency.

The Impact of MI-oriented Tasks on Learning of Vocabulary

The first research question addressed the impact of MI-oriented tasks and thematic vocabulary presentation on the participants' vocabulary learning. Since the vocabulary scores were not normally distributed in EG3, as shown in Table 1, we conducted the nonparametric tests of Kruskal-Wallis and Mann-Whitney to analyze the relevant research data to answer this question. The results are presented in Table 3.

Table 3.
Descriptive Statistics and Kruskal-Wallis Test of the Groups' Vocabulary Posttest Scores

	N	Mean	Std. Deviation	Minimum	Maximum	Test Statistics		
						Chi-square	df	P-value
EG1	20	53.30	2.61	48.00	57.00			
EG2	20	49.95	1.19	48.00	53.00			
EG3	20	50.05	1.35	48.00	53.00	56.65	3	.001
CG	20	37.95	3.61	32.00	44.00			

P value: Kruskal-Wallis test

The groups' descriptive statistics revealed observable differences among the EG1 (M=53.30/60, SD=2.61), the EG2 (M=49.95/60, SD=1.19), the EG3 (M=50.05/60, SD=1.35), and the CG (M=37.97/60, SD=3.61). Moreover, the results of the Kruskal-Wallis test, in Table 3, revealed a statistically significant difference in the four groups' vocabulary learning scores ($\chi^2(3, n = 80) = 56.65, p = .001$). Hence, to locate the difference more accurately, we ran the Mann Whitney test for pairwise comparison. The results are presented in Table 4.

Table 4.
Pair-wise Post hoc Examination of the Groups' Vocabulary Posttest Scores

(I)	(J)	Mean Difference (I-J)	P value	95% Confidence Interval		Mann Whitney			
				95% Confidence Interval		U	Z	Eta squared (η^2)	d_{Cohen}
EG1	**EG2**	3.35*	0.00	Lower Bound	Upper Bound	53.00	-4.01	0.40	1.64
EG1	**EG3**	3.25*	0.00	1.35	5.35	59.00	-3.84	0.36	1.52
EG1	**CG**	15.35*	0.00	1.25	5.25	0.00	-5.42	0.73	3.32
EG2	**EG3**	-0.10	1.00	13.35	17.35	197.00	-.08	0.00	.02
EG2	**CG**	12.00*	0.00	-2.10	1.90	0.00	-5.43	0.73	3.34
EG3	**CG**	12.10*	0.00	10.00	14.00	0.00	-5.43	0.73	3.34

P-value: Mann-Whitney test

Detailed comparison of the Mann-Whitney test revealed a significant difference in the performance of the EG1 and the other three groups (U= .00, P=.00<.05). The greatest mean difference was between the EG1 and the CG (15.35). The effect size was calculated (η^2=0.73) which, according to Cohen's (1988) classification is a large effect size. The lowest difference was related to the EG2 and EG3 (0.10) whose performance was very similar with a small effect size (η^2 =0.00). Hence, the answer to the first research question was positive, that is TC with MI-oriented tasks could significantly enhance the participants' vocabulary learning.

The Impact of Intelligence Orientation on Vocabulary Learning

Having analyzed the results of the vocabulary posttest scores of the groups, we examined their performance based on their dominant intelligence which addressed the second research question to examine if participants with various intellectual tendencies differed significantly in their learning of vocabulary. To answer this question, we first calculated the descriptive statistics of the MI in the EG 1 and EG 2 as they included learners with different intelligences.

Table 5.
Descriptive Statistics of the EG1 and EG2 Groups' Posttest Scores

	Learning					
		EG1		**EG2**		
	N	Mean	SD	N	Mean	SD
Interpersonal	4	54.75	1.71	4	51.25	1.26
Visual	4	55.00	2.16	4	49.25	0.96
Verbal	5	53.40	1.52	5	49.40	1.14
Intrapersonal	4	49.50	1.29	4	49.75	0.96
Logical	3	54.00	2.65	3	50.33	0.58

As it is depicted in Table 5, the highest mean score on the vocabulary posttest scores in EG1 belonged to the participants with dominant visual intelligence (M = 55/60) and the lowest to those with dominant intrapersonal intelligent ones (M = 49.50/60). Other intelligence types had obtained mean scores close to that of the visual group. However, in the EG2, the interpersonally intelligent participants achieved the highest mean scores (M = 51.25/60) while the visually-oriented group obtained the lowest score (M = 49.25/60). Since, the research data were normally distributed in both EG1 and EG 2, as depicted in Table 1 (p=.20, p=.07, respectively), we ran a one-way between-groups ANOVA test to explore the impact of intelligence orientations on their vocabulary learning. Table 6 depicts the results.

Table 6.
Comparison of the Posttest Scores in Various Intelligence Groups in EG1 and EG2

		Sum of Squares	Df	Mean Square	F	Sig.
EG1	Between Groups	79.25	4	19.81	5.83	.001
	Within Groups	50.95	15	3.39		
	Total	130.20	19			
EG2	Between Groups	10.83	4	2.70	2.52	.08
	Within Groups	16.11	15	1.07		
	Total	26.95	19			

Table 6 shows that there existed a significant difference at the $p < .05$ level in the posttest scores of various intelligent groups only in the EG1: $F (4, 15) = 5.83$, $p=.001$. To locate the difference more precisely, thus, we conducted a post hoc Tukey test, the results of which are presented in Table 7.

Table 7.
Pairwise Comparison of the EG1 Groups' Posttest Scores

(I) Intelligence Type	(J) Intelligence Type	**EG1: Posttest Scores**	
		Mean Difference (I-J)	P-value*
Interpersonal	Visual	-0.25	1.00
Interpersonal	Verbal	1.35	0.80
Interpersonal	Intrapersonal	5.25	0.001*
Interpersonal	Logical	0.75	0.98
Visual	Verbal	1.60	0.69
Visual	Intrapersonal	5.50	0.001*

(I) Intelligence Type	(J) Intelligence Type	**EG1: Posttest Scores**	
		Mean Difference (I-J)	P-value*
Visual	Logical	1.00	0.95
Verbal	Intrapersonal	3.90	0.04*
Verbal	Logical	-0.60	0.99
Intrapersonal	Logical	-4.50	0.04*
Partial eta squared		0.60	

According to Table 7, Post-hoc comparisons using the Tukey HSD test indicated that the mean score for intrapersonally intelligent learners in the EG1 (*M* = 49.50, *SD* = 1.29) was significantly lower than those of the other four groups of interpersonally (*M* = 54.75, *SD* = 1.71, p=.00), visually- (*M* = 55.00, *SD* = 2.16, p=.00), verbally- (*M* = 53.40, *SD* = 1.52, p=.04), and logically-intelligent learners (*M* = 54.00, *SD* = 2.65, p=.04). The effect size, calculated using the eta squared, was 0.60 which is a large one (Cohen, 1988). Hence, the answer to the second research question is also positive; that is, the participants' intellectual orientation significantly impacted their vocabulary learning when they were engaged in performing tasks that were compatible with their dominant intelligences. The participants in the EG2 did not differ significantly in their vocabulary learning considering their intelligence types.

Discussion

The results indicated that the EG1, who were engaged in performing tasks compatible with their dominant intelligences, significantly outperformed the other groups in learning thematically-clustered words and that the intrapersonal group achieved significantly lower scores compared to the other groups. The EG2 did not differ significantly from the EG3 and achieved significantly higher levels of vocabulary learning compared merely to the CG.

The five intelligence groups in EG2 did not differ significantly in terms of learning outcomes,

Small positive correlation was already reported by Fardad et al. (2015) between MI scores and vocabulary knowledge and by Javanmard (2012) between vocabulary test performance and bodily-kinesthetic intelligence. Although the present study is not a correlational one and more narrowly concerned with vocabulary learning not lexical knowledge, the findings emerging from this study seem to strengthen the interconnection of intellectual tendencies and vocabulary learning and highlight the possibility of cultivating learners' intelligence tendencies in task design to augment vocabulary learning outcomes.

The findings on the outperformance of the EG1 with matched MI tasks, nevertheless, lend support to those of Anderson (1998); Hamidi and Seifoori (2014); Hanh and Tien (2017); Šafranj (2018), Shakouri et al. (2017); Soleimani, et al. (2012), and Zeraatpishe, et al (n.d.) who all verified the facilitative impact of tailoring learning tasks and activities to learners' intellectual tendencies on the learning outcomes. The findings might be substantiated in terms of the multiple intelligence theory (Gardner, 1999), individualized education (Armstrong, 2000, 2002), and sociocultural theory (Vygotsky, 1978).

The Theory of Multiple Intelligences argues for individualized education (Armstrong, 2000, 2002) the purpose of which is to initially identify learners' intelligence preferences and tailor the educational practices to the learners' intellectual differences. The initial emphasis on individual differences in applied linguistics research underscored the need to tailor learning tasks to learners' preferences and intellectual orientations. This orientation is represented in differentiated learning (Grant & Basye, 2014) in which instruction aims at the same overarching goals for groups of learners while allowing the teacher to use various resources and approaches to respond to varied learning styles and preferences. Such differentiation might involve flexibility in assessment, grouping, learning processes, instructional content, or learning vehicles and tasks. Teachers employing such techniques are recommended to link overall instructional goals with learners' diverse interests and propensities and capacities. From this perspective, the treatment in the present inquiry might be described as a way of offering differentiated learning (Bray & McClaskey, 2017) even in mixed classrooms through forming intelligence-based groups who work on tasks matching the groups' dominant intelligences.

In addition, the significant improvement in the performance of the EG2 compared to the CG might be attributed to the learners' engagement in pedagogic tasks as an effective way of promoting learning. Cognitively, enhanced outcomes in this group could have been achieved through task-based negotiation of meaning that could direct the participants' attentional resources (Long, 1995) and elicited output (swain, 1995).

The superior performance of the EG2 without matching MI tasks compared to the CG could be attributed to the effectiveness of the tasks used and might also be explicated in terms of experiential learning (Kolb, 1984; Kolb & Kolb, 2005) they experienced using tasks and situational learning (Lave & Wenger, 1991) they were involved in and the support they received from other group members who helped to mediate the learning (Lantolf & Thorne, 2007; Vygotsky, 1978).

The use of tasks in EG2 served to elicit participation and engage the group members in social interaction (Ellis, 2003, p. 176) enabling them to learn by doing (Kolb, 1984; Kolb & Kolb, 2005). During group work, they could experience instances of language use and reflectively observe their own and other members'. This reflective experience and observation, in turn, could facilitate the conceptualization of knowledge (Lave & Wenger, 1991). Their performance on the posttest indicated that they could transfer what they had learned to other contexts.

Socioculturally, it is likely that the task-based group work in EG2 provided opportunities for mediated learning (Lantolf & Thorne, 2007; Vygotsky, 1978). The participants could initially rely on the learning tasks as the first stage of regulation representing object-regulation followed by other-regulation or interpersonal mediation when they receive support in social interaction. This support included different levels of assistance, guidance, and scaffolding by the teacher and peers. Their superior performance on the final exam might be considered as some level of self-regulation.

Therefore, as suggested by Mitchell & Myles (2004), interaction in L2 is not simply considered as a source of input but the main source of cognitive development and transition from object and others-regulation to self-regulation. In the present study, the participants in the EG2 were engaged in group work to perform various tasks while interacting with each other. It seems that either the tasks or the elicited collaborative interaction served to activate their cognitive processes for language learning and regulate mental behavior, especially in groups with interpersonally intelligent learners. The paramount of verbal mediation may also be attributed to the role it plays in facilitating learners' progress from other regulation to self-regulation, from appropriating the helping means provided by others to autonomous use of the language (Mitchell & Myles, 2004).

The participants in both EG1 and EG2, who were found to surpass the CG, were provided with thematically-clustered words accompanied by some tasks. This supremacy might be attributed to the TC presentation to which they were exposed, too. Schema theory lends theoretical support to the TC as a vocabulary selection and presentation technique. Schema is considered as an active organization of past reactions or experiences that reflects one's interpretation of the world from a psychological perspective and Schema Theory links learning to already existing schemata (Brewer & Nakamura, 1984). It explains how the learning of new information is affected by the possession of the old one (Brewer & Nakamura, 1984). Relying on associative strength, this type of clustering seems to be more cognitively-oriented, than linguistically-oriented, and seems to be more congruent with implicit process-oriented language learning programs. Hence, exposure to words with a common theme could have triggered the EG1 and EG2 participants' past experiences and boosted their learning.

With regard to the variation among intelligence groups, the findings of the second research question indicated that the intrapersonally-intelligent learners achieved significantly lower than interpersonal, logical, verbal, and visual groups in EG1. This difference might be justified with the intellectual tendencies of various groups. Lantolf (2003) described intrapersonally intelligent learners as those who are self-sufficient, capable of problem-solving and independent learning and, as a result, may feel less leaning towards group work. Hence, the intrapersonal participants in the EG1 might have failed to successfully make the transition from other-regulation to the self-regulation stage *which* involves gaining the ability to perform mental actions without any apparent external assistance (Lantolf, 2000). Internalization is also recognized when learners are able to transform social processes they underwent with others while developing the once guided activities to an autonomous level.

Conclusion

Based on the research findings, it may be concluded that vocabulary learning can be promoted at advanced levels of proficiency through TC vocabulary presentation when the learners are grouped according to their intellectual propensities to work on tasks matching their dominant intelligences, as in EG1. Moreover, based on the higher levels of achievement in the EG2 group compared to the CG, we can conclude that performing tasks in intellectually homogeneous groups can reinforce the effect of TC presentation even if the tasks are not in line with the groups' intellectual orientations. It seems that the homogeneous groups can find it easier to interact and benefit from the tasks and peer support in the process of achieving self-regulation. Finally, with regard to the significantly poorer performance of the intrapersonal group, we may highlight the urgent need to avoid placing such learners in the same group since their intrapersonal tendencies may prevent them from initiating interaction.

The findings of this study offer manifold implications for teachers, syllabus designers and material developers. The findings can help teachers enhance the effectiveness of their vocabulary presentation through TC and engage learners in more meaningful learning through forming homogeneous groups who work on MI-oriented task. This, of course, emphasizes the teachers' need to develop their task design skills as a way of promoting individualized learning experiences in mixed classes. Finally, the findings can raise syllabus designers' and course book developers' sensitivity towards the need to incorporate tasks congruent with varying intellectual tendencies to accommodate the wide array of intelligences and to relieve the burden on the teachers.

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Appendix A: Reliability Analysis of McKenzie's MI Inventory

			Intraclass Correlation Coefficient				
				95% CI		F Test	
	N of case	Cronbach's Alpha	ICC	Lower Bound	Upper Bound	f	P-value
Section 1	10	0.80	0.67	0.27	0.87	5.18	0.00
Section 2	10	0.95	0.92	0.78	0.97	24.17	0.00
Section 3	10	0.72	0.66	0.10	0.83	3.64	0.00
Section 4	10	0.75	0.78	-0.01	0.79	2.88	0.02
Section 5	10	0.88	0.79	0.50	0.92	8.93	0.00
Section 6	10	0.71	0.65	0.07	0.82	3.46	0.01
Section 7	10	0.80	0.76	0.25	0.87	5.02	0.00
Section 8	10	0.74	0.68	0.02	0.78	2.85	0.03
Section 9	10	0.83	0.71	0.32	0.89	5.89	0.00
Total	10	0.78	0.78	.69	.84	4.59	0.00

Icc: Intraclass Correlation

95% CI: 95% Confidence Interval

Appendix B: A Sample of Vocabulary Knowledge Scale

I I do not remember having seen this word before.
II I have seen this word before, but I do not know what it means.
III I have seen this word before, and I think it means_____________(synonym or translation).
IV I know this word, it means_____________(synonym or translation).
VI I can use this word in a sentence_____________(write a sentence). (If you do this section, please also do section IV.)

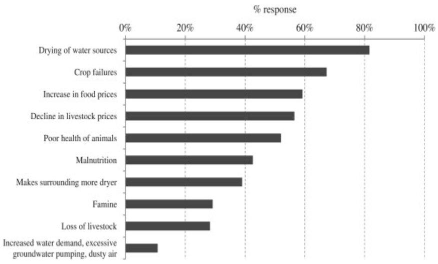
Food Crops:	I	II	III	IV	V
abandon					
aggregate					
cultivation					
Fertilize					
irrigation					
precipitation					
intensify					

Appendix C: Designed MI-based Tasks

Intrapersonal	**Activities for Food Crops: abandon, aggregate, cultivation. fertilize, irrigation, precipitation, intensify** Think of common problems that farmers face like drought, infestation, or infertile soil. Rank them based on the seriousness of the impact they may have on food crops and suggest ways of overcoming them.
Interpersonal	**Activities for Food Crops: abandon, aggregate, cultivation. fertilize, irrigation, precipitation, intensify** (Each member of the group will be presented with one common problem that farmers face like drought, infestation, infertile soil) Discuss the impact of the problems on food crops and ways of overcoming them or minimizing their effects.

Learner type	**Activities for Food Crops: abandon, aggregate, cultivation. fertilize, irrigation, precipitation, intensify**
Linguistic	Work cooperatively to prioritize various things that farmers need to do for a better harvest. Use a list of words given on separate sheets of paper and make an ordered list.

Visual / Spatial	**Activities for Food Crops: abandon, aggregate, cultivation. fertilize, irrigation, precipitation, intensify**  Close your eyes and think of an ideal farm land with many crops. Then look at the picture given to you and mention two differences between this one and your ideal farm and suggest ways of maintaining your crops in your dream farm.

	Activities for Food Crops: abandon, aggregate, cultivation. fertilize, irrigation, precipitation, intensify	
Logical / mathematical		Look at the table depicting the farmers' perceptions on the impact of drought on different aspects of people's lives in an area. Compare the severity of the damage and discuss ways of helping it.