



Effects of Multiple Intelligences-based Instruction on English Achievement and Learner Autonomy of Thai Tertiary Students

Mongkolchai Tiansoodeenon

Thammasat University, Thailand

Pragasit Sitthitikul

Thammasat University, Thailand

It is evident that English classes in Thailand are overcrowded, as students frequently come from diverse backgrounds and have a variety of skills and interests. In response to this out-of-control circumstance, Howard Gardner's multiple intelligence (MI) theory proposes a new style of teaching that accounts for individual differences. This study seeks to investigate 1) the effects of MI-based instruction on English achievement and 2) the extent to which MI-based instruction fosters learner autonomy (LA). A quasi-experimental design was used to assess students' language achievement, while mixed-method research was used to assess students' LA. This study included 123 engineering faculty members from a university in the central region of Thailand. The English achievement test was used to assess their general English proficiency, while the adapted questionnaire from Murase's (2015) Measuring Instruments of Language Learner Autonomy (MILLA), the semi-structured interviews and the teacher's log were used to assess their LA. The results showed that the experimental group improved their listening, speaking, reading, writing and grammar skills, while their writing skills did not differ from the control group. There was no significant difference in the students' level of LA after the MI-based instruction.

Keywords: Multiple intelligence theory, Multiple-intelligences based instruction, English achievement, Learner autonomy, Thai tertiary students

Introduction

Even as globalization has impacted all elements of daily existence (Hamid & Nguyen, 2016), English has influenced all aspects of life because it is considered the first worldwide language to be used as a means of communication and continues to be the most extensively spoken language on the part of people from different cultural backgrounds (Chaya & Inpin, 2020; Nilmanee & Soontornwipast, 2014). Despite Thailand's lack of a direct colonial history and the absence of an intra-functional role for English, globalization is increasing the influence of English usage in the country (Suntornsawet, 2019). However, many Thai university students do not speak English well enough to take advantage of the benefits of internationalization (Bruner, Sinwongsuwat & Radic-Bojanic, 2015).

Many factors are believed to contribute to this unwelcome situation. What exacerbates the situation is the diversity of language backgrounds encountered within the country, resulting in a degree of communication complexity. In order to teach and learn, two languages and literacy skills are needed. Due to their poor English skills, students become frustrated, confused and stressed when they try to learn the



language of their field and tend to act assertively and unprofessionally in an English-speaking university (Nilubol, 2020).

Moreover, it is reported that the average number of students in language classrooms in Thailand exceeds forty, making classroom management challenging. For several reasons, engagement cannot take place in such large classes. For instance, it is time-consuming to give demonstrations, and the activities may only engage a few students (Whisenhunt, 2019). It is also believed that a large class size precludes students from engaging in adequate speaking practice and limits the teacher's ability to provide individual attention to each student. Additionally, it hinders the teacher's navigation of the classroom in order to plan and facilitate communicative activities (Bruner, Sinwongsuwat & Radic-Bojanic, 2015; Likitratnaporn, 2014; Watanapokakul et al., 2016). Another problem with big class sizes is that it can be hard to give students timely, personalized feedback, which is necessary to help them learn (Van der Kleij, Feskens & Eggen, 2015).

In response to this issue, Gardner (1983) developed the new concept of intelligence, which leads to a more profound questioning of what is called "intelligence." His theory of multiple intelligences (MI) offers another possibility for dealing with learner diversity. Gardner (2011) defines intelligence as the ability to solve problems encountered in daily life, as represented by logical-mathematical intelligence. It relates to the capacity to generate new problems to be solved as a foundation for acquiring new knowledge. It is represented by visual and existential intelligence and involves the capacity to create or offer something of benefit to one's culture. Furthermore, he says that the educational system could be a lot better if teachers were taught to respect students' different preferences and abilities, and to teach them accordingly.

At its core, MI theory involves the proposition that individuals can develop a combination of eight distinct intelligences, or spheres of intelligence. The above proposition is based on Gardner's statement that an individual's cognitive capacity cannot be adequately represented by a single metric such as an IQ score. Instead, because each person demonstrates various degrees of distinct intelligence, an individual's unique profile, according to the theory, would be a more accurate representation of an individual's strengths and weaknesses. Moreover, Gardner pointed out that each person has some of the same abilities, but to a different degree (Armstrong, 2009).

Another factor that has attracted the attention of several educators when it comes to improving the English proficiency of Thai learners is learner autonomy (LA). According to research, the development of LA has a beneficial effect on the development of the target language competence (Little, 2008). For this reason, the autonomy of English learners and related language learning techniques are critical characteristics for their success in the language (Iamudom & Tangkiengsirisin, 2020). Moreover, Cotterall (1995) and Palfreyman (2003) express the view that learning on your own can improve language skills, help you prepare for lifelong learning, and let you take advantage of learning opportunities both inside and outside the classroom.

Even though research indicates that Thai students have a favourable attitude towards LA (Iamudom & Tangkiengsirisin, 2020; Swatevacharkul & Boonma, 2020), instructional strategies that promote LA have not been clearly established. It is considered that significant efforts will be required to promote the development of LA among Thai university students, as they are typically dependent on their teachers due to the prevalent Thai societal attitude of reliance or dependence on superiors (Tapinta, 2016). Rather than actively participating in his or her education, a typical Thai school student who is considered passive does nothing but listen to, absorb and retain information (Kaur, Young & Kirkpatrick, 2016; Young, 2021). In many ways, Thai learners are obstructed by a lack of self-confidence. Meesong and Jaroongkhongdach (2016) also said that Thai students are not ready to be self-directed learners because they tend to rely on their teachers and use only a few learning practices.

Significant research on MI theory has shown its effectiveness in terms of strengthening learners' grammar, vocabulary and speaking and writing skills (Boonma & Phaiboonnugulkij, 2014; Rattanavich, 2013; Shekhar, 2019). Little research has been undertaken on the effects of MI theory on English achievement in all four essential language skills as a whole, and on how it can foster LA, especially in a

tertiary context. Therefore, this study aims to examine how MI-based instruction affects general English learning and LA on the part of Thai tertiary students in central Thailand.

To fill in the gap, the following research questions will be addressed in the present study:

1. Is there any difference in English achievement between MI-based instruction and the traditional teaching method among Thai tertiary students? If so, to what extent?
2. To what extent does MI-based instruction promote learner autonomy for Thai tertiary students?

Literature Review

MI Theory

The rise in popularity of interest can be attributed to the advent of a new intelligence theory, namely Howard Gardner's MI theory. Instead of adhering to the traditional psychometric view of intelligence, which is operationally defined as the ability to answer questions on intelligence tests, MI challenges the idea that intelligence is more of a person's inborn trait or ability than something that can be changed through age, education or experience (Gardner, 2006). Within this theory, intelligence is considered the sum of one's many innate talents. Moreover, Nicholson-Nelson (1998) expanded on Gardner's (1983) concept of intelligence, stating that intelligence consists of three basic components. Firstly, it is the ability to produce an effective product or service that is valued in another culture. Secondly, it describes the ability that empowers someone to overcome difficulties in their daily lives. Thirdly, it enhances the capacity to create a new problem to solve in order to get new information.

Gardner (1983) established eight criteria for identifying official intelligence by distinguishing between biological intelligence and ability or aptitude. To begin with, a person with a brain injury may lose one skill while retaining another. Second, a person with a learning disability can inherit intelligence from savants, prodigies and other gifted individuals. Third, distinct development and expert "end-state" performance must be used to fully comprehend the various intelligences. Fourth, humans, like other species, have both intelligent and uneducated brain sections. Intelligence reflects the advancement of humanity. Fifth, the Weschsler Intellect Scale for Children would be used to assess intelligence in addition to formal testing. Sixth, experimental psychological tasks support this notion by demonstrating how intelligence works in real-world situations. Many intelligences can be better understood with the help of personal psychology. Seventh, each intelligence has basic functions that drive its activity. Finally, all intelligent entities are capable of encoding symbols because symbols allow humans to share knowledge.

As seen in Table 1, Gardner (1983) defined nine distinct categories of intelligence. Individuals may have varying strengths and limitations in each of these intelligences, and each can operate independently of the others (Akbari & Hosseini, 2008).

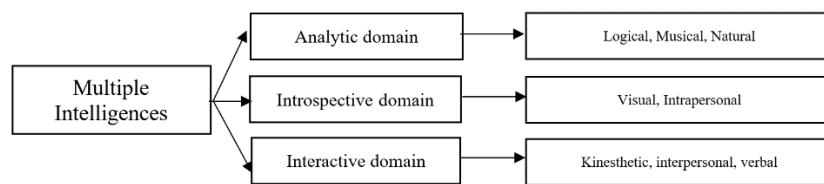
TABLE 1
The Nine Component Intelligences of Gardner's Theory

<i>Intelligences</i>	<i>Description</i>
Linguistic	The ability to communicate effectively orally and in writing
Logical-Mathematical	The ability to think abstractly and deductively using numbers
Spatial	The capacity to accurately interpret and modify the visual-spatial environment.
Bodily-kinesthetic	The ability to use one's whole body to express ideas and feelings, as well as the skill to make or change things.
Musical	The ability to perceive, distinguish, convert, and express musical elements.
Interpersonal	The ability to recognize and tell the difference between other people's feelings, thoughts, intentions, and motivations.
Intrapersonal	The capacity to acquire self-awareness and act adaptively relying on that awareness.
Natural	The ability to distinguish and categorize the numerous species (flora and fauna) in a

Existential	person's environment The capacity to locate oneself in relation to certain existential aspects of human necessities, such as the meaning of life
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Gardner (1983) argues that the majority of individuals possess all forms of intelligence. However, individuals may be strong in one area of intelligence while being deficient in others. Therefore, individuals typically mix and employ intelligence in profoundly individualistic ways (Armstrong, 2009). Although MI theory identifies nine distinct intelligences, they can be organized into three domains: analytic, introspective and interactive. This domain makes it easier to understand how each intelligence is related to the others and how they work together (McKenzie, 2005). Figure 1 illustrates the relationship between the eight forms of intelligence.

MI Domains



Note. Adapted from "Wheel of MI Domains," by McKenzie (2005, p. 17).

Figure 1. Three domains of intelligences (Source: McKenzie, W. (2005, p.25))

The analytic domain assists students in analysing data and information. This domain is heuristic because it facilitates data analysis and consolidation into existing schema. The introspective domain has an explicitly affective component, requiring individuals to look inward, connect their emotions to their experiences and beliefs, and use them to make sense of new information. Lastly, the interactive domain lets students talk about their ideas, find out more about their surroundings, and improve their understanding by talking to other people.

According to Gardner (2011), learners' MI may be advantageous in educational contexts because it permits the program to create activities that are tailored to each learner. He asserts that the learning process can be significantly enhanced by motivating teachers to take into account students' diverse preferences and intellectual attributes and to teach them accordingly. Still, the implications of MI theory have not yet been widely accepted in Thailand, where many universities allocate students to the same big classrooms based on their department, which may not be enough to improve their language skills (Cholsakorn & Piamsai, 2022).

Even though MI theory has been expanded due to its popularity, there are some criticisms of the belief and application. First, MI Theory has insufficient empirical support because it does support the concept of a wide single intellect, or "Spearman's g". People who performed well on one mental exam performed well on all, according to the first mental tester who discovered the "g factor". Second, there is a lack of solid research support for the claim that MI exists in the classroom since the strict methodology makes validating MI in the classroom difficult. Finally, MI simplifies the curriculum so students believe they are smart, as MI theory promotes a "feel-good" attitude because each child is told they are clever. Although these concerns about the effectiveness of implementing MI theory in the classroom exist, for a variety of reasons, it seeks to promote a pluralistic view of what could be considered human intelligence. Substantial research has been conducted by incorporating MI theory into their teaching methods and the results have all proved that student achievement in terms of reading ability, vocabulary learning and so on is related to MI theory. Moreover, it focuses on how to respond to the different kinds of students by trying to include as many different kinds of activities as possible to improve not only learning but also how people get along with each other (Armstrong, 2009).

Moreover, there has been little research on the incorporation of MI theory into classroom practices. Boonkongsan, Nakaved and Pranarach (2020) studied the link between the MI of Thai EFL students and the use of vocabulary learning strategies (VLS) and identified the VLS predictors. On the basis of the MI Theory, Sahatsathatsana (2010) designed an effective curriculum for teaching English Conversation 1. Many scholars, such as Nicholesen-Nelson (1998), Rattanavich (2013), Richard and Rodgers (2014) and Sogutlu (2018), argue that MI can also be used in English language teaching and learning because it is a foundation for learning English. It is time to bridge the gap between MI theory and English language teaching (ELT) in Thailand.

Learner Autonomy (LA)

Over the last thirty years, much research has been written about LA, regarding its definition, promotion and implications for foreign language teaching and learning (Shabani et al., 2020). According to Holec (1979), autonomy is defined as “the process of taking command of one's own learning and taking full responsibility for all aspects of it”. Benson (2011) defines autonomy as the ability to regulate one's own education. Holec (1985) maintains that autonomy should be centred on learners' abilities in the classroom, whereas other researchers emphasize instances where learners work alone outside of the regular language classroom. As a result, LA is described as a quality of the learners, whereas self-directed learning is defined as learning that is achieved by the learners themselves rather than learning from others (Benson, 2011).

Autonomy is exercised in at least five distinct ways during language learning (Benson & Voller, 1997). It is used to begin the learning process in situations where learners are expected to learn independently. Secondly, it involves active learning that learners can apply towards their own learning. Thirdly, it is a skill that can be acquired through education. Fourthly, it is the responsibility that learners assume for their own learning. Finally, it entails the right to shape and direct one's own education (Swatevacharkul & Boonma, 2020). Furthermore, the control dimensions provide a more comprehensive view of how autonomy can be developed in language learning under the assumption that learners naturally control their own learning without instruction or special training. Control over learning management, which includes learners' behaviours and cognitive processing, shows how learners manage their cognitive strategies through learning management, leaving out learners' behaviours and language learning subject matter, which focuses on the what and why of language learning (Benson, 2011).

The autonomy of English learners and their language learning strategies are critical dimensions of their English performance (Iamudom & Tangkiengsirisin, 2020). LA is emphasized as a primary objective of higher education (Baume, 1992). Students at the university level should be involved in processes that enable them to be self-governing, choose what to learn and take major responsibility for their own learning. According to Baume (1992), students relate their beliefs, ideas and thoughts to the world beyond the classroom by engaging in their own learning process (Tanyeli & Kuter, 2013). Thus, they can be encouraged towards becoming autonomous learners when they finish school and are forced to learn on their own. Therefore, they will know what they need to learn and how to do it quickly and well (Iamudom & Tangkiengsirisin, 2020).

In recent years, there has been an increase in interest in research on LA from a variety of perspectives in Thailand. Tapinta (2016) investigated the perceptions of English language teaching graduate students in Thailand towards LA for an international program. The findings revealed that initial support from the teacher was essential for fostering LA among students. If a teacher could create a welcoming learning environment and employ effective teaching techniques, students would be motivated to learn and take an interest in the subject matter. Swatevacharkul and Boonma (2020) explored the attitudes towards LA of graduate students in an ELT international program in Thailand. The findings revealed that the participants' attitudes towards the concept of LA appeared to be favourable, and they valued LA as a motivator for independent learning. However, the relationship between MI-based instruction and LA

among students has not been sufficiently studied. This study aims to bridge the gap by investigating how the incorporation of MI-based instruction would affect the LA of Thai students.

Methods

Research Design

This study investigated students' English proficiency and LA using mixed approaches. According to Dörnyei (2007), mixed-methods research is more valid and thus more accessible because of the triangulation process. The quantitative research methodology used in this study enabled the researcher to assess students' English proficiency, as shown in Table 2. The LA questionnaire, semi-structured interviews, and a teacher's log were used to collect data about students' LA.

TABLE 2
The Design of The Study

<i>Group</i>	<i>Pre-test</i>	<i>MI-based instruction</i>	<i>Post-test</i>
Experimental	T1	X	T2
Control	T1	-	T2

Population and Participants

The population included approximately 3,000 first-year students who enrolled in an English for Communication I course in the second semester of the 2021 academic year. There were 123 participants selected using the convenience sampling technique. These were divided into two groups: control and experimental groups. Sixty-one students were assigned to the experimental group, which included fifty-one males and ten females, and sixty-two students were assigned to the control group, which included forty males and twenty-two females. Both groups were from the Faculty of Engineering.

The MI-based instruction was given to the experimental group, whereas the control group was instructed using the traditional teaching method, which was characterized as lecture-based instruction. The researcher was the person who conducted the lessons for both groups. To ensure that participants in both groups had an adequate level of English proficiency, the researchers used their university English placement score as a selection criterion for this study. The participants' English tests yielded identical results, which were at the A1 CEFR level.

Research Instruments

The data for this study was gathered using a variety of instruments. Each instrument is described in detail as follows:

Pre- and post-English achievement tests

The tests were used to answer the first research question and assess students' proficiency in four key areas of English (listening, speaking, reading and writing) in line with the current English for Communication I course objectives. The pre- and post-tests were identical. The test contained 45 multiple-choice items in total (75 points), including the listening (15 points), reading (15 points) and grammar (15 points) sections. The writing (20 points) section was characterized by two short essay writing items, and the speaking part contained five items for the interview. Three inter-raters were used to examine the test results for the learners' writing and speaking skills. The intra-class correlation (ICC) was

0.92 for writing and 0.88 for speaking, respectively. The pre- and post-tests were validated by the experts, then piloted to determine the reliability value. The reliability of Kuder-Richardson (KD20) was 0.75.

Learner autonomy questionnaire

The five-Likert scale questionnaire, which was developed by Murase's (2015) Measuring Instruments of Language Learner Autonomy (MILLA), including technological, psychological, political-philosophical and sociocultural autonomy, was adapted and used to answer the second research question and determine students' autonomy. It contained a total of seventy-one items. To ensure content accuracy, the back translation technique was applied to translate the items from the English version to the Thai version. The questionnaire was piloted and the Cronbach's alpha coefficient was 0.93.

Semi-structured interviews

The interview questions used to answer the second research question and investigate LA were modified by Swatevacharkul and Boonma (2021). These included "What is your specified long-term objective and how does it assist in your learning?"; "How does motivation benefit your learning in this ELT program?"; "Do you prefer to design the lesson plan with the teacher?"; "If so, how and why?" and "Do the activities of learning in the classroom assist you to become autonomous learners? If so, how and why?". These are examples of questions that were translated into Thai and then validated in terms of content by the experts.

The teacher's log

The teacher's log entries were written after each lesson and focused on the students' interactions with and perceptions toward the MI-based activities. It was used to supplement the results from the semi-structured interviews and answer the second research question. The remarkable concerns from the point of view of students were marked, along with the level of participation in each activity. All lessons were recorded by the Microsoft Teams program to assist the teacher in the retrospective, which improved data accuracy.

Data Collection Procedures

Due to the COVID pandemic, the teaching was conducted entirely online through Microsoft Teams (MS Teams), and the coursebook World English 1 (Special Edition) published by National Geographic was used as a textbook for both groups.

The duration of the experiment lasted fifteen weeks during the second semester of the 2021 academic year. Prior to the intervention, the experimental group was introduced to the MI survey and orientation, and both groups received the pre-test; only the experimental group was required to complete the LA questionnaire. The MI-based instruction was given to the experimental group as an intervention for three hours of class per week for thirteen weeks with the purpose of improving students' English proficiency and fostering their LA. The wheel of the MI domain introduced by McKenzie (2005) was used in rotation to ensure that students had equal opportunities to be exposed to all MIs. After class, every session's researcher's log was written with the goal of capturing student engagement and was then uploaded to the MS-Teams platform for additional revision. Also, both groups completed a post-test after fourteen weeks. The questionnaires and semi-structured interviews were only given to the experimental group to find out the level of LA of the students.

In accordance with ethical considerations, the Research Ethics Office approved this proposal for this study in order to conduct the research. This is to ensure that the procedure for data collection adheres to all formalities that respect the privacy and benefits of all participants.

TABLE 3
The Experiment Procedures

	<i>The Control Group</i>	<i>Class Activities</i>	<i>The Experimental Group</i>	<i>MI Domain</i>
Week 1	Orientation week/Pre-test	Ice breaking	Orientation week/Pre-test/ LA questionnaire	Ice breaking MI-survey
Week 2 -14	Traditional teaching method	Grammar translation method, video comprehension, completing exercise, group discussion	MI-based instruction with various MI-based activities such as natural world tour game, bar graph, mind-mapping, word sort, memories, etc.	1. Analytic domain 2. Introspective domain 3. Interactive domain (In rotation)
Week 15	Post-test		Post-test Semi-structured interviews, LA questionnaire	

Data Analysis

The descriptive statistics (M and S.D.) and inferential statistics (z-test) were used to analyze data from the LA questionnaires of the experimental group and both groups' pre- and post-tests. They were used to compare the students' LA in the experimental group after the MI-based instruction and the effects of MI-based instruction on English achievement and the traditional teaching method between both experimental and control groups.

To analyze the qualitative data from the semi-structured interviews and the teacher's log, the interview data were collected using the MS Teams platform, transcribed into verbatim descriptions, and then verified by the interviewees to ensure data accuracy. This study applied the content analysis in line with Creswell & Creswell (2018), which includes five steps. Firstly, the researcher transcribed the interviews and the irrelevant information was eliminated. Secondly, the researcher generally viewed the data to get a general sense of the information. Thirdly, the researcher assigned text data into categories, or "coding," which is the process of arranging the data by writing a word to represent a category. Fourthly, all relevant details were structured into meaningful units, which could be interpreted as the themes and subthemes. Lastly, the researcher examined a narrative passage to determine if it effectively conveyed the results of the analysis.

Results

Q1. Is there any difference in English achievement between MI-based instruction and conventional teaching among Thai tertiary students? If so, to what extent?

The mean, S.D. and z-test were used to answer the first research question of whether there is a difference in English achievement between the experimental and control groups after MI-based instruction. The results, as shown in Table 4, indicated that the pre-test mean scores between the control and experimental groups were 30.14 and 27.50, respectively. The z-test results revealed that there was no significant difference in the English achievement of both groups at the 0.05 level (p-value = 0.110). However, the post-test mean scores of the control and experimental groups were 37.88 and 48.09, respectively. The z-test results indicated that there was a significant difference in English achievement at the 0.05 level (p-value = 0.001).

Overall, the pre-test results revealed that the students were not different in their listening, speaking, reading and grammar skills, but their writing skills showed a significant difference (p-value = 0.003). The post-test results in Table 5 showed that there were significant differences at the 0.05 level (p-value = 0.000) in the listening, reading and speaking skills and grammar between the control and experimental

groups after the MI-based instruction. However, there was no significant difference in writing skills between the two groups after the MI-based instruction.

TABLE 4

The Overall English Achievement Test Results of The Pre-and Post-test between Two Groups.

Test	Group	n	M	SD	z-value	df	p
Pretest	Control	62	30.14	10.68	1.560	121	0.110
	Experimental	61	27.50	7.35			
Posttest	Control	62	37.88	9.19	-7.488	121	0.000*
	Experimental	61	48.09	5.49			

TABLE 5

Results of English Achievement Subskills in the Control and Experimental Groups

Skills	Test	Group	n	M	S.D.	z-test	df	p
Listening	Pretest	Control	62	6.89	2.95	-0.120	121	0.904
		Experimental	61	6.95	2.93			
	Posttest	Control	62	7.06	2.71	-6.834	121	0.000*
		Experimental	61	9.87	1.75			
Speaking	Pretest	Control	62	3.71	1.43	1.596	121	0.111
		Experimental	61	3.30	1.41			
	Posttest	Control	62	5.65	1.41	-3.759	121	0.000*
		Experimental	61	6.51	1.12			
Reading	Pretest	Control	62	6.10	3.02	-0.186	121	0.852
		Experimental	61	6.20	2.94			
	Posttest	Control	62	6.61	3.11	-7.662	121	0.000*
		Experimental	61	10.25	2.05			
Grammar	Pretest	Control	62	5.89	2.84	-0.125	121	0.901
		Experimental	61	5.95	2.82			
	Posttest	Control	62	7.37	3.26	-4.191	121	0.000*
		Experimental	61	9.41	1.99			
Writing	Pretest	Control	62	7.56	4.67	2.994	121	0.003*
		Experimental	61	5.10	4.42			
	Posttest	Control	62	11.19	3.66	-1.406	121	0.160
		Experimental	61	12.05	3.12			

Q2. To what extent does MI-based instruction promote LA for Thai tertiary students?

Results from the LA questionnaire

The LA questionnaire was used to measure students' LA. The five-Likert scale's interpretation is as follows:

Mean	Interpretation
4.21 - 5.00	Very high level of LA
3.41 - 4.20	High level of LA
2.61 - 3.40	Moderate level of LA
1.81 - 2.60	Low level of LA
1.00 - 1.80	Very low level of LA

From Table 6, the post-test of the questionnaire mean score of the students' LA was equal to 3.96, which was higher than the pre-test of the questionnaire mean score of 3.75. However, the p-value was 0.221, which means that there was no significant difference in the students' level of LA after the MI-based instruction.

TABLE 6

Results of The Pre- and Post-test of The LA Questionnaire of The Experimental Group

	<i>M</i>	<i>SD</i>	<i>Level</i>	<i>z-value</i>	<i>p</i>
Pre-test	3.75	0.32	High	-1.223	0.221
Post-test	3.96	0.11	High		

In all four dimensions, the post-test scores of the questionnaire did not increase from the pre-test values ($p < 0.05$). From Table 7, it was only the technical domain's mean score that increased from 3.28 (moderate) to 3.88 (high), which means that there was a significant difference at the 0.05 level (p -value = 0.000). Comparing the mean gains of the questionnaires demonstrates that the students improved the most in the technical (0.60), sociological (0.12), political (0.10), and psychological (0.01) domains, respectively.

TABLE 7

Results of Pre- and Post-tests of Each Domain of Autonomy

<i>Domain</i>	<i>Pre-test</i>			<i>Post-test</i>			<i>Mean Gain</i>	<i>z-value</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>Level</i>	<i>M</i>	<i>SD</i>	<i>Level</i>			
Technical	3.28	0.65	Moderate	3.88	0.61	High	0.60	-5.037	0.000*
Psychological	3.83	0.63	High	3.84	0.66	High	0.01	-0.039	0.969
Political	3.95	0.60	High	4.05	0.59	High	0.10	0.906	0.365
Sociological	3.94	0.66	High	4.06	0.57	High	0.12	1.051	0.293

Results from the semi-structured interviews and the teacher's log

To supplement the results of the LA questionnaire, the researchers conducted semi-structured interviews with fifteen participants and discontinued the collection process when the data were saturated. In addition, the teacher's log was completed after each teaching session. After analyzing and grouping the statements from the interview transcription into themes, the most important themes related to LA were presented.

Regarding the technical domain, goal-setting strategies have emerged as a central theme. One of the subthemes was planning for English-language development. Ten participants expressed a desire to be able to hold a conversation in English, and seven of them were eager to learn the language because they wished to understand spoken or written English on online platforms. This could imply that students' goal setting might lead to technical autonomy since there were positive signs of a desire for self-improvement. The first and second excerpts came from the semi-structured interview questions about the students' plans.

Excerpt 1 (Answer to a question about students' future learning plans)

I try to practise speaking English, and I believe that the more I practise, the better I can speak. I told myself that I need to be able to have a conversation in English in the future if I want to be able to talk to foreigners who ask me questions in English, and so that I can understand them. (S9)

Excerpt 2 (Answer to a question about students' future learning plans)

I'm excited to hear the English soundtrack on social media because I want to watch movies without looking at the subtitles. I think that by watching YouTube videos, I can learn more words, and it's

fun to learn from what you like to do. So, when I come across words I don't know, I'm going to write them down and try to remember them. (S6)

Six participants also said that they had a strategic plan when it came to learning English for their future careers. They pointed out that they prepared themselves for the TOEIC examination and believed that English was important after graduation. This revealed that they had a tendency to take control of their own learning when the goal was explicit. Excerpt 3 was also obtained from the semi-structured interviews.

Excerpt 3 (Answer to a question about students' future learning plans)

I want to take the TOEIC because I think it will help me get a good job. I plan to take an extra English course or download an English learning application so I can learn and review the lessons later. (S4)

In addition, the teacher's log also demonstrated that MI-based instruction offers a variety of learning activities that may direct students to learn English using a wide range of methods. This is due to the fact that it was observed that students reacted differently to the various activities. The teacher observed that their vocabulary knowledge was greater when he posted review questions before commencing a new topic.

With regard to the psychological domain, both intrinsic and extrinsic motivations emerged as the themes. The twelve participants agreed that they intended to improve their English language because they realised that English is a universal language and they enjoyed learning English.

Excerpt 4 (Answer to a question about motivation with regard to learning English)

I want to learn English so I can communicate with foreigners. When I've free time, I study grammar, which I was not interested in learning before. (S10)

Six participants stated that they desired a good grade, and seven stated that they were willing to live abroad. These extrinsic motivations can be seen in Excerpt 5.

Excerpt 5 (Answer to a question about motivation with regard to learning English)

I want to get an A in English, and I want to be able to speak English as well as my friends. When I see my colleague answering questions, I wish I could do the same. English will help me in the long run. If I'm good at English, I'll have more opportunities to live and work abroad. (S3)

The teacher's log revealed that students enjoyed answering questions collaboratively. They stated that the quiz raised their awareness and that they learned from their errors. MI-based activities can also stimulate students' curiosity and provide opportunities for everyone to participate, as students who were remarkably quiet during the first two sessions attempted to answer questions voluntarily. Nevertheless, the teacher observed that some students appeared too timid to express their ideas to the entire class. They suggested that they were afraid that if this happened, it would make them feel humiliated.

During the semi-structured interviews, themes about the freedom to negotiate in learning and individual autonomy emerged in the political and philosophical domains. All the participants agreed that it would be beneficial to plan learning activities with teachers because they thought it would better serve each person's needs. Moreover, five of the participants liked the MI approach as they were able to learn at their own pace or through activities outside of the classroom, such as playing games or watching videos.

Excerpt 6 (Answer to a question about teacher instruction)

I'd prefer it if I could talk to the teacher about what we should be learning. In this way, the teacher would be able to customize their methods of instruction to the specific needs of their students. (S2)

Moreover, it was evident from the teacher's log that students promptly followed the instructor's instructions. When the teacher suggested how to learn English from his own experience, the students paid close attention and listened attentively. Some students used the website for their independent studies. However, a few students felt neutral towards the teacher's instructions because they believed that people are unique and that the teacher's instruction was not always suitable for everyone.

Excerpt 7 (Answer to a question about the authority to take control of their own learning)

I don't put any pressure on myself. I like being on my own. For example, playing games with foreign players where I must type in English with foreign players or watching online information that I'm interested in helps me improve my English. I think it's a stress-free way to learn. (S15)

Excerpt 8 (Answer to a question about the authority to take control of their own learning)

I agree with some of the teacher's advice, but not all of it. People have different experiences and live their lives in different ways, so I will think about his advice when I think it applies to me and makes sense. (S1)

The concept of social interaction as a source of knowledge has emerged in the sociological domain. As a result of the teacher's superior subject-matter knowledge and expertise, thirteen students agreed with the teacher's advice and enjoyed learning with their peers.

Excerpt 9 (Answer to a question about the level of agreement with the teacher's advice)

I agree with what the teacher says because he knows what he is talking about. The teacher has a lot of life experience, which I can learn from and use in my own life. (S7)

Excerpt 10 (Answer to a question about the person who has the greatest impact on students' ability to learn)

I think my teacher is important to my success in learning English because I can talk to him about anything I don't understand. Also, my classmates are very important because we can help each other learn and share information in class. (S13)

Additionally, MI-based instruction offers numerous opportunities for team building. Students collaborated to solve problems and shared their answers with the class. The teacher's log also showed that the level of interaction between students was high.

Discussion

The experimental group outperformed the control group. They improved their listening, speaking, reading and writing skills, as well as their grammatical knowledge, compared to the control group students. Since MI-based instruction helped language teachers understand how complex their students were and how to work with different types of learners, students in the experimental group improved in

almost every way in which they learned the language. This is in line with Jones (2017), Spirvoska (2013), Xu (2021) and Salem (2013), who agree that instruction based on MI is more effective than the traditional method. Moreover, Dolati and Tahriri (2017) assert that MI-based instruction allows teachers to evaluate the complexity of their students and plan activities that take into account their different intelligences so that students can build on their strengths and rectify their weaknesses.

Moreover, students in the experimental group were exposed to the MI domains in rotation so they could learn from a variety of learning techniques that enhanced their language acquisition and allowed them to excel in their strong domain while improving in their weak domain. This is consistent with Mirzaei, Rahimi and Heidari (2014), who found that interactive, logical and introspective domains benefit L2 readers because teachers can create individualized activities with MI-based instruction. Moreover, this rationale is in line with Winarti, Yuanita and Nur (2019), who stated that MI-based instruction provides students with a variety of abilities; therefore, language learning exercises may be more effective when they encourage the use of MI relevant to their level, resulting in several opportunities to comprehend new content.

However, the findings revealed that both groups had similar writing skills. Even though MI-based activities provided a certain amount of writing practice, it was mandatory to accommodate more opportunities to enhance their writing skills, design an appropriate sequence within the limited timeframe and provide corrective feedback. This is consistent with Lee (2021), who affirms that task sequencing is also significant to improving learners' writing skills because it has a significant influence on cognitive load, syntactic complexity and lexical diversity, which could hinder learners' writing performance if not well organized. In addition, the time equally allotted to contributing to a range of activities for both groups that may or may not directly promote writing, as well as the emphasis on writing assignments and teacher feedback, remains limited when it comes to enhancing their writing skills fully. Choe, Ryu and Jeon (2022) noted that, when incorporating reading and writing tasks into L2 learning, students should have enough time for pre-task planning; therefore, they do not just copy the source material. This explains why writing performance was deemed unsatisfactory compared to other skills.

Regarding the students' LA, only the technical autonomy domain improved after MI-based instruction, while the others showed no significant difference after the post-test of the questionnaire. This is because LA is complex and has multiple dimensions to certify autonomous learning. Holec (1981) and Little (1991) assert that autonomous learners should understand the purpose of their learning program, take responsibility for their own learning, contribute to establishing learning objectives, plan and execute their own learning activities and consistently evaluate their own learning. For this reason, it is premature to draw a simple conclusion after fifteen weeks of experimentation. Moreover, this is consistent with Holec (1981), who stated that LA includes the ability to act in learning and that this skill cannot be inherited and must be acquired through natural means or formal education.

However, students expressed a desire to be able to hold a conversation in English, and they were eager to learn the language because they wished to understand spoken or written English on online platforms. It was observed that the students demonstrated their determination to improve themselves in communicating in English, which might reveal a positive signal for them to improve their technical autonomy. This might be because MI-based instruction aims to crystallize students' experiences by giving them access to mentors and online platforms and offers a variety of learning activities that may direct students to learn English using a wide range of methods. This is consistent with Benson (2010), who asserts that technology can promote autonomous behaviour in learners because it enables self-access to learning and provides numerous opportunities for learners to self-direct their learning and take charge. Moreover, they discussed problem-solving methods through MI-based activities. Interacting with peers could help students see how others use different learning strategies and choose the best one for themselves. It helped them shift from passive to expressive learners, as the lecture-based approach, which led to passive learners, is still widely used in Thailand (Kaur et al., 2016).

Students' psychological autonomy did not improve. Although MI-based instruction implemented a variety of activities that allowed students to interact with and learn from their peers, they may have been

disappointed if required to work with their peers who could express themselves better in English. This may cause them to feel inferior and embarrassed to express themselves during the group activity, which is consistent with Pandito's (2017) findings that Thai students were anxious about making embarrassing mistakes in front of their classmates. Moreover, the results from the teacher's log also showed that some students were too timid to speak up in class because they were afraid this would embarrass them.

The majority of students preferred to rely on teachers. The students promptly followed the teacher's instructions. They perceived the teacher as a knowledgeable resource who could teach them English effectively. According to Wangdi and Shimray's (2022) study, there was a positive relationship between teachers and students in a Thai classroom setting since the students mainly depended on and valued teacher instructions. Moreover, the results of political-philosophical autonomy correlate with Koad (2022) in that Thai students were associated with a teacher-centred method in which a teacher plans classroom activities, and there is a culture of respect for the elderly.

Regarding sociocultural autonomy, the majority of students observed how other students learned the language and adopted the method that was most applicable to their own learning style. The students demonstrated less interest in how other students studied English. Respect for individual differences seemed to be one of their primary concerns. Moreover, MI-based training did not attempt to promote a competitive atmosphere, yet it fostered collaborative learning through social interaction. Consequently, the students were not required to experience a sense of competition. This is in line with Benson (2011) and Holec (1981), who defined autonomy as the ability to take charge of one's own learning and stated that a strong sense of self-determination is one of the factors that leads to a sense of LA.

Conclusion and Implications

This study investigated the effects of MI-based instruction on English achievement and LA in Thai undergraduate programs. The following were the study's major findings: first, the experimental group outperformed the control group in listening, speaking, reading and grammar compared to that of the control group. However, there was no significant difference between the two groups in terms of writing ability. Second, LA increased slightly after MI-based instruction was used with the experimental group, but there was no significant difference. However, after MI-based instruction, students improved in terms of their technical domain of autonomy.

The qualitative data obtained from semi-structured interviews and the teacher's log revealed that the majority of students attempted to communicate effectively in English. They believed that English was essential for their future careers. In addition, they expressed a positive attitude towards learning English after having learned the language. MI-based instruction exposed them to alternative, individual-preference-appropriate methods for successful language acquisition, as they were able to investigate numerous aspects of alternative language-learning techniques.

The study's implications are that it is possible to teach an acceptable strategy for appreciating individual differences and to promote student autonomy in language acquisition. It is clear that MI-based instruction has the potential to motivate some passive learners to become more assertive in their own learning. As a result, teachers should consider introducing a variety of learning activities that allow students to learn from their strengths as well as their weaknesses. However, those incorporating MI-based instruction should be aware that it intends to maximize the full potential of students rather than believe that they are superior to others. Finally, providing them with the appropriate support may contribute to fostering their LA.

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The Authors

Mongkolchai Tiansoodeenon (first author) is a Ph.D. candidate at the Language Institute, Thammasat University. His areas of interest involve teaching methodology, life-long learning, and English material development.

Language Institute, Thammasat University
2, Prachan Road, Grand Palace Subdistrict
Phra Nakhon District Bangkok 10200, Thailand
Email: mongkolchai1352017@gmail.com

Pragsit Sitthitikul (corresponding author) is a full-time lecturer of the Language Institute, Thammasat University, Thailand. He earned a doctorate in Language and Literacy Studies, with a concentration in second-language reading processes, at the University of Illinois at Urbana-Champaign, USA. His areas of interest include Second Language Literacy, Cognitive and Sociocultural Factors in Second Language Learning, and Intercultural Issues in Second Language Learning.

Language Institute, Thammasat University
2, Prachan Road, Grand Palace Subdistrict
Phra Nakhon District Bangkok 10200, Thailand
Email: pragsit@gmail.com

References

- Akbari, R., & Hosseini, K. (2008). Multiple intelligences and language learning strategies: Investigating possible relations. *System, 36*(2), 141-155.
- Armstrong, T. (2009). *Multiple intelligences in the classroom*. Ascd.
- Benson, P. (2011). *Teaching and researching autonomy*. Harlow.
- Benson, P., & Voller, P. (2014). *Autonomy and independence in language learning*. Routledge.
- Boonkongsaen, N., Nakaved, P., & Pranarach, M. (2020). The link between Thai EFL students' multiple intelligences and use of vocabulary learning strategies. *Journal of Studies in the English Language, 15*(2), 130-153.
- Boonma, M., & Phaiboonnugulkij, M. (2014). Why is an application of multiple intelligences theory important for language learning and teaching speaking ability? *Advances in Language and Literary Studies, 5*(5), 162-168.
- Bruner, D. A., Sinwongsuwat, K., & Radic-Bojanic, B. (2015). EFL oral communication teaching practices: A close look at university teachers and A2 students' perspectives in Thailand and a critical eye from Serbia. *English Language Teaching, 8*(1), 11-20.
- Carroll, J. B. (1977). Characteristics of successful second language learners. In M., Burt, H., Dulay, & M., Finocchiaro (Eds.), *Viewpoints on English as a second language in honor of JE Alatis* (pp. 1-7). Regent Publishing Company Inc.
- Chaya, P., & Inpin, B. (2020). Effects of integrating movie-based mobile learning instruction for enhancing Thai university students' speaking skills and intercultural communicative competence. *English Language Teaching, 13*(7), 27-45.

- Cholsakorn, P., & Piamsai, C. (2022). The effects of differentiated reading instruction on reading comprehension and self-efficacy of Thai undergraduate students. *Kasetsart Journal of Social Sciences*, 43(3), 715-720.
- Choe, Y., Ryu, J., & Jeon, M. (2022). Effects of pre-task planning and source texts on Korean EFL college learners' summary writing. *The Journal of AsiaTEFL*, 19(1), 109-124.
- Cotterall, S. (1995). Readiness for autonomy: Investigating learner beliefs. *System*, 23(2), 195-205.
- Cresswell, J. W. & Cresswell, J. D. (2018). *Research design (5th Ed.)*. Sage Publications.
- Dolati, Z., & Tahriri, A. (2017). EFL teachers' multiple intelligences and their classroom practice. *SAGE Open*, 1-12.
- Dörnyei, Z. (2007). *Research methods in applied linguistics*. Oxford University Press.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. Basic Books.
- Gardner, H. (2006). *Multiple intelligences: New horizons in theory and practice*. Basic books.
- Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. Basic Books.
- Hamid, M. O., & Nguyen, H. T. M. (2016). Globalization, English language policy, and teacher agency: Focus on Asia. *International Education Journal: Comparative Perspectives*, 15(1), 26-44.
- Holec, H. (1979). *Autonomy and foreign language learning*. Pergaman Press.
- Holec, H. (1985). On autonomy: some elementary concepts. In P. Riley (Ed.), *Discourse and Learning* (pp. 173-190). Longman.
- Iamudom, T., & Tangkiengsirisin, S. (2020). A comparison study of learner autonomy and language learning strategies among Thai EFL learners. *International Journal of Instruction*, 13(2), 199-212.
- Jones, E. (2017). One size fits all? Multiple intelligences and legal education. *The Law Teacher*, 51(1), 56-68.
- Kaur, A., Young, D., & Kirkpatrick, R. (2016). English education policy in Thailand: Why the poor results? In R. Kirkpatrick (Ed.), *English language education policy in Asia* (pp. 345-361). Springer.
- Koad, P. (2022). Learner autonomy: Perception and challenges for Thai university students. *The Journal of AsiaTEFL*, 19(1), 364-372.
- Lee, J. (2021). Task sequencing and task complexity effects on L2 writing: Does task order really matter? *The Journal of AsiaTEFL*, 18(4), 1088-1107.
- Likitattapanorn, W. (2014). Teaching phonological accuracy and communicative fluency at Thai secondary schools. *English Language Teaching*, 7(2), 1-10.
- Little, D. (2008). Knowledge about language and learner autonomy. In J. Cenoz., & N.H. Hornberger (Eds.), *Encyclopedia of Language and Education* (pp. 247-258). Springer.
- McKenzie, W. (2005). *Multiple intelligences and instructional technology*. International Society for Technology Education.
- Meesong, P. K., & Jaroongkhongdach, W. (2016). Autonomous language learning: Thai undergraduate students' behaviors. *Thai TESOL Journal*, 29(2), 156-186.
- Mirzaei, A., Rahimi Domakani, M., & Heidari, N. (2014). Exploring the relationship between reading strategy use and multiple intelligences among successful L2 readers. *Educational Psychology*, 34(2), 208-230.
- Murase, F. (2015). Measuring language learner autonomy: Problems and possibilities. In C. J. Everhard & L. Murphy (Eds.), *Assessment and autonomy in language learning* (pp. 35-63). Palgrave Macmillan.
- Nicholson-Nelson, K. (1998). *Developing Students' Multiple intelligences*. Scholastic Professional Books.
- Nilmanee, M., & Soontornwipast, K. (2014). Exploring factors influencing the teaching of culture and its challenges: teachers' perceptions. *LEARN Journal: Language Education and Acquisition Research Network*, 7(2), 1-18.
- Nilubol, K. (2020). The impacts of L1 integration towards general English classroom of Thai public university undergraduate students: An account of learning motivation perspective. *LEARN Journal: Language Education and Acquisition Research Network*, 13(2), 426-444.

- Palfreyman, D. (2003). Introduction: Culture and learner autonomy. In D. Palfreyman & R.C. Smith (Eds.), *Learner autonomy across cultures*. Palgrave Macmillan.
- Pandito, P. B. (2017). *A study of the problems of English speaking skill of the first year students at Maha Chulalongkorn Rajavidyalaya University*. Maha Chulalongkorn Rajavidyalaya University.
- Rattanavich, S. (2013). Comparison of effects of teaching English to Thai undergraduate teacher-students through cross-curricular thematic instruction program based on Multiple Intelligence Theory and conventional instruction. *English Language Teaching*, 6(9), 1-18.
- Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching*. Cambridge University Press.
- Sahatsatsana, S., & Siriyothin, P. (2010, October 3-4). *The improvement of students' English proficiency and intelligences through multiple intelligence integrated syllabus*. In 2010 4th International conference on distance learning and education, San Juan, Puerto Rico. <https://doi.org/10.1109/ICDLE.2010.5606042>
- Salem, A. A. (2013). The impact of multiple intelligences-based instruction on developing speaking skills of the pre-service teachers of English. *English Language Teaching*, 6(9), 53-66.
- Shabani, M. B., Latifi, G. R., Javaheri, R., & Mazloum, M. (2020). Undergraduate students' emotional intelligence and their perceptions of learner autonomy: Interface between social science and English language students. *Cogent Education*, 7(1), 1850194.
- Sogutlu, E. (2018). Multiple Intelligences and foreign language learning: Possible relationship. In *Proceedings of the 3rd International Conference on New Findings in Humanities and Social Sciences* (pp. 1-10).
- Spirovska, E. (2013). Integrating multiple intelligences in teaching English as a foreign language-SEEU experiences and practices. *SEEU review*, 9(1), 9-20.
- Suntornsawet, J. (2019). Problematic phonological features of foreign accented English pronunciation as threats to international intelligibility: Thai EIL pronunciation core. *Journal of English as an International Language*, 14(2), 72-93.
- Swatevacharkul, R., & Boonma, N. (2020). Learner autonomy: Attitudes of graduate students in English language teaching program in Thailand. *LEARN Journal: Language Education and Acquisition Research Network*, 13(2), 176-193.
- Tanyeli, N., & Kuter, S. (2013). Examining learner autonomy in foreign language learning and instruction. *Egitim Arastirmalari-Eurasian Journal of Educational Research*, 53(A), 19-36.
- Tapinta, P. (2016). Thai teachers' beliefs in developing learner autonomy: L2 education in Thai universities. In R. Barnard & J. Li (Eds.), *Language learner autonomy: Teachers' beliefs and practices in Asian contexts* (pp. 96-113). CERC.
- Van der Kleij, F. M., Feskens, R. C., & Eggen, T. J. (2015). Effects of feedback in a computer-based learning environment on students' learning outcomes: A meta-analysis. *Review of Educational Research*, 85(4), 475-511.
- Wangdi, T., & Shimray, R. (2022). Thai EFL school students' perceptions of using L1 in English language classrooms. *The Journal of AsiaTEFL*, 19(1), 257-264.
- Watanapokakul, S. (2016). The perceptions and experiences of English teachers regarding large EFL Classes. *LEARN Journal: Language Education and Acquisition Research Network*, 9(2), 199-219.
- Whisenhunt, B. L., Cathey, C., Visio, M. E., Hudson, D. L., Shoptaugh, C. F., & Rost, A. D. (2019). Strategies to address challenges with large classes: Can we exceed student expectations for large class experiences? *Scholarship of Teaching and Learning in Psychology*, 5(2), 121.
- Winarti, A., Yuanita, L., & Nur, M. (2019). The effectiveness of multiple intelligences-based teaching strategy in enhancing the multiple intelligences and science process skills of junior high school students. *Journal of Technology and Science Education*, 9(2), 122-135.
- Young, D. (2021). The hierarchy of Thailand and its effects on English language learning. *LEARN Journal: Language Education and Acquisition Research Network*, 14(1), 15-27.

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