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Reinvestigating the Determinants of Lifelong Learning: Can Pedagogy for Critical Thinking Contribute to Developing Lifelong Learners?

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Abstract: The aim of the current study is to investigate practically the determining factor(s) affecting the students' inclination to become lifelong learners and further to verify the potential effect of pedagogy for critical thinking to play a significant role in this respect. Participants in the study were 80 freshman English majors, found mostly through the Intrinsic Motivation Inventory (IMI) questionnaire to be amotivated as learners. Primarily, significant variables, identified in the literature to affect the students' inclination to grow as lifelong learners, were specified. The criteria were applied in practice to investigate their relative contribution in making a group of amotivated freshman English majors motivated as lifelong learners. Various instruments and materials from questionnaires to student writings were used to collect data concerning the identified variables so as to identify through both quantitative and qualitative analyses the most determining one(s) in educating lifelong learners. The results suggested critical thinking as the most consequential variable involved. Implications of the study for pedagogy in higher education were discussed and questions were raised for future studies to take into account.

Keywords: intrinsic motivation, lifelong learning, critical thinking, self-regulated learning, self-determination.

Introduction

In today's age of globalisation, marked by uncertainty and supercomplexity (Branditt, 2007), the purpose of education, rather than the mere acquisition of particular content knowledge, is to ferment within the learners a sense of doubt and complexity of things, enthusiasm for enquiry and a spirit of criticism (Eagleton, as cited in McLean, 2006, p. 78) to develop lifelong learners. This entails primarily a strong interest in education and learning and adequate competence to translate this interest into activities, enhancing one's current level of knowledge and skills (Lüftenegger, Schober, Schoot, Wanger, Finsterwald & Spiel, 2013; Klug, Krouse, Schober, Finsterwald & Spiel, 2014). The concern has been raised by various scholars in the realm of critical pedagogy (e.g. Freire, 2000; Kanpal, 1990). However, the significant question that deserves to be raised here is how we can as educators contribute to the development of lifelong learners, particularly when the desire for learning is concerned.

In response to this question, various theories have been advanced, each focussing on a particular factor, from sociocultural (Deci & Ryan, 2000) to metacognitive (Bandura, 1991) and affective (Wigfield & Eccles, 2000), believed to affect learners' autonomy and motivation to engage in lifelong learning. Among such theories, one can refer to the self-determination theory (SDT), self-regulated learning theory and the attributional theory of motivation. Applied linguists have also pronounced issues concerning how to put

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into practice such theories to help learners grow in critical thinking and autonomy (e.g. Kumaravadivelu, 2006, 012; McLean, 2006; Nemiroff, 1992). Numerous empirical studies have also been conducted based on such theories, none, however, testing them in practice, as trying to motivate amotivated students to become autonomous lifelong learners. The question, therefore, is still open to how we can, as educators, promote autonomous lifelong learners, hence the rationale for the current investigation to be conducted.

The Aim of the Study

The aim is to identify the real challenges faced in practice and how they can be solved with the theories currently at hand.

Materials and Methods

Throughout the literature, two main prerequisites are identified for lifelong learning to be attained as a goal in education, a persisting motivation and a will to learn as well as the skills to learn and enhance one's current state of knowledge and ability (Lüftenegger *et al.*, 2012). Therefore, one can say, individuals can become lifelong learners primarily when they see knowledge and acquisitions as significant, have the abilities to autonomously regulate their own learning and effectively manage their acquired knowledge (Lüftenegger, 2012). In other words, self-determination, self-regulation and autonomy are the main features learners should develop if they are to become lifelong learners. A large number of theories have been proposed in the literature in response to the question of how we can, as educators, habilitate lifelong learners, each discussing the issue from a different point of view.

Self-regulated learning theories

At the core, all self-regulated learning theories have a view of self-regulated learners as those who are motivationally, metacognitively and behaviourally active participants in their own learning process (Zimmerman, 1986) and the assumption that the purposive use of certain processes, strategies and responses is necessary for the students to improve their academic achievement (Zimmerman & Schunk, 1989). They generally divide learning actions and their determinants into three action phases, a forethought phase to initiate and plan a learning action, a performance/volitional phase through which the learning actions are carried out, and a self-reflection phase, involving a functional assessment of the learning phase (Zimmerman & Schunk, 1989).

What they differ, however, is mainly in what they regard as the source of motivation for the students to self-regulate their learning behaviours and thus in the outcomes, they expect as a result of that. Operant theorists, for instance, believe the source of all self-regulated learning responses to be ultimately under the control of external reward or punishment contingencies (Mace, Belifore & Shea, 1989). Phenomenologists, on the other hand, attribute the source of self-regulation to 'self' as a primary phenomenon that permeates and directs human behaviour and to its need to enhance or actualise one's self-concept and self-esteem both globally, that is, the learners' general perception of their knowledge, skills and abilities beyond any particular fields and domain-specifically (McCombs, 1989). It is assumed that individuals, based on the conception of their knowledge, abilities and skills, regulate their subsequent activities, for example, by setting goals, planning, monitoring and evaluating, to overcome their shortcomings and boost their self-esteem (Zimmerman, 1989). Affective reactions, as a result of one's self-perception, in this approach are assumed to play a key role in motivation; that is, negative effects as a result, for instance, of low self-esteem could diminish motivation while positive self-perceptions could contribute not only to enhance self-confidence, but intrinsic motivation as well (McCombs, 1989). Therefore, improving self-perceptions is considered as the key to enhancing overt performance.

Social–cognitive theorists further confirm the significance of self-efficacy as a source for self-regulated learning behaviours, however, in the sense that students will be motivated to self-regulate their own learning primarily if they see favourable outcomes ahead and further if they regard themselves as efficacious enough to attain the expected results (Bandura, as cited in Zimmerman & Schunk, 1989). In addition to these variables, volitional theorists direct the focus to another significant factor involved in self-regulated learning, namely volitional strategies. Corno (1989) draws a distinction between motivation and volition, with the former mediating the formation of decisions and promoting decisions and the latter mediating the enactment of those decisions and protecting them, thus escalating the intention to learn and steering involvement along. A sufficiently high degree of self-awareness is considered as a prerequisite for obtaining full access to volitional strategies (Kuhl, as cited in Zimmerman & Schunk, 1989, p. 15). Nevertheless, not all types of self-awareness are conducive to volitional control, for instance, ruminating about previous failures, preoccupation with future rather than immediate outcomes and vacillation when deciding courses of action (Corno, 1989). Thus, several cognitive monitoring techniques have been suggested in the literature to assist learners to resist debilitating cognitions and focus instead on task actions (Corno, 1989).

Cognitive constructivists, on the other hand, insist on the use of discovery learning and problem solving activities, believing them as a significant source of stimulating self-regulated learning behaviours within the learners. The assumption here is that there is an intrinsic motivation to seek information in a state of disequilibrium or cognitive conflict when the information at hand does not readily match one's cognitive schemas (Paris & Byrnes, 1989). Students are assumed in this regard to develop theories for self-regulation of their own learning, considering four major factors, their estimation of their own abilities and the academic task at hand and the degree of effort they need to exert and their purposes for that as well as the particular strategies they need to apply to process information, manage time, motivation and emotions (Paris & Byrnes, 1989). In addition to these elements, Wilcox (2006) refers to autodidaxy as another significant factor involved in self-regulated learning.

In sum, viewing the issue from the perspective of self-regulated learning theorists in general, one can realise the significance of such cognitive and metacognitive variables as the students' self-perception and self-efficacy, the awareness of their own abilities and focus on the demands of the given tasks, their expectation of a worthwhile outcome and application of appropriate strategies to process information, manage time, motivation and emotions for them to become self-regulated. What is missing here, however, is a consideration, on the one hand, of the environmental factors and, on the other hand, of the individual characteristics of the learners, which could affect their development of self-regulated learning skills.

Self-determination theory

SDT, proposed by Deci and Ryan (1985), is an elaboration of the well-established cognitive psychological theory of intrinsic versus extrinsic motivation. SDT is based on the assumption that human beings have a natural tendency towards self-motivation, self-regulation and personality growth provided that three of their 'innate psychological needs' are satisfied, the need for competence, relatedness and autonomy (Ryan & Deci, 2000, p. 68). Therefore, fulfilling these three basic needs is the main strategy, which, according to SDT, can be used to facilitate the optimal functioning of human natural potentialities for growth and constructive social development (Ryan & Deci, 2000).

Nevertheless, when it comes to practice, as the results of empirical studies suggest, such elements do not seem to be enough to keep the students motivated as lifelong learners. Vansteenkiste, Simon, Lens, Sheldon and Deci (2008), for instance, examined the SDT hypotheses that intrinsic (vs. extrinsic) and autonomy supportive, as opposed to autonomy controlling learning contexts would improve the students' learning performance. Their results suggested that although intrinsic goals and autonomy-supportive contexts could be useful in enhancing the learners' deep processing and understanding of the given materials, they are not so effective in providing the learners with the incentive for the free-choice persistence at activities related to learning. Lüftenegger *et al.* (2013) also obtained similar findings, suggesting that the students' increased motivation in their study was restricted merely to the classes in which they enjoyed

a more autonomy-supportive atmosphere. Moreover, the researchers suggested that allowing the learners room for autonomous performance does not necessarily indicate that they will ultimately become self-directed in education as no significant correlation was found between the two variables. Where the element of relatedness is concerned, Guay, Ratelle, Larose, Vallerand and Vitaro (2013) demonstrated that more autonomy-supportive relationships do not necessarily guarantee a better sense of competence and improved academic achievement. Therefore, as it appears, fostering the intrinsic motivation and persistence for lifelong learning in the learners might not be attainable through the criteria SDT finds significant *per se*, hence the probability of other factors being involved.

In this regard, Kreber (1998) proposed the possibility of the learners' critical thinking abilities and personality style to affect their predisposition to become self-regulated in education. Unlike the researcher's hypothesis, developed based on Jung's (1971) definition of the various personality types, extroverted intuition was found to be a strong predictor of the students' inclination to engage in self-regulated learning activities. Besides calling for future studies to investigate this controversy, Kreber (1998) recommended some instructional practices through which she believed learners could strengthen their intuitive psychological style as well as critical thinking abilities. Nevertheless, with the study being merely a correlational one, no intervention was introduced to verify whether through the identified variables, one could enhance the learners' tendency to become more self-regulated in their studies. Moreover, where the issue of lifelong learning is concerned, one cannot say for sure that the stated variables could give the students the incentive and perseverance as well to become lifelong learners. Although numerous studies have been conducted on the pedagogical approaches for enhancing critical thinking (e.g. Angeli & Valanides, 2009; Carroll, 2007; Glassner & Schwarz, 2007; Marin & Halpern, 2011), none has yet taken into account their effects on the learners' intrinsic motivation as lifelong learners.

In response to this gap in the literature, the current investigation adopted the principles of pedagogy for critical thinking (Angeli & Valenides, 2009), to instruct a group of English major undergraduates to observe the effect on the learners' motivation to persistently engage in self-regulated learning activities, hence their tendency to become lifelong learners. Given the possibility for the learners' personality style to play a significant role in this respect, the criterion was introduced in the study as a control variable to verify its independent contribution to enhancing the learners' intrinsic motivation and thus their propensity to grow into lifelong learners. Meanwhile, the study will take into account the relative effect of other variables such as the learners' perceived sense of autonomy and relatedness, as suggested by the SDT (Deci & Ryan, 2000), to test the theory in practice to realise the extent to which it keeps its promises in making the learners intrinsically motivated as lifelong learners.

Research questions

In sum, the current investigation is aimed to answer the following questions:

1. Are the determinants of the students' lifelong learning; that is, motivation and self-regulation, systematically dependant on their psychological type and critical thinking abilities?
2. Can pedagogy for critical thinking cultivate in the learners the incentive to become lifelong learners? Is there any significance in this regard for the learners' perceived sense of competence, relatedness and autonomy?

Method

The main purpose of the current investigation is to verify the extent to which pedagogy for critical thinking has the potential to promote the learners' inclination to engage in lifelong learning activities and whether this tendency is dependent on the learners' personality type and critical thinking abilities. Lifelong learning was assessed through its main determinant, that is, intrinsic motivation to engage in learning activities (Lüftenegger *et al.*, 2012). Critical thinking was defined in terms of the learners' ability to develop

a sensible and dialogic argument, locating the issue within an appropriate context, recognising alternative perspectives and thereby coming to a sound firm conclusion (Camp, 2012; Hays, 1984; Stapleton, 2001). In defining personality types, the study followed Jung (1921) in defining them in terms of extroversion, introversion, intuition, feeling, thinking and sensing and their various combinations.

Participants

Participants in the study were a group of 40 freshman English majors, both females and males, pursuing their BA degrees at Payame Noor university of Shiraz, Iran. They took part in a four credit speaking and listening comprehension course, held twice a week. The course was taught by a PhD candidate of TESL, who had 7 years of experience teaching English as a foreign language and was quite well-read with respect to such issues as autonomy, motivation, critical thinking, self-regulation and lifelong learning.

Materials and instruments

Myers–Briggs Type Indicator (MBTI)

The MBTI is a psychometric questionnaire designed based on Jung’s (1921) theory of psychological types to measure psychological preferences in how people perceive the world and make decision. Following Jung (1921), the model assumes that there are four psychological functions according to which we perceive and experience the world, one of which is most often the most dominant one, intuition, sensation, feeling and thinking. Accordingly, the MBTI sorts some of these psychological differences into four dichotomies, with a resulting 16 psychological types. None of the types is considered to be superior to the other; however, following Jung (1921), Briggs and Myers (1962) assert that individuals tend naturally to prefer one overall combination of type differences over the others just as they tend naturally to be either right-handed or left-handed. The 16 types are generally referred to by an abbreviation of four letters, the initial letters of each type, as presented in the following table (see Table 1).

Table 1. The initial letters of psychological type

Extroversion (E) - Introversion (I)
Sensing (S) - Intuition (N)
Thinking (T) - Feeling (F)
Judging (J) - Perception (P)

Intrinsic Motivation Inventory (IMI)

IMI was the scale used to assess the participants’ intrinsic motivation as the main determinant of lifelong learning. IMI is a multidimensional device developed to examine the participants’ subjective experience in relation to a particular activity related to intrinsic motivation and self-regulation. The instrument has various subscales measuring the participants’ degree of enjoyment and satisfaction (Kunter *et al.*, as cited in Lüftenegger, *et al.*, 2012), perceived competence and self-efficacy (Zimmerman, 1989), the value they perceived in performing the task (Krapp, 2002), their perceived choice or autonomy in performing the task (Deci & Ryan, 2002; McCombs & Miller, 2007) and their relatedness with valuable people. The items in IMI are not task-specific and have been such designed that they can be easily modified for any given activity, without changing any significantly the reliability and validity of the instrument (Deci, Eghrari, Patrick & Leone, 1994) and the same was done in the current investigation to absorb information concerning the learners’ motivation in their own particular fields both before and after the experiment was conducted.

Self-assessment questionnaire

Following Fukuda, Sakata and Takeuchi (2011), a self-assessment questionnaire was used in the study primarily to allow the students more autonomy in the class. The questionnaire had two main parts, a section allocated to the learners' evaluation of their own performance and learning in the class and one to their expression of their emotions and ideas about the class, identification of factors impeding or fostering their learning and comments for the instructor concerning how they expected her to promote the quality of the class. In filling out the questionnaire, administered every session at the end of the class, the students were encouraged to make use of the lexicogrammatical items and idiomatic expressions they had acquired both to establish and demonstrate their own learning. Nevertheless, the instructor was constantly there as a source of help for the learners whose low proficiency in the target language did not allow them to express their ideas clearly. This way, the questionnaire served as a means not only to enhance the students' autonomy in the class, but also to increase their self-reflection as well as learning.

Student writings

Every session at the end of the class, the students were required to provide a written account of the classroom discussions over the topics raised and the conclusion they ultimately reached taking into account the various ideas exchanged to corroborate their own resolution. The writings were intended to provide information concerning the learners' critical thinking abilities, given Hunter's (2009) claims concerning the relationship between critical thinking and argument and further the advantages of framing critical thinking in the form of arguments as a means to promote the skill.

Data collection

The study was carried out overall in 10 sessions. Pre-experimental data concerning the learners' personality type, level of intrinsic motivation and critical thinking were collected in the first two sessions of the class without the learners being aware of the purpose of the study. For the first two variables, the students filled out the relevant questionnaires; however, to raise the students' interest and encourage genuine responses, the instructor provided them with a warm-up concerning the content of each questionnaire and discussed with them some of the questions before they were administered. Data for the learners' pre-experimental for the learners' level of critical thinking were collected through the second session of the class, which was devoted mostly to the learners' discussion on the topic of 'Crime and Punishment', given a recent relevant event in the country and the students' reference to that at the beginning of the class. The instructor encouraged all the students to express their ideas and challenge one another. To bring the discussion to an end, all the learners having expressed their ideas, they were asked to provide a written account of the discussion, including the various ideas argued and the conclusion they ultimately reached at. The aim was to observe the learners' reaction to opinions for and against theirs and their manner of argumentation as a clue to their critical thinking (e.g. Stapleton, 2001; Glassner & Schwarz, 2006) prior to the experiment. The students were further asked to fill out a self-assessment questionnaire on their class participation. They were encouraged to express their feelings, opinions and comments both as feedback for the course instructor and as a means to enhance the learners' reflection on their performance in the class.

Throughout the following sessions, the participants received instruction for critical thinking along with their practice of speaking and listening comprehension, which was the main focus of the course, thus highlighting either skill every other session. Following Hunter (2009), critical thinking was defined in the study as 'reasonable and reflective thinking that is aimed at deciding what to believe or what to do' (p. 2). Critical thinking is reasonable in the sense that it demands that we have reasons, preferably good ones, for the decisions we make (Hunter, 2009, p. 4). Critical thinking is reflective in the sense that it

involves ‘thinking about a problem at several different levels or from several different angles all at once, including thinking about what the right method is for answering or solving the problem’ (p. 5) to judge the acceptability and strength of the reasons one is considering. Such principles were taken as a clue for teaching the learners to think critically. In the sessions specified to the practice of speaking, topics were selected from real life controversial issues such as female/male roles in the society and co-education. The students were then asked to work in pairs or groups, share ideas and form a strong argument taking into account the arguments counter to theirs and providing a convincing response to that. When the students raised their arguments in the class, the instructor further encouraged them to challenge one another or challenged them herself to prompt them not to have a one-sided approach towards issues and take into account alternative perspectives as well.

In the sessions, when the practice of listening skill was of concern, the students watched short movies, demonstrating generally a moral dilemma. Prior to that, however, they were provided with a warm up on the general topic of the movies for them to better understand the content. While watching the movies, comprehension questions were asked to make sure they were following. Prior to the ending, the students were encouraged to guess the ending based on their perception of the characters’ personalities and what they would do if they had similar characteristics. Having watched the ending, the students were asked to discuss the righteousness of the protagonists’ decisions. The aim was to help learners be less biased in their judgments and decisions by taking into account the particularities of each individual’s context. At the end of the discussion, the students were asked to write an account of the classroom discussion, the various ideas exchanged and the conclusion they reached accordingly. The written notes were intended for further analysis and assessment of the learners’ critical thinking abilities. Practice of lexicogrammatical items and idiomatic expressions was of course an inseparable dimension of every class room session as well. Similar was the case with the learners’ filling out the self-assessment questionnaire to evaluate their participation in the class and provide comments for the betterment of the class. The information was used as evidence to be compared with the questionnaire information concerning the learners’ degree of intrinsic motivation. The experiment continued for 10 sessions when the results on the learners’ critical thinking abilities proved to be more established.

Data analysis

For the purpose of the study, data were analysed both qualitatively and quantitatively:

Qualitative data analysis

Qualitative analysis of the data involved the assessment of the students’ writings for their critical thinking abilities and of their self-assessment questionnaires to detect any changes in their degree of intrinsic motivation.

Assessment of the students’ critical thinking

To assess the students’ critical thinking abilities, their written arguments were evaluated according to Hays’ (1984) stage model of argumentative/analytic writing development, which uses models of intellectual development to explore the cognitive underpinnings of writing growth. The model was particularly selected, on the one hand, because the criteria in terms of which it evaluates students’ argumentative essays were quite in line with the study’s definition of critical thinking as reasonable and reflective thinking taking into account the acceptability and strength of the reasons one is using in her/his arguments (Hunter, 2009). On the other hand, the model was employed as it provided a continuum from least to most mature, including several kinds of transitions, thus allowing the students’ growing critical thinking to be assessed at various levels. It considers nine factors to be significant in the assessment of argumentative writings, which it

defines as growing across six stages of development. Of these nine elements, five were selected for the assessment of the students' critical thinking. These were the criteria, which pertained specifically to the quality of the students' arguments, and thus as Hunter (2009) indicates, their critical thinking abilities and not to their writing skill in particular. Therefore, overall, the students' critical thinking was scored out of 30 based on this scheme. Table 2 below presents the model on which the assessment of the learners' critical thinking was based.

Table 2. Model for the assessment of the learners' critical thinking

CT	1	2	3	4	5	6
Stage Criterion						
Complexity of thought	No perception of the issue's complexity, disgorging everything they know about the subject	Little perception of the issue's complexity, providing few strategies, purposes or goals	Some perception of the issue's complexity	Much	Over-much	Much
Writer's sense of own position	Absolutist	Tentative	Moderate	firm	Firm, but reasonable	Firm, but reasonable
Basis of argument	Moralistic and didactic	Moralistic, didactic, but more emotional	Pragmatic	Social	Ethical	Ethical, pragmatic and social
Type of argument emphasised	Edicts and opinions	narrative and generalised examples	Explanation	Casual analysis	Problem solving	Logical argument
Questioning of own position and awareness of the reader	No questioning of their own argument	occasional response to questions someone might raise to their statements	Seldom, and if so, not convincing	Shows appeals to the readers' self-interest	Deliberately enters the reader's point of view	Genuinely realises weaknesses in her/his own position

With 30 being the overall score for the students' critical thinking, a ratio was developed for the interpretation of the scores as low, intermediate and high. Ten intervals were considered for each level so that 1–10 suggested a low, 11–20 a moderate and 21–30 a high level of critical thinking. All through the experiment, all the students' writings were scored and evaluated accordingly by the researcher to make sure about the efficacy of the instructions provided. However, for quantitative analyses, the focus of the study was set basically on those essays written prior to and two sessions before the end of the experiment. Each text was assessed twice with a four-week time interval between the two evaluations to allow the results to be independent of one another. The scores assigned to the students' critical thinking were subjected to Chronbach's alpha test of reliability. The intra-rater reliability index acquired was 0.85.

Analysis of self-assessment questionnaires

The researcher studied the self-assessment questionnaires students filled out, on the one hand, to realise their individual preferences and comments about the class so as to better know how to treat each and make up for the shortcomings of the following sessions. Further significant in the analysis of self-assessment questionnaire was the trace of any changes in the way students assessed their own performances in the

class and the criteria they considered as a clue, on the one hand, to the quality of their self-assessment, a significant qualification for becoming a lifelong learner, on the other hand, to their development of critical thinking abilities according to the extent to which they could see their own faults. The results obtained from the self-assessment questionnaires were ultimately to be compared with those arrived at from through the assessment of the students' writings and the IMI questionnaires for the stated criteria.

Quantitative data analysis

To verify the extent to which the inclination to becoming a lifelong learner is dependent on the students' perceived sense of competence, relatedness and autonomy, and their critical thinking skills and personality type, a Pearson product moment test of correlation-coefficient was run between the learners' total scores on the IMI questionnaire and the individual scores they obtained on each of stated variables independently, both prior to and after the experiment. In the post-experimental phase, primarily a one-sample t-test was run both between the learners' critical thinking skills and total level of intrinsic motivation to identify the occurrence of any significant change in the two. A correlation test was then run to determine the extent to which their relationship was maintained. The results were then justified through evidence from the students' writings and self-assessment questionnaires. A multiple regression test was further run to determine whether the pre-experimental results concerning the contribution of the students' personality style to their inclination to becoming a lifelong learner were held in the post-experimental analyses. Hierarchical multiple regression was further used to realise the directness/indirectness of the effect of the identified significant variables in affecting the students' intrinsic motivation to become lifelong learners.

Results

Pre-experimental findings

As the table of descriptive statistics below demonstrates, the mean of intrinsic motivation for the sample was found to be 1.05, with about 60% of the class being found amotivated, lacking the interest and/or competence for education in this particular field (see Table 3). English literature, as their responses suggested was the major they had selected just inevitably as they had not been accepted in any other majors or other universities. Regarding their critical thinking abilities, the mean for the sample was 8.85, and only about 20% of the sample scored above the average on the skill, between 11 and 20. The students mostly suggested a one-sided absolutist approach in argumentation emphasising merely their own positions without allowing room for any alternatives. For instance, in response to the question of whether or not they agreed with capital punishment, one of the students wrote:

For sure, criminals must be killed for other people to learn and not to repeat the action any more. The reason for so much crime to be in our country is that we do not hang enough the lawbreakers. Killing is a brutal action, but everyone agrees that it is very interesting to see a culprit hanged that is why so many people go to watch the scene when someone is hanged in the public. In addition, it is our religious duty to clear the earth of criminals and lawbreakers that is why we enjoy watching hanging.

Although the writer, as the excerpt suggests, tries to provide evidence for her/his position for capital punishment, she/he is quite absolutist in argumentation disregarding any ideas against capital punishment. She/he projects her/his own enthusiasm for capital punishment to others, assuming everyone to agree. Moreover, the premises the writer provides in the argument appear to be mostly emotional and moralistic with the writer emphasising on the joy of watching a culprit being hanged as a moral obligation. Thus, this writer, given Hunter's (2009) and Hay's (1984) criteria for critical thinking, was assumed to be more or less immature in her/his own critical thinking abilities.

Table 3. Descriptive statistics for critical thinking and intrinsic motivation

	Minimum	Maximum	Mean	Std. deviation	N
Critical thinking	2.00	23.00	10.6062	4.96041	80
Intrinsic motivation	20.00	220.00	1.0513	148.14913	80

Style	IN	IS	IF	IT	EN	ES	EF	ET
Frequency	10	8	10	12	11	12	7	10

Concerning their personality styles, although limited in number, the sample represented a wide range of psychological types whose distribution is represented in Table 4 below.

Correlational analyses in the pre-experiment phase confirmed the assumption concerning the relationship between intrinsic motivation (in general with all its constituent elements) and critical thinking on the one hand, and psychological type on the other ($p < 0.05$). Nevertheless, introvert intuition was the only psychological type, which correlated significantly with intrinsic motivation. Although refuting Kreber (1998) who unjustifiably found extroverted intuition as significant, the results of the current investigation seem to be concordant with Jung's (1921) conception of introverted intuition, which is believed to allow individuals a greater clarity of the perception of inner psychological processes and stimuli, a prerequisite for self-motivation.

Table 4. Correlations between intrinsic motivation, critical thinking and psychological type

		Critical thinking	IN
Intrinsic motivation	Pearson correlation	0.992**	−0.738**
	Sig. (2-tailed)	0.000	0.000
	N	80	80

** . Correlation is significant at the 0.01 level (2-tailed).

The implication of these findings for the experimental side of the study was that classroom instruction was to focus primarily on ways to promote the learners' critical thinking skills as well as their introverted intuition to enhance inner vision to be able to grasp the psychological motivations behind their behaviours to verify whether they could help boost the learners' attitude and intrinsic motivation for education and further to verify whether this could be beneficial for all the learners.

Post-experimental findings

The descriptive statistics obtained based on the analysis of the IMI suggested a higher level of intrinsic motivation within the learners (Mean = 2.17). This increase, as it appeared in the results of the one-sample t-test, was particularly attributable, on the one hand, to their more favourable attitude towards the major, which they found now to be quite valuable and useful in developing their personality and promoting their worldview and on the other hand to their increased sense of competence ($p < 0.05$). As it was expected based on the pre-experimental findings concerning the correlation between critical thinking and intrinsic motivation, a parallel change was observed in the learners' critical thinking, which in the results of the one sample t-test, presented in Table 5 below, suggested a significant increase in comparison to its pre-experimental state ($p < 0.05$).

Table 5. One-sample t-test for the pre- and post-experimental level of critical thinking

	t	df	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
					Lower	Upper
Critical thinking	19.124	79	.000	10.60625	9.5024	11.7101
CT2	27.805	79	.000	15.65000	14.5297	16.7703

The increase was reflected in their argumentations where the students tended to be less biased and opinionated in their discussions, demonstrating an awareness of an opposing side to the argument, even though, in case of some of the students, the justifications provided were not so strong and acceptable. For instance, in response to the question of whether or not college education is worth it, one of the students wrote:

On the one hand, there are a lot of educated people in the society who are unemployed or employed in jobs that do not require a high level of college education or are not related to their majors. For example, I know a physician who has started a restaurant and works also as a taxi driver. In addition, some uneducated people are employed in very good jobs and are earning big amounts of money. But, on the other hand, college education is very necessary to learn how to communicate with others, especially in our country because men and women are always separate everywhere and do not know how to communicate with each other. Also, college education is necessary to develop the country in the world.

Although the writer is quite tentative in argumentation and does not specify her/his own position in the debate, she/he at least demonstrates some consideration for the opposing side to the argument, which, based on Hay's (1984) model of argumentative writing development, is indicative of an advance for the writer's critical thinking, moving from being totally absolutist, as demonstrated in the previous excerpt presented, to being tentative in the current piece.

Further suggestive of the increase in the learners' critical thinking skills was their ability to find faults with themselves, regarding themselves as a main source of change to bring about improvements in the society, in response to the question of where they would start from if they intended to bring about a positive change in the society. The point was further evident in their self-assessment questionnaires, particularly where they were required to identify the impediments to their own learning in the class. Whereas at the beginning of the term questions concerned the limitations of the society not allowing them to study in the majors in which they were the most interested and were the most talented, around the end of the experiment, one of the students wrote:

I think in the last [sik] sessions, it was my idea about my major and the lesson [sik] that did not let me understand the teacher and like the class. Now, I take it easy and understand better...

Such attitudinal changes, suggestive of some advancement in learners' critical thinking skills, were taken as evidence corroborating the assumption of the study concerning the contribution of critical thinking to enhancing the learners' intrinsic motivation for education and thus their likelihood to become a lifelong learner, beyond other factors such as their perceived sense of autonomy and relatedness on which SDT insists (Ryan & Deci, 2000). Correlational analyses between the post-experimental results of intrinsic motivation and critical thinking provided further confirmation for the hypothesis, demonstrating a significant correlation between the two ($p < 0.05$).

Nevertheless, critical thinking was not apparently the only factor whose effect on the learners' intrinsic motivation was noticeable; similarly significant was the learners' engagement in introverted intuitive activities, such as introspection, to grasp the hidden psychological stimuli behind different behaviours and affects. In the results of the multiple regression test conducted to verify the power of the learners' psychological type in predicting their degree of intrinsic motivation, although all the

eight styles were included in the model, only four were retained as predictors: IN, EN, IT, ET. However, introverted intuition appeared as the only style significant in this regard, accounting uniquely for 66% of the changes in the dependent variable. This finding confirmed not only similar results in the pre-experimental phase, but also the information absorbed from the learners' writings and self-assessment questionnaires concerning their higher engagement in self-reflection and its effect in promoting their critical thinking and ultimately intrinsic motivation and inclination to become lifelong learners. Table 6 below represents the results.

Table 6. Coefficients

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.	Correlations			Collinearity statistics	
		B	Std. error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	186.226	3.865		48.183	0.000					
	IN	0.761	0.064	0.847	11.914	0.000	0.807	0.809	0.794	0.879	1.138
	IT	0.123	0.429	0.204	0.286	0.776	-0.111	0.033	0.019	0.009	114.795
	EN	-0.167	0.429	-0.282	-0.390	0.698	-0.122	-0.045	-0.026	0.008	118.066
	ET	0.106	0.064	0.179	1.665	0.100	-0.160	0.189	0.111	0.383	2.609

a. Dependent variable: IM2

With the significance found for introverted intuition, a hierarchical multiple regression test was conducted to verify whether by controlling for the learners' critical thinking abilities, introverted intuition could still account for the discrepancies in the learners' intrinsic motivation. The aim was ultimately to verify whether Kreber's (1998) held true here concerning the predisposition of certain psychological styles to grow self-regulated and therefore, as we presumed, to become lifelong learners. Thus, critical thinking was entered in the first step, explaining 65.2% of the differences in the learners' intrinsic motivation, which was found to be statistically significant ($p > 0.05$). However, when in the second step, intrinsic intuition was added to the model, no statistically significant changes appeared in its predictive power to justify the differences in the learners' intrinsic motivation. The model as a whole could now explain 65.4% of the differences with just an additional 0.2% of the variances being accounted for by the learners' intrinsic intuition ($p > 0.05$). This indicated that critical thinking was the main factor, which could, above all other factors, affect the students' motivation to become lifelong learners and introverted intuitive thinking could just contribute to facilitate that.

Thus, in response to the first research question concerning the significant factor(s) affecting the learners' inclination to become motivated for lifelong learning, the results of the current investigation found critical thinking as the most consequential force, given its potential to develop in the learners, primarily an eye for the alternatives to every idea and every occasion and thereby a more positive attitude towards the value of education in spite of the limitations and difficulties they might perceive. In other words, enabling learners to realise the *raison d'être* for education to empower them as individuals to gain freedom and thus to become agents of their own lives (Nemiroff, 1992; Kanpol, 1999; Kumaravadivelu, 2006, 2012) was the main factor the study found significant in giving the learners a will to learn, above all the other criteria emphasised in the literature such as perceived sense of autonomy and relatedness. "In order to learn a truly valuable subject matter, individuals must consider themselves 'worthy of the knowledge' (Nemiroff, 1992, p. 30) and this is possible if they realise their own responsibility in creating meaning, values and purposes for their own life in general and education in particular (Nemiroff, 1992), hence the salience of introverted intuitive thinking in the study. Framing 'good' purposes and selecting and arranging resources for their realisation further entails growth in judgment, understanding and evaluation (Nemiroff, 1992), the very factor the study underscored as critical thinking.

Nevertheless, this insistence on critical thinking and introverted intuition does not mean to deny the prominence of such factors as allowing the learners autonomy in the class. Rather, the aim is to maintain that without the learners realising the value of this autonomy and the logic behind that, it might not lead to their ultimate development as lifelong learners. This could be the reason why Lüftenegger *et al.* (2012) and Guay *et al.* (2013) did not find autonomy and relatedness as necessarily sufficient criteria for becoming lifelong learners. However, as it appeared from the results of the experiment and the learners' responses to the IMI questionnaire in the post-experimental phase, students' development in critical thinking and their realisation of their ultimate goal for education can make them more intrinsically motivated in spite of being in a similar context.

The results of the study, however, concerning the potential contribution of pedagogy for critical thinking to developing lifelong learners sound to contradict those of Chiang, Leung, Chui, Leung and Mak (2013) who did not find instruction through small group learning activities to be at all significant in this regard. Nevertheless, this apparent contradiction could be attributed, on the one hand, to their instructional limitation, which left critical thinking quite implicit in the course. The current experiment by exposing the learners directly to deliberate challenges, as recommended by Angeli and Valanides (2009), tried to make up for the limitation, which appeared to be successful and sounds recommendable for future studies.

Conclusions

The current experiment, in spite of its favourable results, suffers from certain limitations, requiring future studies to be conducted. Most significantly, the results of the study were collected over a course merely of 10 sessions whereas lifelong learning demands a longitudinal investigation to assure the persistence of the learners' motivation for education throughout time. Therefore, it sounds highly recommendable for future studies to replicate the current investigation to determine the extent to which the results are maintained.

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