The Relationship between Self-Directed Learning and Critical Thinking Ability of Iranian EFL Learners

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ABSTRACT

Introduction
Self-directed learning and critical thinking are both worthwhile frameworks. They simply apply to different domains of the adult education enterprise. Separate studies have been conducted on these two issues, but a few ones are devoted to the relationship between them in other countries or even in Iran. The present study intended to investigate the relationship between self-directed learning and critical thinking of learners of foreign languages.

Methods
This cross-sectional descriptive study was conducted at postgraduate levels at the School of Health Management and Information Sciences of Iran University of Medical Sciences in 2014. The population of the study consisted of all postgraduate students (N=49). Two sets of questionnaires were distributed among the students, 1) Honey's (2004). 2) Williamson’s (2009). The collected data were analyzed by means of one-sample Kolmogorov-Smirnov Test, Pearson Correlation, Independent T-Test, and One Way ANOVA through SPSS16.

Results and Discussion
The results revealed a positive (significant) relationship between critical thinking and self-directed learning (r = 0.424, p = 0.039), therefore it can be concluded that they are beneficial to learners of foreign languages and help them achieve higher level skills.

Key Words: Critical Thinking, Self-Directed Learning.
INTRODUCTION

Critical thinking (CT) is an important and vital topic in modern education. Recently, there has been a growing interest among educators to teach CT to learners. Many academic departments hope that their professors and instructors will become informed about the strategy of teaching CT skills, identify areas in one's courses as the proper place to emphasize and teach CT, and develop and use some problems in exams that test students' CT skills (Schafersman, 1991). Once teachers grasp the concept and value of CT skills development in the classroom, they will begin to see opportunities for engaging students in this area (Halvorsen, 2005).

Another issue of interest for educationalists is self-directed learning (SDL) which encourages autonomous learning and engages learners in a deliberate and planned learning, i.e. in any actions designed to help learning. As stated by Abdullah (2001), self-directed learners are "responsible owners and managers of their own learning process” (p. 1). Self-directed learners are able to design their own learning programmes, parts appropriate for their goals, such learning is common among adults; in fact, SDL may seem to be self-explanatory and we all probably assume we know what it is. However, there is no single, accepted definition; rather there is a confusion of terms used in various ways by different people (Leach, 2000).

Although a great deal of studies focused on these two issues separately, rarely can one find studies conducted on the relationships between them; therefore, the present study aimed to investigate the relationship between CT and SDL.

LITERATURE REVIEW

Critical Thinking

Thinking is a complex internal process in which the individual detaches from the external world to engage in an inner “dialogue” and contemplation of ideas and abstract concepts. While this thinking or reflection may be purposeful, it is not necessarily critical (Garrison, 1992); however, the ideal of CT is to learn to think for oneself, to gain command over one's thought processes, it entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform (Paul & Elder, 2001).

CT is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication as a guide to belief and action (Scriven & Paul, 2003). Sternberg (1986) interpreted it broadly "CT as comprising the mental processes, strategies and representations people use to solve problems, make decisions, and learn new concepts. The particular elements of CT that people use vary widely both in scope and in
quality across persons, tasks, and situations, hence, it is necessary to specify in some detail just what the elements of CT are, and how they vary across persons, tasks, and situations”.

CT has always been, since Socrates, the important outcome of education (Reed, 1998), even today, it has become one of the major concepts in educational programs (Teimourtash & Fahim, 2012); however, there is no consensus on the definition of CT or on the skills to be taught in the literature (Reed, 1998) since it is not an easy concept to define and can mean quite different things to different people in different contexts and cultures (Halvorsen, 2005). This diversity, according to Teimourtash and Fahim (2012), is due to the fact that people look at it from different aspects.

CT is the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems (Chance, 1986); therefore, failures can be reduced through investment in CT as part of the analysis process. It is a deliberate meta-cognitive (thinking about thinking) and cognitive (thinking) act whereby a person reflects on the quality of the reasoning process simultaneously while reasoning to a conclusion. The thinker has two equally important goals: coming to a solution and improving the way she or he reasons. CT helps mitigate the effects of mindsets and biases by invoking skillful examination of evidence both for and against an issue, as well as consideration of obvious and less obvious alternative explanations (Moore, 2007). Although, everyone thinks; it is our nature to do so, much of our thinking is biased, distorted, partial, uninformed or down-right prejudiced (Paul & Elder, 2001), in fact, it is not an innate ability rather it must be taught by trained and knowledgeable instructors (Schafersman, 1991), and through practice, and with guidance from a good instructor, one can develop thinking skills (Facione, 2000). It is the responsibility of educational institutions to teach students to improve and to achieve higher level skills and habits involved in CT (Mayer & Goodchild, 1995). CT and its relationship to the educational process has become a central issue and it is time to explore the term (Cotton, 1988).

According to Nickerson's (1987, cited in Khatib & Mehrgan, 2012), a good critical thinker uses evidence skillfully and impartially, attempts to anticipate the probable consequences of alternative actions, differentiates between reasoning and rationalizing, and can learn independently.

**Self-directed learning**

Self-directed learning, which has its roots in adult education, is an approach that has also been tried with learners in elementary and secondary schools (Abdullah, 2001). The ability to acquire skills in SDL may be the key link between undergraduate education, postgraduate training, and continuing professional development; therefore, one should aim to provide learning opportunities that promote self-confidence, question asking and reflection, openness and risk taking, uncertainty and surprise (Towle & Cottrell, 1996). In SDL, the individuals select, manage, and assess their own learning activities, whenever they want. In schools, teaching emphasizes SDL skills, processes, and systems rather than content coverage and tests. For the
individual, SDL means engaging in personal challenging activities and developing the personal qualities to complete them successfully (Ni, 2013).

Knowles (1975) considers SDL as a process during which individuals determine their learning needs, set their learning goals, identify available resources for learning, choose and implement appropriate learning strategies, and evaluate learning outcomes. He maintains that “SDL is more in tune with natural processes of psychological development” (p. 14). An important phase of people’s maturation process is taking responsibility for their lives “to become increasingly self-directing” (p. 15). SDL is valued as necessary for achieving ownership of learning outcomes. Knowles identifies the competencies of SDL from the perspective of the individual and includes a variety of competencies, such as understanding the differences between teacher-directed and SDL; determining one’s concept as a self-directed being; relating to peers collaboratively and as resources for learning; diagnosing learning needs and formulating objectives; viewing teachers as facilitators; identifying other resources; and collecting and validating evidence of accomplishments.

SDL situation occurs when learners—not the institution—control both the learning objectives and the means of learning, thus, whether or not learning is self-directed depends not on the subject matter to be learned or on the instructional methods used. Instead, self-directedness depends on who is in charge—who decides what should be learned, who should learn it, what methods and resources should be used, and how the success of the effort should be measured. To the extent the learner makes those decisions, the learning is generally considered to be self-directed (Mocker & Spear, 1982). ‘SDL Readiness’ is defined as the degree that the individual possesses i.e., the attitude, abilities and personality characteristics which are necessary for SDL (Wiley, 1983).

The nursing faculty at McMaster University proposed six competencies required for individuals to become self-directed learners:

- Assessment of learning gaps.
- Evaluation of self and others.
- Reflection.
- Information management.
- Critical thinking.
- Critical appraisal.

These skills are interrelated in such a way that students use all or a combination of them simultaneously to direct and control their learning experiences. In addition, students need to be reflective, flexible, sympathetic, communicative, and responsible for their learning in a positive way. They must be able to apply useful information for current and future activities. Within the McMaster University program, competition is discouraged but collaboration is encouraged and rewarded (Patterson, Crooks, & Lunyk-Child, 2002). A key element for university graduates to involve in continuous learning is their ability to be self-directed in learning (Canipe & Brockett, 2003) which has been accepted by many as an important goal of higher education (Wilcox, 1996). Self-directed learners, according to Abdullah (2001), are “responsible owners and
managers of their own learning process”. SDL integrates self-management (management of the context, including social setting, resources, and actions) with self-monitoring (the process whereby learners monitor, evaluate, and regulate their cognitive learning strategies) (Bolhuis, 1996; Garrison, 1997). A person who is considered a self-directed learner would be described as having a greater internal locus of control than that of an external locus of control. In simple terms, the more internal the level of control, the greater the ability of the individual to deal with changes within their learning environment (Shannon, 2008).

**Critical thinking and self-directed learning**

There has always been an effort to find a distinctive framework or theory as a basis for studying and practicing adult education, but there has been no consensus up to now (Garrison, 1992). About two decade ago SDL was used as the identifying framework of adult education and CT, a recent concept, was said to be “the best chance for adult education to define itself as a distinct domain of research theory and practice” (Brookfield, 1990).

According to Garrison (1992), SDL and CT are two important and worthwhile theoretical frameworks in adult education, and none is superior to the other. The difference, he believes, is that they refer to different domains of the adult education; therefore, it would be possible to unify or combine them to have a more comprehensive and coherent understanding and explanation of the adult education enterprise. Paul (1990, cited in Garrison, 1997), defines CT as “disciplined SDL”, and states that “education implies a self-motivated action upon our thinking,” and Mezirow (1985), asserts that “Becoming critically aware of what has been taken for granted about one’s own learning is the key to self-directedness” (p. 10). These ideas refer to a close relationship between SDL and CT; therefore to be a critical thinker, one needs to be self-directed; and conversely, to be a self-directed learner, one needs to be a critical thinker (Garrison, 1992).

The ability to think critically and the willingness and capacity to engage in SDL are considered as important prerequisites for lifelong education, but research on SDL and CT, to date, has largely ignored individual differences among learners, yet educators can foster competence in SDL by providing opportunities for students to develop both their intuition and logical reasoning skills, and that students with a well-developed intuition function or an ability to evaluate arguments and interpret evidence would be more willing and capable to engage in SDL than others (Kreber, 1998).

According to Boud (1988), knowledge becomes obsolete because of rapid social, political and technological change, therefore one’s success to a great extend depends on continued learning and development throughout one's lifetime, thus, it is the objective of higher education to enhance the capacity for self-directed lifelong learning among students, it means that learner without the help of others can identify their need, formulate their goals, determine available resources, and evaluate learning outcomes (Knowles, 1975)
Despite the fact that some studies were conducted on the relationship between CT ability, L2 vocabulary knowledge, and L2 vocabulary learning strategies (Fahim & Komijani, 2010), the relationship between CT ability of Iranian EFL learners and their resilience level facing unfamiliar vocabulary items in reading (Kamali & Fahim, 2011), the impact of teaching CT skills on reading comprehension of Iranian EFL learners (Fahim & Sa’eepour, 2011), just to name a few, very few studies have been conducted on the relationship between CT and SDL of Iranian EFL learners; therefore this study aimed to identify any significant relationship between CT and SDL of Iranian EFL learners.

**RESEARCH QUESTIONS AND HYPOTHESIS**

In order to identify the relationship between CT and SDL of EFL learners, the following research question and hypothesis were raised:

Q: Is there any significant relationship between CT ability and SDL of Iranian EFL learners?

H₀: There is no significant relationship between CT ability and SDL of Iranian EFL learners.

**METHODOLOGY**

This cross-sectional descriptive study was conducted at postgraduate levels at the School of Health Management and Information Sciences of Iran University of Medical Sciences in 2014. The population of the study consisted of all postgraduate students (N=49), of Health Management, Medical librarianship, Health Economics, Biostatics, Medical Informatics and Information Technology. Two sets of questionnaires were distributed among the students: 1) Honey's (2004). 2) Williamson’s (2009).

1) Honey's (2004) Critical Thinking Questionnaire consists of 30 items on CT and aims to evaluate the three main skills of comprehension, analysis, and evaluation of the participants. The translated version was adopted from Naieni (2005) with a reliability of 0.86. It is a Likert-type questionnaire with 30 items that allows researchers to investigate the learners' ability in note-taking, summarizing, questioning, paraphrasing, researching, inference, discussing, classifying, outlining, comparing and contrasting, distinguishing, synthesizing, inductive and deductive reasoning.

The participants are asked to rate the frequency of each category they use on a 5-point Likert-scale, ranging from never (1 point), seldom (2 points), sometimes (3 points), often (4 points), to always (5 points). Therefore, the scores could vary from 30 to 150 (Honey, 2004).

2) Williamson’s (2009) 60-item self-rating scale of self-directed learning (SRSSD) is an instrument developed for measuring the level of self-directedness in one's learning process. Knowledge of learners' levels of self-directedness will benefit both learners and educators. Firstly, students responding to the SRSSDL items will not only reveal their own levels of self-directedness in learning, but will also have the opportunity to develop an insight into self-directed learning and a better understanding of the concept, which is crucial for developing of
self-directed, independent and lifelong learning. Secondly, teachers, having identified learners' levels of self-directedness and deficits in learning, will be better able to guide students from their positions of learning dependence to independence, considering each student's individual learning needs.

The structure of the SRSSDL included a brief profile of respondents and general instructions on how to use the scale. The SRSSDL consists of 60 items categorized under five broad areas of self-directed learning:

- **Awareness**: Twelve items relating to learners' understanding of the factors contributing to becoming self-directed learners.
- **Learning strategies**: Twelve items explaining the various strategies self-directed learners should adopt in order to become self-directed in their learning processes.
- **Learning activities**: Twelve items specifying the requisite learning activities learners should actively engage in order to become self-directed in their learning processes.
- **Evaluation**: Twelve items revealing learners' specific attributes in order to help monitor their learning activities.
- **Interpersonal skills**: Twelve items relating to learners' skills in inter-personal relationships, which are pre-requisite to their becoming self-directed learners.

Responses for each item are be rated by using a five-point scale: 5= always; 4= often; 3= sometimes; 2 = seldom; 1 = never. An 'any other' space is also included for each broad area of the SRSSDL. It provides an opportunity to the users of the SRSSDL to include any other relevant items they deemed fit. Thus, the SRSSDL is an open-ended instrument. The categorization of SRSSDL items into five broad areas allows for specific areas where students lack abilities in their self-directedness to be identified and support offered. Students with high scores, indicating a high level of self-directedness in their learning, should also be supported in order to help maintain and further develop their abilities in becoming independent life-long learners.

**Scoring the SRSSDL**

All the items of the SRSSDL are positively stated. For each item the 'always' response is rated as 5 and the 'never' response is rated as 1. Thus, the maximum and the minimum possible scores of the SRSSDL are 300 and 60 respectively (Williamson, 2007).

The questionnaire was validated by Dehnad et al. (2014), through a back translation procedure and experts’ ideas. The reliability of the questionnaire was measured by test retest ($r=0.9$).

The two questionnaires were distributed among 49 postgraduate students, and 43 completed questionnaires were returned. The collected data were analyzed by means of the
following statistical means: one-sample Kolmogorov-Smirnov Test was used to test the normality of the distribution of data, Pearson Correlation was used to find the relationship between the two variables, i.e. CT and SDL, Independent T-Test was used to find the correlation between CT and SDL with students’ age and academic semester and finally One Way ANOVA was used to determine the relationship between CT and SDL with students’ fields of study. The data were then analyzed through SPSS16.

RESULTS AND DISCUSSION

The participants consisted of 23(53.5%) females and 20 (46.5%) males. The age range was from 21-50. The mean was (26.95) and std. Deviation was (6.460) (Tables 1 & 2).

Table 1.
Age distribution

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>17</td>
</tr>
<tr>
<td>25-29</td>
<td>14</td>
</tr>
<tr>
<td>&gt;=30</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>39*</td>
</tr>
</tbody>
</table>

Missing System 4
Total 43
*4 missing

Table 2.
Mean and std. deviation

<table>
<thead>
<tr>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>39</td>
<td>21</td>
<td>50</td>
<td>26.95</td>
</tr>
</tbody>
</table>

*Valid (listwise) N 39

The participants constituted 49 students. Among them, 31 were among the newly admitted students, four others were admitted in the second semester of 2013 and the remaining eight students missed to mention the required information. The highest number of questionnaires received belonged to the students of Heath Management while the fewest were delivered by the students of Medical Informatics (Table 3).

Table 3.
Students’ field of study
The normality of the distribution of data was tested through One-sample Kolmogorov-Smirnov Test (Table 4).

Table 4.
Normality of the Distribution of Data

<table>
<thead>
<tr>
<th>One-Sample Kolmogorov-Smirnov Test</th>
<th>SDL_Total</th>
<th>skill_Total</th>
<th>CT_Total</th>
<th>SDL_1</th>
<th>SDL_2</th>
<th>SDL_3</th>
<th>SDL_4</th>
<th>SDL_5</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>26</td>
<td>41</td>
<td>36</td>
<td>38</td>
<td>32</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Normal Parameters&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Mean</td>
<td>237.73</td>
<td>47.71</td>
<td>105.06</td>
<td>47.05</td>
<td>49.19</td>
<td>46.54</td>
<td>46.86</td>
</tr>
<tr>
<td>Most Extreme Differences</td>
<td>Absolute</td>
<td>.099</td>
<td>.093</td>
<td>.093</td>
<td>.128</td>
<td>.116</td>
<td>.099</td>
<td>.182</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>.099</td>
<td>.052</td>
<td>.084</td>
<td>.128</td>
<td>.116</td>
<td>.055</td>
<td>.182</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>-.088</td>
<td>-.093</td>
<td>-.093</td>
<td>-.097</td>
<td>-.103</td>
<td>-.099</td>
<td>-.108</td>
</tr>
<tr>
<td>Kolmogorov-Smirnov Z</td>
<td>.505</td>
<td>.593</td>
<td>.558</td>
<td>.792</td>
<td>.656</td>
<td>.584</td>
<td>1.077</td>
<td>.720</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.961</td>
<td>.874</td>
<td>.914</td>
<td>.557</td>
<td>.783</td>
<td>.885</td>
<td>.196</td>
<td>.678</td>
</tr>
</tbody>
</table>

<sup>a</sup> Test distribution is Normal.

As it is shown in Table 4, the test distribution is normal.
Pearson Correlation was used to find the relationship between the two variables, i.e. CT and SDL, the results indicated a positive (significant) linear correlation between these two variables \( (r = 0.424, p = 0.039) \) as seen in the following Scatter diagram.

![Scatter diagram 1.](image)

The relationship between CT and SDL of Iranian EFL learners

Then the relationship between CT and 5 areas of SDL was measured and a significant relation was observed in three areas (Table 5).

Table 5.

Correlation Matrix between CT and 5 areas of SDL

<table>
<thead>
<tr>
<th>Area of self-directed learning</th>
<th>Critical thinking</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td></td>
<td>0.306</td>
<td>0.084</td>
</tr>
<tr>
<td>learning strategies</td>
<td></td>
<td>0.226</td>
<td>0.247</td>
</tr>
<tr>
<td>learning activities</td>
<td></td>
<td>0.432</td>
<td>0.013*</td>
</tr>
<tr>
<td>evaluation</td>
<td></td>
<td>0.503</td>
<td>0.003*</td>
</tr>
<tr>
<td>interpersonal skills</td>
<td></td>
<td>0.540</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

*Significant p-value
Scatter diagram 2.

The relationship between CT and learning activities of Iranian EFL learners

Scatter diagram 3.
The relationship between CT and evaluation of Iranian EFL learners

Scatter diagram 4.

The relationship between CT and interpersonal skills of Iranian EFL learners

As for the relationship between CT and other areas of SDL, no significant relationship was observed.

In order to find out if there is any relationship between the two variables (CT and SDL) and students’ demographic characteristics (gender and academic semester), independent T-Test was used. The results showed that there was no significant relationship between the variables under the study (Tables 6-9).

Table 6.
The relationship between CT and gender

<table>
<thead>
<tr>
<th>gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical_thinking_total</td>
<td>female</td>
<td>20</td>
<td>105.05</td>
<td>17.370</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>16</td>
<td>105.06</td>
<td>9.970</td>
</tr>
</tbody>
</table>

Table 7.
The relationship between SDL and gender

<table>
<thead>
<tr>
<th>gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-directed</td>
<td>female</td>
<td>12</td>
<td>244.33</td>
<td>25.539</td>
</tr>
</tbody>
</table>
learning_Total  | male | 14 | 232.07 | 25.107 | P=0.230

Table 8.
The relationship between CT and academic semester

<table>
<thead>
<tr>
<th>academic semester</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical_thinking_total</td>
<td>1</td>
<td>26</td>
<td>104.77</td>
<td>14.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>112.33</td>
<td>3.215</td>
</tr>
</tbody>
</table>

Table 9.
The relationship between SDL and academic semester

<table>
<thead>
<tr>
<th>academic semester</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-directed learning_Total</td>
<td>1</td>
<td>18</td>
<td>239.17</td>
<td>26.783</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>231.67</td>
<td>17.786</td>
</tr>
</tbody>
</table>

To investigate the relationship between the variables (CT and SDL) and students’ field study one way ANOVA was used but no significant differences were observed (Tables 10-11).

Table 10.
The relationship between CT and students’ field of study

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Management</td>
<td>10</td>
<td>107.00</td>
<td>14.606</td>
<td>4.619</td>
<td>F=1.200</td>
</tr>
<tr>
<td>Medical Librarianship</td>
<td>6</td>
<td>108.67</td>
<td>10.328</td>
<td>4.216</td>
<td></td>
</tr>
<tr>
<td>Health Economics</td>
<td>7</td>
<td>102.43</td>
<td>18.743</td>
<td>7.084</td>
<td>P=0.333</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>4</td>
<td>109.00</td>
<td>10.165</td>
<td>5.083</td>
<td></td>
</tr>
<tr>
<td>Medical Informatics</td>
<td>2</td>
<td>83.00</td>
<td>26.870</td>
<td>19.000</td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td>7</td>
<td>105.86</td>
<td>8.435</td>
<td>3.188</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>105.06</td>
<td>14.367</td>
<td>2.394</td>
<td></td>
</tr>
</tbody>
</table>
Table 11.

The relationship between SDL and students’ field of study

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Management</td>
<td>6</td>
<td>241.33</td>
<td>29.008</td>
<td>11.842</td>
<td></td>
</tr>
<tr>
<td>Medical Librarianship</td>
<td>5</td>
<td>228.20</td>
<td>22.917</td>
<td>10.249</td>
<td>F=0.466</td>
</tr>
<tr>
<td>Health Economics</td>
<td>6</td>
<td>230.00</td>
<td>31.887</td>
<td>13.018</td>
<td>P=0.797</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>3</td>
<td>239.33</td>
<td>1.528</td>
<td>.882</td>
<td></td>
</tr>
<tr>
<td>Medical Informatics</td>
<td>1</td>
<td>243.00</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td>5</td>
<td>250.20</td>
<td>28.464</td>
<td>12.729</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>237.73</td>
<td>25.566</td>
<td>5.014</td>
<td></td>
</tr>
</tbody>
</table>

Testing the Null Hypothesis

As stated before the distribution of data was normal; therefore, Pearson Correlation was used to find the relationship between the two variables, i.e. CT and SDL (Table 12).

Table 12.

Pearson Correlation between CT and SDL

<table>
<thead>
<tr>
<th></th>
<th>CT_total</th>
<th>SDL_Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical_thinking_total</td>
<td>.424*</td>
<td>.039</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.039</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>36</td>
<td>24</td>
</tr>
</tbody>
</table>

Self-directed learning_Total

|                        | .424*    | 1         |
| Sig. (2-tailed)        | .039     |           |
| N                      | 24       | 26        |

* Correlation is significant at the 0.05 level (2-tailed)

As it is indicated in Table 12, the results revealed a positive (significant) linear correlation at 0.05 level (r = 0.424, p = 0.039) between CT and SDL.

Based on the results, the null hypothesis, indicating: “there is no relationship between CT and SDL in EFL learners” was rejected. In fact, the findings indicated a significant positive relationship between these two variables.
There are other studies that came to the same conclusion. Choi et al. (2014), investigated the outcome abilities including CT, problem-solving, and SDL of nursing students receiving PBL vs. traditional lecture-based classes and found a positive significant correlation between CT and problem-solving ($r = .713$, pb$.001$), between CT and SDL ($r = .503$, pb$.001$), and between problem-solving and SDL ($r = .747$, pb$.001$) (Choi, Lindquist, & Song, 2014).

The findings were also in line with the study conducted by Kreber (1998) who studied the relationships between SDL, CT, and Psychological Type, and a positive correlation was identified for scores on two of the CT and SDL ($r = 0.32$, $r = 0.33$). Whilst these correlations were not very strong, they were found to be highly significant ($p < 0.001$).

Furthermore, the results of the study are supported by Garrison (1992) who believes: “To be a critical thinker, one needs to be self-directed; and conversely, to be a self-directed learner, one needs to be a critical thinker”, and it indicates a positive relationship between CT and SDL.

Similarly, in another study in an Iranian context, Hashemabadi et al. (2013) investigated the relationship between tendency to CT and SDL in nursing and midwifery students and its role on their academic achievement in Mashhad. Although there was no significant relationship between SDL and tendency to CT and Academic Achievement ($P > 0.05$), a significant and positive relationship between self direction and tendency to CT ($P < 0.0001$, $r = 0.45$) was observed.

All these studies indicated a positive relationship between CT and SDL, in fact there is no innate contradiction between SDL and CT. Taking a meaningful learning experience into consideration does not mean to neglect the integrity and freedom of the individual, and attention should be paid to develop integrative models through unifying existing fundamental frameworks, i.e. to develop a CT learning model that incorporates the concept of SDL (Garrison, 1992). Therefore, it can be concluded that teaching the techniques of CT and encouraging learners to become self-directed learners can be beneficial to learners of foreign languages.

**Conclusion**

Critical thinking and self-directed learning are important parts in adult education, the educational strategies proposed to develop CT and SDL are essentially the same. These best practices include providing students with frequent opportunities to use the reflective judgment processed (Candy, 1991), in fact, the capacity for SDL is required to implement the reflective judgment process and underlies many of the dispositions needed for CT. SDL is the ability to direct and regulate one’s own learning experience (Hendricson, 2006).

Leach (2000), has interpreted five meanings for SDL. Four of these are related to an external dimension of self-direction – taking control of learning, i.e. taking control and making decisions; freedom; learning on one’s own; and learning with others, the one related to the internal dimension of SDL is making meaning which refers to the responsibility for constructing personal meaning. Skills in SDL can be taught by means of teaching techniques which are at
least as effective as traditional methods of education and at the same time promote more enjoyment and enthusiasm among both staff and students (Towle & Cottrell, 1996).

Critical reflection, on the other hand, is not concerned with the how or the how-to of action, but with the why, the reasons for and the consequences of what we do (Mezirow, 1990). CT aims to: 1) help learners step out of one’s thoughts, examine them and the process that brought them about. It does not require some higher level of cosmic consciousness or a split personality; rather it does require training and thought (Moore, 2007), and 2) improve the thinking skills of students and thus better prepare them to succeed in the world (Schafersman, 1991).

Although the effectiveness of CT and SDL has been proved in many studies, rarely are they taught in classroom contexts, as Norman (1980) puts it: "It is strange that we expect students to learn, yet seldom teach them anything about learning" (Tuma & Reif, 1980), or as Kreber (1998) states: “while promoting the ability for lifelong learning has been proposed as a goal of higher education by many administrators and faculty, this has not yet been translated into changes in the process of higher education teaching which would facilitate progression towards this goal.”

The review of related literature indicted the importance of teaching CT and SDL in higher education teaching since learners at this stage are ready to study independently of their instructors. Of course this autonomy cannot be achieved overnight, rather it should be the aim of every educational system to apply different models to prepare learners from undergraduate levels and train the in a way to become ready to be autonomous. One such model could be the one introduced by Grow (1991), it suggests that the chosen teaching styles should eventually lead the learners from low to moderate, intermediate and finally High Self-Direction.

Although different methods in different studies are introduced and suggested for teaching CT in classroom settings, such as: lecture, homework, term papers, and exams (Schafersman, 1991), no unique and single instruction can be proposed, rather what is needed as McMillan (1987) asserts: “is a set of multiple measures of CT that can be used to triangulate the results. For instance, measures of student and teacher perceptions, judgmental analyses of essay answers, and locally devised instruments could be used in addition to appropriate standardized tests. In fact, large samples, carefully developed instruments, and adequate designs are required.
REFERENCES


Moore, D.T. (2007). The national defense intelligence college supports and encourages research on intelligence issues that distills lessons and improves intelligence community capabilities for policy-level and operational consumers.


