# The Relationship between Medical Students' Perceptual Learning Styles and Their Multiple Intelligences

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## Abstract

The theory of multiple intelligences has immerged from some recent cognitive researches that, as Gardner (1991) believes, "document the extent to which students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways". The present study attempts to explore the relationship between perceptual learning styles and multiple intelligences of Iranian medical students. To this end, 144 Iranian medical students participated in the study. They filled out two questionnaires: the *perceptual learning-style preference* by Reid (1995), and a researcher-made multiple intelligences (MI) questionnaire. The results of the study revealed that **interpersonal intelligence** stance is highest in comparison with *linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial-visual, and intrapersonal* types of intelligence. As to learning styles, **tactile style** ranked highest from among *auditory, visual, group, kinesthetic, tactile,* and *individual* learning styles. Owing to the urgent needs of medical students to English, adopting an appropriate instructional approach seems to be of paramount importance. The pedagogical implication represents that the primary focus of attention for medical students should be on leaner-centeredness, group working, and hands-on activities.

**Key words**--Perceptual Learning Styles; Multiple Intelligences; Medical Students

## 1. Introduction

Language awareness has taken several forms of conceptualization by the educationalists and methodologists; in this regard, awareness, noticing, and attention to particular properties of language have come to enjoy some relevance in language learning and teaching. In its specific concept, it may refer to a form of consciousness-raising whereby learners' attention is drawn to those aspects of language on which they possibly mostly linger. This may virtually arise, at least in some settings, some doubt on using this technique as it can somehow remind us the so-called outlawed notorious incongruous aspect of grammar translation method and other prescriptivist approaches that suggest learners preprogrammed syllabi of what to do and not to do in an L2 learning context (Lier, 2001). This is actually not the case if we however, appear to distinguish, as Widdowson (1990) rightly does, between a natural milieu for language learning and what really happens within the confines of a second language classroom. To Widdowson, replication in the classroom of the conditions for natural communicative use of language is mistaken for two critical reasons; "First to do so is to deny the whole purpose of pedagogy, which is to contrive economical and more effective means for language learner.[...] Second, natural language use typically deflects attention from language itself and presupposes a knowledge of the language system as a basic resource which learners have, by definition, not yet acquired." In this regard, Brown (2007) points to the

facilitating role of the teachers in L2 settings and sets forth ways on how to increment learners' awareness so as to depart from the near-naturalness, as some may assert, of the communicative situations. In a chapter entitled, "The Post Method Era: toward informed approaches ", Brown (2007) introduces his own terminology for autonomy of the learners in L2 context as 'strategic investment' and goes on to explain that "students are given opportunities to focus on their own learning process through raising their awareness of their own *styles of learning* (strengths, weaknesses, preferences) and through the development of appropriate strategies for production and comprehension." Lier (2001) points to three fundamental reasons as sources under scoring language awareness: 1) language awareness movement initiated in the early 1980s in the UK; 2) consciousness-raising, focus on form, and various approaches to explicit teaching and metalinguistic awareness; and 3) critical perspectives on language and discourse. In Widdowson's (1990) viewpoint, a distinction has to fundamentally be made in reality between 'authoritarian' and 'authoritative' perspectives of instructional enterprises as the former refers to the superior position taken by the instructors to exert complete dominance and power thereby adopting a prescriptionist surveillance over the proceedings of the class whereas in the latter the teacher acts as a person who is skilled and has special expertise in nearly directing the class through multiple tasks appealing to a large swath of learners; this is to be the goal of most post-method enlighted educational settings.

## 2. Learning styles

Isn't it virtually difficult to teach students if we do not know how they learn?  In the words of Coffield et al (2004, p. 1):

> There is a strong intuitive appeal in the idea that teachers and course designers should pay closer attention to students' learning styles – by diagnosing them, by encouraging students to reflect on them and by designing teaching and learning interventions around them.[…]
> The logic of lifelong learning suggests that students will become more motivated to learn by knowing more about their own strengths and weaknesses as learners. In turn, if teachers can respond to individuals' strengths and weaknesses, then retention and achievement rates in formal programmes are likely to rise and 'learning to learn' skills may provide a foundation for lifelong learning.[…] For example, if students become more independent in their learning as a result of knowing their strengths and weaknesses, then negative effects from lower levels of contact between lecturers and students will be counterbalanced if students develop more effective learning strategies which they can use outside formal contact time.

To start with children and their learning style at the process of finding words, O'Grady (2005) refers to two analytic and Gestaltian styles as a continuum through which children swing at different situations without adopting a completely fixed style. Some children, though, are analytically oriented and produce words which are short and easy to learn (for example, Mommy, Daddy, car, … ) whereas others mostly exhibit tendencies the other way round. "They memorize and produce relatively large chunks of speech (often poorly articulated) that correspond to entire sequences of words in the adult language" (p. 14).

For adults, learners' preferences in how to come to grips with a language were not usually detected in traditional classroom settings. Learners were typically left on their own to find the root to their success. Today, though, it is asserted that learners demonstrate varying orientations and styles that bring with them to the learning environment the awareness of which is a prerequisite for efficient and appropriate grasp of  a second language. (Nunan, 1999;  Lightbown and  Spada, 2003).

Styles by definition are "related to personality (such as extroversion, self-esteem, anxiety) or to cognition (such as left/right orientation, ambiguity tolerance, field sensitivity), characterizing the consistent and enduring traits, tendencies or preferences that may differentiate you from another person" (Brown, 2007). Styles have been identified to be more fixed and immutable than strategies which are specific techniques and activities adopted by the learners to deal with a difficult task in a particular learning context. And as Kumaradivelu (2006) points, learners have to identify their learning styles so as to become aware of their strengths and weaknesses as language learners. Also as Scrivener (2011) identifies, picking up signals from students can assist teachers' orientation in squaring their teaching career with most learners' learning traits. As to learning styles, a distinction has often been made, as Oxford (2003) argues, between *sensory preferences* and *personality orientations*. For the former, she refers to 'visual, auditory, kinesthetic (movement oriented), and tactile (touch-oriented)' propensity of learners in learning whereas for the latter she identifies individuals as 'introverted vs. extroverted;

intuitive-random vs. a sensing-sequential; thinking vs. feeling; and closure-oriented – judging vs. open/perceiving.' Moore et al (2007), however, contend that "the most popular typology of learning styles comes famously from Kolb (1984) who through his research and analysis has divided learners into four key categories according to the following styles: reflectors, activist, theorists, and pragmatics." The classification by Reid (1987) of learning styles can be regarded as parallel most with what Oxford has argued; he refers to tactile (hands on activities), kinesthetic (movement oriented), auditory (listening preference), visual (learning by seeing), group (working with others), and individual (learning in person) learning orientations.

## 3. Multiple Intelligences (MI)

The concept of multiple intelligence was first introduced by Howard Gardner in his book, *Frames of Mind* (1983) and was soon embraced by researchers working in varying disciplines such as psychology and education. "Gardner's (1983, 1999, 2004) model of intelligence includes at least nine types of intelligence, which has lead educators to view a number of forms of 'smartness' that learners manifest " (Brown, 2007). In traditional notion of IQ (intelligence quotient), there was a conviction for just one type of intelligence which was more often than not measured through tests which were of far low reliability and thus limiting. Relying on this test as the sheer measurers of smartness however could no longer be acknowledged as, for example, we may observe many students around with no academic performance but considerable success in second language learning or in business (Lightbown and Spada, 2003; Brown, 2000; Scrivener, 2011 from among many researchers). The initial formulation of Gardner's types of intelligence was seven.

In the process of developing the theory, in1994–1995, Gardner took a sabbatical and used part of his time to examine whether, as some had suggested, there was convincing evidence for the existence of new intelligences. He finally concluded that there was ample evidence for a *naturalist* intelligence (the ability to make consequential distinctions among organisms and entities in the natural world); and suggestive evidence as well for a possible existential intelligence ("the intelligence of big questions"). He also explored the relation between intelligences—which he construes as *biopsychological potentials*—and the various domains and disciplines that exist in various cultures. He was of the conviction that intelligences may possess the same names as cultural activities but they are not the same thing: as one example, the performance of music entails several intelligences (among them bodily and interpersonal); as another example, individuals strong in spatial intelligences can follow a range of careers and activities (Gardner, 2011).

Gardner also proposed three distinctive uses of the term *intelligence*:
• A property of all human beings (All of us possess these 8 or 9 intelligences)
• A dimension on which human beings differ (No two people—not even
  identical twins—possess exactly the same profile of intelligences)
• The way in which one carries out a task in virtue of one's goals.

Anyway, the first two of these intelligence types were taken to be typically relevant in schools (i.e., linguistic and logical/mathematical) whereas the next three (i.e., musical, bodily-kinesthetic, and spatial) were usually connected with the arts and the two others (interpersonal and intrapersonal) were called personal intelligences. Gardner's later inclusion of the other three intelligences (natural, existential, and spiritual) has raised a good deal of contention for their intelligibility and relevance in language teaching (Smith, 2002, 2008). Having been aware of learners' intelligences of linguistic (capacity to efficiently deal with words to achieve a purpose), logical-mathematical (capacity for discovery learning, scientific investigating and deductive reasoning), bodily-kinesthetic (potential of using body to solve problems), spatial- visual (capacity for designing, interpreting and wrapping up), musical (sensitivity to rhythms), interpersonal (inclination for group working), and intrapersonal (personal concerns), instructors can apply this expertise in a variety of ways and directions to arrange the components of classroom syllabi to meet the learning needs of most of the disparate learners. ''Traditional education systems may have tended to focus on some intelligence over others especially on language and logical intelligences'' (Scrivener, 2011).

Sternberg has also suggested a 'triarchic' concept of intelligence or 'smartness' in rejection of the traditional unidimensional symmetric theory in which mostly mental speed is valued. These are :

- Componential ability for analytic thinking
- Experiential ability to engage in creative thinking, combining disparate experiences in insightful ways
- Contextual ability; 'street smartness' that enables people to 'play the game' of manipulating their environment  (others, situations, institutions, contexts)

(Brown, 2000)

And finally as one may be under the illusion that some overlap could exist between learning styles and multiple intelligences, we differentiate between these two through Seifoori and Zarei's (2011) terms: "Multiple Intelligences must be understood more as the 'output' function of information intake, knowledge, skills and talent […] ,whereas Learning Styles can be seen as explaining information 'input' capabilities of human beings." In Gardner's (2011, p. xv) own terms:

> For the first decade after publication, I had been content simply to observe what others were doing and saying in the name of MI theory. But by the middle of 1990s, I had noticed a number of misinterpretations of the theory. As one example, the concept of intelligences was often conflated with that of learning styles; in fact, an intelligence (the computing power of an individual's musical or spatial or interpersonal capacity) is not at all the same as a style (the way in which one allegedly approaches a range of tasks). As another example, I noted the frequent confounding of a human intelligence with a societal domain (e.g., musical intelligence being misleadingly equated with mastery of a certain musical genre or role).

## 4.  Methodology

### 4.1. Participants

The participants of the this study were the medical students in Shahid Sadoughi University of Medical Sciences who had passed all the English courses. They were 144 including 45 males and 99 females with the age average of 21.

### 4.2. Instruments

The instruments of the present study consisted of two questionnaires, namely the "Perceptual Learning Style" by Reid (1995), and the second one was a researcher-made Multiple Intelligence questionnaire. Owing to the high citation and acceptable reliability and validity of the former, it was adopted with no alteration. The rational to develop the latter however was difficulty of the adjustability of the current standard questionnaires to Iranian socio-cultural elements.

### 4.3. Design

In view of the variables, there were two major ones, namely learning style and multiple intelligences. As illustrated in the introduction, there were six dimensions for the former, and seven for the latter. Because the data collection instruments were questionnaires, the nature of the data was ordinal in origin which were then transformed into intervals. Parametric tests were then conducted to reveal the correlation between the dimensions of the two variables.

### 4.4. Procedure
1. In a pilot study, the two questionnaires were checked for reliability and validity. In this regard, all the students who had entered into the medical field of study in 2010 participated in the study, and only 11 mortalities ware reported.
2. After getting assured of the instruments' applicability, the participants were asked to fill out the questionnaires.
3. All the data were entered into SPSS version 18, and relevant parametric test analyses were then performed.

## 4. Results

In the first table, the frequency distribution of the participants is shown. As mentioned, they were 45 (31.3%) males, and 99 (68.8%) females.

Table1. Participants' frequency

|  | Frequency | Percent |
|---|---|---|
| **Male** | 45 | 31.3 |
| **Female** | 99 | 68.8 |
| **Total** | 144 | 100.0 |

The second table reveals multiple intelligence details including different intelligence types as well as the mean and standard deviation of the participants. As it is shown, the maximum mean is dedicated to *interpersonal intelligence* which is 14.97 (out of 28), and logical and bodily intelligences closely follow interpersonal intelligence whereas linguistic, interpersonal, and spatial intelligences are at the lowest. It means that enjoying the highest level of *interpersonal intelligence*, the medical students are most likely to make a good relationship with other individuals. However, these students are less representative of intelligences such as intrapersonal, spatial, and linguistic. These realities demonstrate that the learners might not be so successful in self-awareness (for having low interpersonal intelligence); in imagination (for possessing low spatial intelligence), and in learning other languages (for enjoying the lowest intelligence in linguistics). Their musical intelligence is not so high; therefore, they probably might not be so capable in making rhythms. Their bodily and logical intelligences are almost high thereby demonstrating they are talented in view of performing bodily movements and making logical reasoning. However it is significant to note that all of these figures are averages; in this regard, in comparison with the students of other fields such as pharmacology, dentistry, and even English language, medical students are not unlikely to show higher capability in learning English.

Table 2. Multiple Intelligence central tendencies

| Intelligence Type | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| **Linguistic** | 7 | 20 | 13.21 | 2.63 |
| **Intrapersonal** | 8 | 19 | 13.23 | 2.25 |
| **Spatial** | 7 | 20 | 13.32 | 2.38 |
| **Musical** | 5 | 19 | 13.73 | 3.17 |
| **Bodily** | 9 | 20 | 14.77 | 2.82 |
| **logical** | 6 | 20 | 14.89 | 2.80 |
| **Interpersonal** | 8 | 20 | **14.97** | 2.82 |

Figure 1. represents the same concept of table 2.

Figure 1. Multiple Intelligences scores
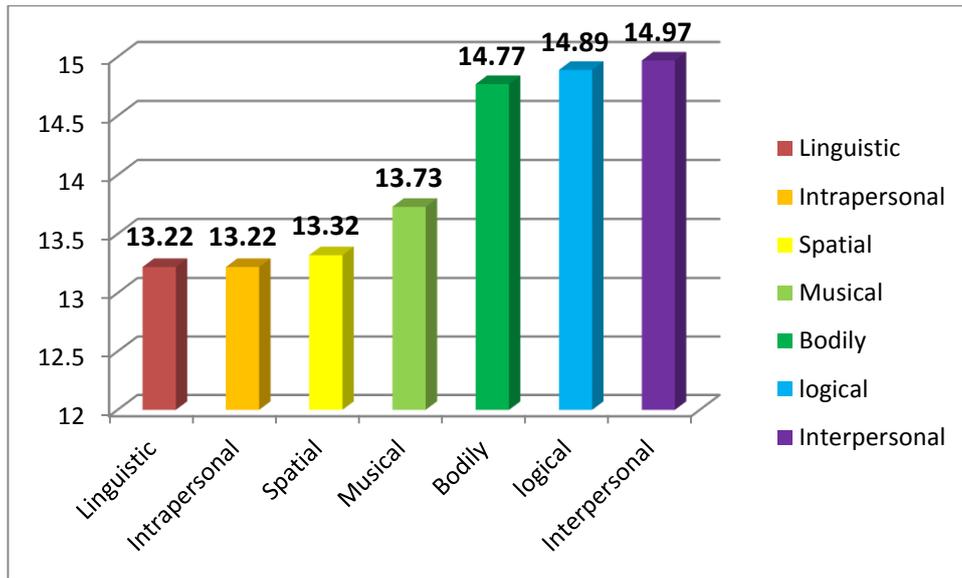
The third table shows the learning style of the medical students in detail. As it is indicated, the highest and lowest mean scores are related to *tactile* and *group* styles, respectively (tactile=39.91 and group 33.21, out of 50).

The table indicates that tactile style of the participants is the strongest (39.91± 5.81) followed by kinesthetic, auditory, and visual learning styles whereas individual and group styles lie at the other end at the continuum (34.04± 7.91 and 33.21± 8.79 respectively).

Table 3. Learning style central tendencies

| Learning Style | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| Group | 10 | 50 | 33.21 | 8.79 |
| Individual | 18 | 50 | 34.04 | 7.91 |
| Auditory | 22 | 50 | 36.83 | 7.19 |
| Visual | 22 | 50 | 37.64 | 5.82 |
| Kinesthetic | 18 | 50 | 39.14 | 5.82 |
| Tactile | 22 | 50 | **39.91** | 5.81 |

Figure 2. represents the same concept of table 3.
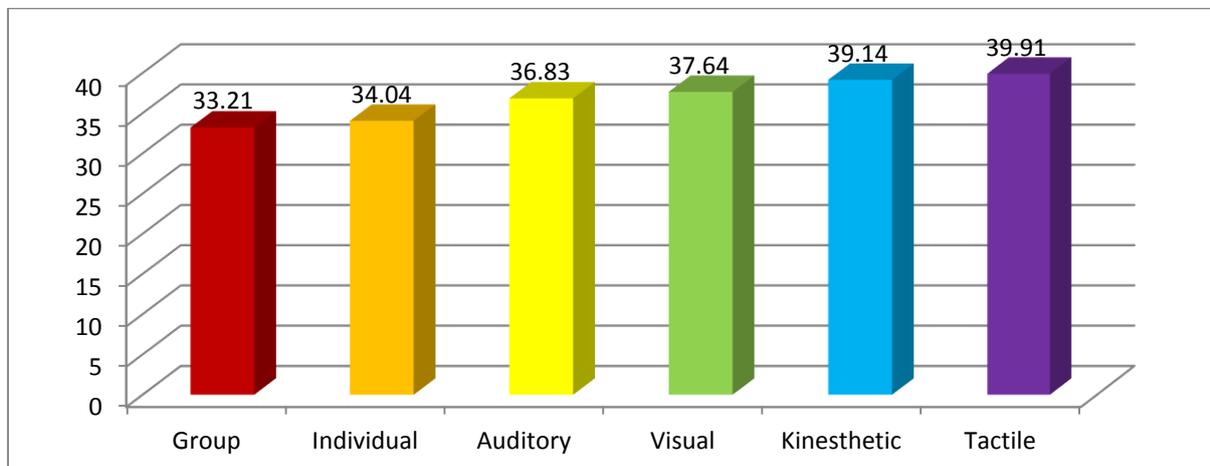
Figure 2. Learning styles preferences scores

Table 3. Correlation table

| | Linguistic | logical | Musical | Bodily | Spatial | Interpersonal | Intrapersonal | Kinesthetic | Visual | Tactile | Auditory | Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| logical | -.104 | | | | | | | | | | | |
| Musical | .210* | -.116 | | | | | | | | | | |
| Bodily | .176 | .015 | .099 | | | | | | | | | |
| Spatial | .095 | -.029 | -.052 | .164 | | | | | | | | |
| Interpersonal | .220* | .048 | -.010 | .400*** | .031 | | | | | | | |
| Intrapersonal | .144 | .062 | .059 | -.054 | .214* | -.092 | | | | | | |
| Kinesthetic | .184 | -.071 | .118 | .091 | -.140 | .352*** | -.191* | | | | | |
| Visual | -.190* | .106 | -.024 | .050 | -.112 | .123 | .023 | .223* | | | | |
| Tactile | .207* | .091 | .151 | .073 | .052 | .272** | .157 | .489*** | .284** | | | |
| Auditory | .112 | .089 | .124 | .111 | -.140 | .338*** | -.110 | .455*** | .010 | .296** | | |
| Group | -.058 | -.048 | .055 | .244** | -.062 | .332*** | -.236* | .506*** | .270** | .177 | .318** | |
| Individual | -.081 | .169 | -.118 | -.203* | .188* | -.410*** | .223* | -.247** | .045 | .062 | -.203* | -.556*** |

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

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

\*\*\*. Correlation is significant at the 0.001 level (2-tailed).

In table 3, Pearson-product moment correlations reveal some significant relationships between learning styles and intelligence types of medical students such as the following: there is a low negative relationship between linguistic and visual   (r=-.190, p<.05), a low positive relationship between linguistic and tactile (r=.207, p<.05), a low positive relationship between bodily and group (r=.244, p<.001), a low negative relationship between bodily and individual (r=-.203, p<.05), a low positive relationship between spatial and individual (r=.188, p<.05), a positive relationship between interpersonal and kinethtetic (r=.352,p<.0001),a positive relationship between interpersonal and tactile (r=.272, p<.001), a positive relationship between interpersonal and auditory (r=.338, p<.001), a positive relationship between interpersonal and group(r=.332, p<.001), a positive relationship between interpersonal and individual(r=-.410, p<.001), a low negative relationship between intrapersonal and kinesthetic (r=-.191, p<.01), a negative relationship between intrapersonal and group.(r=.236, p<.01), and a positive relationship between intrapersonal and individual (r=.223, p<.01).

## 5.  Discussion

As the results indicate, *tactile learning style* and *interpersonal intelligence* ranked highest among the medical students. In terms of learning styles, those following tactile were kinesthetic, visual, auditory, individual, and group styles respectively. Explanation for this hierarchy of styles can be as follows: tactile and kinesthetic styles both rank close to each other (first and second respectively) representing that medical students, being highly movement oriented, mostly prefer to look for some opportunities to have hands-on activities to learn (as this is true in view of having many practical courses in different school laboratories as part of their course requirement). Interestingly, auditory and visual styles both positioning in the middle of the continuum and not significantly different from each other represents that teachers can still seek ways to work on these important capacities through individual or group learning styles in the hope of  ameliorating all of these four capacities. In a study conducted by Reid (1998), 1300 ESL students of varied cultural backgrounds (e.g., Korean, Japanese, & Malay) were compared in terms of learning styles. The kinesthetic and tactile styles were shown to be the preference styles of the majority of students. Comparing the results of this study with those of Reid (1998), the two studies are partly in line with each other. In the present study, however, tactile and kinesthetic styles stood

highest respectively thereby representing the closeness of the two styles. In another study carried out by Seifoori and Zarei (2011) on Iranian EFL sophomores, kinesthetic style turned out to be the highest; this style stood the second preference of the students in the present study. The study is in contrast with that of ours in that tactile preference was the fourth learning style of the learners whereas in the current study tactile ranked first. This disparity is probably the result of the difference between the students' fields of study.

Regarding intelligences, interpersonal intelligence ranked highest and logical as well as bodily intelligences closely followed interpersonal intelligence whereas the other intelligences, i.e., musical, spatial, intrapersonal, and linguistic were at the lowest, respectively. The positioning of the learners' interpersonal intelligence at the top of the list and group learning style at the lower end implies that it is most likely to develop the vital style of group learning as these students enjoy the highest level of interpersonal intelligence.

Moreover, the logical-mathematical (capacity for discovery learning, scientific investigating and deductive reasoning) intelligence being rather high represents the significance of this intelligence for medical students to enable them to analyze the diseases syndromes in order to reach an appropriate diagnosis for monumentally various abnormalities in the patients. In a study conducted by Sulainman, Abdurahmal, and Abdul Rahim (2010), the participants hierarchy of intelligences turned out to be linguistic, logical, spatial, musical, kinesthetic, interpersonal, and intrapersonal. Comparing with the present study findings in which linguistic intelligence was the lowest, in these researchers' study it turned out to be the highest. Seifoori and Zarei (2011) also found linguistic intelligence ranking third following spatial and interpersonal intelligences; interpersonal intelligence stood second whereas in the present study it ranked first. It can be concluded that the low distribution of linguistic intelligence among the students of medicine denotes that these students are less oriented to learn languages.

## 6. Suggestions

The findings of the present study can be helpful in the ELT domain in general and ESP courses in particular. English teachers especially those who teach English in medicine or some related majors can surely make advantage of the gained results in their instructional setting. The findings can, moreover, be fruitful for syllabus designers and those researchers who are engaged in developing academic materials. In this regard, they are expected to arrange the materials in line with the practical findings because evidently if the dominant intelligence and perceptual style of the students be considered as critical factors, the quality of teaching and learning can remarkably be raised.

Moreover, there are some other suggestions for the further studies. The first one is pertinent to sample increase. It is statistically typical that in large populations, small differences or changes would be meaningful; therefore, an increase in the sample number may cause more reliable results. The second factor is pertinent to gender control. In the present study, sex was not controlled the controlling of which could reveal some interesting realities. The third element regarded as important is the factor of age the inclusion of which can ensue different results. Still another implication is taking into consideration other probe realms and computing some bivariate correlations such as self-awareness, critical thinking, and reflection that each would require a related survey and the results of which can pave the way to more effective learning and teaching protocols.

## 7. Acknowledgement

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# Vitae

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