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Keywords : *perceptual learning style, tactile, kinesthetic, auditory, visual.*

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PERCEPTUAL LEARNING STYLES OF MEDICAL SCIENCES STUDENTS

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Perceptual Learning Styles of Medical Sciences Students

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Abstract - This study, conducted in Iran, reports on research into perceptual learning style of medical sciences students generally and that of Students of Medicine (SM) and Anesthesiology (SA) in particular. Results revealed that the students' preferred learning styles were *tactile* and *kinesthetic* followed by *visual* and *auditory* but *individual* and *group* preferences were at the lowest. Females of the two fields were stronger than males in 5 domains. Female SM were better in all 6 areas of learning compared to female SA. Male SA, compared to their female peers, however, were better motivated and thus more oriented toward their field and future profession. The findings can have some implications for curriculum development, material development, teacher training courses, and class management. Moreover, by having an awareness of our students' learning styles, classes can be placed into homogeneous groups and expose each to their most preferred learning orientation and even work on and improve the learners' least preferred styles from the other end of the continuum.

Keywords : perceptual learning style, tactile, kinesthetic, auditory, visual.

I. Introduction

Being replete with and idealized in terms of administrative and pedagogical perspectives, contemporary practices in education have in many occasions been plagued by lack of attention to learners' learning orientation and thus lack of adoption of an anticipated and felicitous approach in the classes. Moreover, 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, language awareness 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 aspects 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 rightly (1990) 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 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 assert, of the communicative situations. In a chapter entitled, "The Post Method Era: toward informed approaches, " Brown (ibid) 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 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 underscoring 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 fundamentally been 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 enlightened educational settings.

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a) Learning Styles

To touch upon children and their learning styles as they forge ahead at finding words, O'Grady refers to two analytic and gestalt styles as a continuum along 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" (2005).

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 an L2. (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, activists, theorists, and pragmatics." Ellis (2008) by referring to an extant distinction between learning style and cognitive style, first made by Dörnyei, which to him contributes to resolving a contradiction in literature, states that," cognitive styles are seen as relatively fixed… but learning styles are often seen as mutable, changing according to experience, and potentially trainable." Ellis (ibid) goes on with the concept of field independence/dependence as the instances of cognitive style, initially put forth by general psychology, the first of which captures analytical orientation and association with tests of formal language learning whereas the second, i.e. field dependence, pertains to a global orientation and concern for mostly informal and communicative tests. Leveling some criticism at GEFT (Group Embeded Figures Test), developed by Witkins and his associates (1971) as a measure of field independence/dependence and referring to its inadequacy in determining a proper and acceptable differentiation between these two modes, Ellis refers to a very different approach for measuring cognitive style developed by Riding (1991). For Riding, the distinction has been made in accordance with holistic – analytic learning dimension "distinguish[ing] individuals in terms of whether they preferred to organize information as an integrated whole or as a set of parts making up the whole. This corresponds closely to the FI/FD distinction" (ibid).

A number of researchers have assessed learning styles (eg: Ehrman and Leaver Learning Style, 2003; Perceptual Learning Style Preference Questionnaire, Reid, 1995; Oxford's Style Analysis Survey, 1993; Cohen, Oxford, and Chis' learning style survey, 2001 among others), (cited in Gass and Selinker, 2008). And provided the styles of learning are accommodated, learning conditions and attitude towards learning can be improved. Once the students have identified their own tendencies, they will be given choices from a range of options commensurate with their experience to pave the way for learner-centered classes Cook (1999) has put it rightly saying, "[s]tudents do not like classes in which they sit passively, reading or translating. They do not like classes where the teacher controls everything. They do not like reading English literature much, even when they are literature majors. Thus it is clear that the great majority of university English classes are failing to satisfy learner needs in any way." Therefore, the instructors main responsibility could certainly be creating a favorable learning environment that would zero in on learner-centered approaches emerged from an understanding about learners orientation. Dunn et al (1989) developed a measure of learning style termed Productivity Environmental Preference Survey which identifies learning style in four different areas: environmental, emotional, sociological, and physical stimuli. This questionnaire surveys preferences of the learners in 20 different modalities related to these areas. Some other measures, however, have been specifically designed to investigate language learners (Reid, 1987). The classification by Reid (1987) of learning styles can be regarded as parallel most with what Oxford has argued; she refers to tactile (hands on

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activities), kinesthetic (movement oriented), auditory (listening preference), visual (learning by seeing), group (working with others), and individual (learning in person) learning orientations. The present study thereby set out to investigate the dominant perceptual learning style of Iranian medical sciences students. For this purpose, the following research questions were formulated:

1. What types of perceptual learning styles are mostly preferred by Iranian medical sciences students?
2. What types of perceptual learning styles are mostl preferred by Iranian "Students of Medicine" (SM)?
3. What types of perceptual learning styles are mostly preferred by Iranian "Students of Anesthesiology" (SA)?
4. Is there any difference between the learning styles of males and females in terms of their fields of study?

II. Methodology

a) Setting

This study was conducted in the Medical Faculty of Yazd Shahid Sadoughi University of Medical Sciences (SSUMS) in Iran. The English department of this university offers English language courses such as pre-university, general, and EAP courses for all the medical, dentistry, pharmacy, paramedical and nursing disciplines. The English courses are designed to prepare students to excel mainly in reading comprehension skill so as to be able to deal with texts during or even after graduation and thus keep up with new developments in their disciplines.

b) Instrument

In this research, the perceptual learning style (PLS) preference of medical sciences students was assessed using Perceptual Learning-Style Preference Questionnaire (PLSPQ) designed by Joy Reid (1984) which is reported to have a high reliability by peacock (2001).

c) Participants

The participants of the present study were 107 Iranian medical sciences students (out of 108 but one student was eliminated through data cleaning): 78 (72.9%) Students of Medicine (SM), and 29 (27.1%) Students of Anesthesiology (SA). Of all the participants, there were 34 (31.8%) males, and 73(68.3%) females.

III. Design and Procedure

The PLSPQ designed by Reid (1984) is a multi–item questionnaire which assesses learning styles of the students in six different domains: *visual*, *auditory*, *tactile*, *kinesthetic*, *group* and *individual*, and for each learning category there are 5 questions. The reason for applying this questionnaire is multifaceted; it is easy both to administer and to interpret, it is self-scoring, it has easily reportable scales, and it is of high cited and acceptable reliability and validity. Nonetheless the Cronbach alpha of the questionnaire was also determined through a pilot study with the participation of 48 students is Yazd University of Medical Sciences (α =0.73). This questionnaire assesses visual (learning with eyes), auditory (learning with ears), tactile (hands on activities), kinesthetic (physical activities) individual (working alone) and group (cooperation with others) learning preferences through a 5-point Likert scale (5=strongly agree, 4=agree, 3=undecided, 2=disagree, 1=strongly disagree). Anyway after getting assured of the scale's applicability, the participants were asked to fill out the questionnaire. Data were than collected and analyzed through SPSS. Alpha level was set at $\alpha < 0.05$.

IV. Results

Table 1 : Frequency distribution of the participants in the study

Variable		Frequency	Percent
Sex	Male	34	31.8
	Female	73	68.2
	Total	107	100
Field of Study	Students of Medicine	78	72.9
	Students of Anesthesiology	29	27.1
	Total	107	100

Table 2 : Central tendency of learning styles of the participants

Variable	Visual	Tactile	Auditory	Group	Kinesthetic	Individual
mean ± SD	37.32 ± 5.96	38.95 ± 6.03	36.16 ± 7.28	32.99 ± 8.90	37.36 ± 6.35	32.74 ± 8.1
Median	38	40	36	34	38	32
Min	22	20	22	10	16	18
Max	50	50	50	50	50	50
Total	107	107	107	107	107	107

The first table summarizes the frequency distribution of the participants. Table 2 represents mean, median, and standard deviation (SD) related to all the 6 styles of learning in 107 students and, as it is evident, the mostly preferred learning style was tactile (38.95 ± 6.03) followed by kinesthetic (37.36 ± 6.35), and then visual (37.32 ± 5.95) whereas individual (32.76 ± 8.1) and group (32.99 ± 8.90) styles ranked the lowest respectively.

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Table 3 : Comparison of mean of the learning styles on the basis of the gender in the study

Variable / Sex	Visual	Tactile	Auditory	Group	Kinesthetic	Individual
Male	36.17 ± 4.98	38.58 ± 5.42	34.17 ± 7.80	29.88 ± 7.62	36.05 ± 5.91	34.94 ± 8.44
Female	37.86 ± 6.32	39.12 ± 6.32	37.12 ± 6.87	34.43 ± 9.1	37.97 ± 6.49	31.72 ± 7.79
P-value	0.174	0.671	0.051	0.013	0.148	0.056

Table 3 indicates mean and SD of the students on the basis of their gender representing that the females (F) rank higher on the 5 domains of visual, tactile, auditory, kinesthetic, and group compared to males (M); the difference, however, is shown to be statistically significant only in group domain (F=34.43 ± 9.1> M=29.88 ± 7.62, P=0.013). For individual domain, though, males (M=34.94 ± 8.44> F=31.72 ± 7.79 p=) indicate a greater preference showing a trend toward significance. (p=0.056).

Table 4 : Comparison of mean of the learning styles on the basis the learners' field of study

Variable / Field of Study	Visual	Tactile	Auditory	Group	Kinesthetic	Individual
Students of Medicine	37.41 ± 5.90	39.35 ± 5.83	36.48 ± 7.53	33.05 ± 8.89	38.35 ± 6.04	33.28 ± 8.52
Students of Anesthesiology	37.10 ± 6.22	37.86 ± 6.52	35.37 ± 6.59	32.82 ± 9.07	34.68 ± 6.48	31.31 ± 6.72
P-value	0.814	0.256	0.487	0.909	0.007	0.265

Table 4 details the learning styles of the students pertinent to their field of study revealing that SM are stronger in all of the domains and this strength is statistically significant on kinesthetic style (SM=38.35 ± 6.04>SA=34.68 ± 6.48, P= 0.007).

Table 5 : Comparison of mean of learning styles on the basis of field of study in the males

Variable / Field of Study	Visual	Tactile	Auditory	Group	Kinesthetic	Individual
Students of Medicine	35.78 ± 5.11 n=28	39.28 ± 5.39 n=28	33.92 ± 7.6 n=28	29.28 ± 8.09 n=28	36.50 ± 6.07 n=28	35.78 ± 8.93 n=28
Students of Anesthesiology	38 ± 4.1 9 n=6	35.33 ± 4.67 n=6	35.33 ± 9.00 n=6	32.66 ± 4.32 n=6	34 ± 5.05 n=6	31.00 ± 4.14 n=6
P-value	0.33	0.106	0.70	0.33	0.35	0.21

The results illustrated in table 5 demonstrates the aforementioned preference of the male students in terms of their field of study. It shows a higher mean score for tactile, kinesthetic, and individual styles among the Students of Medicine (SM) but for other styles (i.e., group, auditory, and visual), Students of Anesthesiology (SA) rank higher. In none of the domains, however, the difference is significant.

Table 6 : Comparison of mean of learning styles on the basis of field of study in the females

Variable / Field of Study	Visual	Tactile	Auditory	Group	Kinesthetic	Individual
Students of Medicine	38.32 ± 6.15 n=50	39.40 ± 6.11 n=50	37.92 ± 7.1 n=50	35.16 ± 8.7 n=50	39.40 ± 5.83 n=50	31.88 ± 8.03 n=50
Students of Anesthesiology	36.86 ± 6.71 n=23	38.52 ± 6.85 n=23	35.39 ± 6.07 n=23	32.86 ± 10.03 n=23	34.86 ± 6.9 n=23	31.39 ± 7.39 n=23
P-value	0.36	0.58	0.146	0.32	0.005	0.80

Table 6 is indicative of the preference of the female SM in all the six learning styles compared to female SA with a significant difference related to kinesthetic style (SM=39.40 ± 5.83, SA=34.86 ± 6.9, P=0.005).

V. Discussion and Conclusion

As the results of the research suggest, tactile and kinesthetic learning styles gained higher mean scores among the students of medical sciences whereas group and individual styles ranked the lowest. In a study by Reid (1987) through which 1300 ESL

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students with disparate cultural aspects were investigated, the kinesthetic and tactile learning styles came to be known as the preferred learning styles of the learners respectively thus being somehow consonant with the results of ours.

Mulalic et al (2009) also investigated the perceptual learning style of ESL students in Malaysia. Their results demonstrated kinesthetic as the preferred style of the ESL learners (somehow in line with our study), visual, auditory, and group learning were ranked as minor, but tactile was reported to be the negative preference of the learners which is inconsistent with the results of ours. This can be attributed to the fact that ESL learners are far less concerned in their academic life with hands-on activities compared to medical sciences students.

Seifouri and Zarei's (2011) study on the Iranian EFL students conducted to detect the relationship between their learning styles and multiple intelligences also found that the students strongly relied on kinesthetic capacity followed by auditory style. Perhaps the reason behind auditory style positioning the second stance in their study is that EFL students in Iran are concerned more than medical students in their college life with auditory activities to improve at least their listening abilities; medical sciences students took the fourth stance for this (auditory) style, and perhaps in view of having many practical and laboratory courses, tactile turned out to be the strongest style with these students.

Interestingly enough, as it is evident from their grade point averages, female students of medicine and anesthesiology, compared to males, are much better and stronger in most of the university courses offered to them so this being consistent with their strength in 5 domains (and the significant difference was detected in group domain); males are stronger only in individual learning style with no significant difference.

As to university Entrance-Examination (*Konkour*) grade in Iran, Students of Anesthesiology bear little resemblance to their peers in the field of medicine and always position much lower rank so this being in line with the results of this study that the latter group (SM) turned out to be stronger in all domains and the difference was statistically significant for kinesthetic style. In terms of gender differentiation exactly the same results were obtained with female learners to represent the fact that females are generally stronger in varying learning domains in medical sciences.

That the male students of the two fields struck a balance (individual, kinesthetic, and tactile styles preference with male SM, and visual, auditory and group styles preference with male SA) can be representative of the fact that male SA, compared to females are more enthusiastic about and better motivated by their future profession and regard their job fairly more masculine!; in the interview held randomly with some SA, boys expressed that on the scene in the operating room (and when an anesthesiologist is trying to make a patient unconscious), *girls usually have their hearts in their mouths!*

Reid (ibid), however reported that medicine students preferred auditory learning as a major learning style (one of the two most strong preferences) thus not being consonant with the results of this research.

VI. Suggestions

The strong tactile learning style preference indicated by most medical sciences students, followed by kinesthetic and visual styles can have implications for curriculum development, material development and teacher training courses. Through burgeoning research with a wealth of students across nations it has been reported that traditional classroom instruction is mostly oriented to the auditory learners (Hodges, 1982 cited in Reid 1987) thereby ignoring a large number of other learners. If however students are placed into homogenous learning groups and are exposed to teaching styles that are consistent with their learning styles, a portion of the problem might certainly be resolved. Moreover, for the rather mutability of the learning styles (Brown, 2007), some longitudinal studies could be conducted to examine the case as well as to investigate the factors that bear on the issue. Very few, if any, researches has also been carried out on the relationship between critical thinking and learning styles as both of them may be developed and altered across the learners. The relation between the nature of the courses offered to the students and their consistency with the learners' learning styles can also be a useful and interesting matter of concern. Specifically detailing the relationship between English languages courses, either general or EAP, and learning styles could also have some relevance to the issue.

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