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Full Length Research Paper

Transformative learning between the student and the teacher? Concerning the learning styles of medical residents

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Several factors are involved in the educational process. One of these factors is learning style, defined as the cognitive, affective, and physiological traits that suggest how students perceive, interact and respond to their learning environments. All persons use various learning styles, although there is always one predominant style that may not be permanent. To determine the learning styles of medical residents at the beginning of their medical specialty in a tertiary care hospital. The Honey-Alonso Questionnaire of learning styles of resident who entered medical specialties was applied. Questionnaire results were reported to teachers and students in order to determine the learning style and to find the teaching-learning strategies that may help facilitate the process. We applied the questionnaire to 95 resident of medical and surgical specialties, we used the combinations that had the highest percentage among the four styles for each medical resident; 53.6% of 95 students are pragmatic reflexive. The usefulness of knowing learning style so far is controversial, differentiated instruction in adults is difficult. Learning styles can change throughout a person's academic and professional life, transformative learning, can be influenced by various factors. True instruction begins when instructors understand their students.

Keyword: learning styles, Education, transformative learning, health care.

INTRODUCTION

The ability for self-assessment is an experience that teachers and students should demonstrate during the teaching-learning process so as to improve by self-evaluation of their work. Training of human resources

demands that the educational process be questioned so as to offer the greatest benefits for the student and for the teacher. The learning style of the students is one of the intervening factors. Various concepts exist about the learning style. Among these concepts is "how the mind processes the information" or "how it is influenced by each individual's perception". Another of the best recognized factors and adopted by specialists is the Keefe definition (1988), where the following is noted:

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“learning styles are the cognitive, affective and physiological traits that serve as relatively stable indicators of how students perceive, interact and respond to their learning environment”. As can be seen in Kolb DA [2010], Swailes S, [1999], Delahoussaye M. [2002], Díaz-Véliz G. [2009]. Cognitive characteristics are related to the way in which students structure contents, form and utilize concepts, interpret information, solve problems and select the means of representation, Lankard B [2003] make mention of affective traits are related with the motivations and expectations that influence learning, whereas physiological traits are related with the student's biotype and biorhythm; as well individual factors such as mood, learning is not only a reflection of the intellectual capacity as identified by Stitt-Gohdes [2003], Campo AA [2005], Gleid S [2002]. There are no pure learning styles. All persons utilized different learning styles and, although there is always one that predominates, these are not permanent. Styles can change with each stage of life. No style is better than another. The ideal is that the student knows his or her predominant learning style.

In the business environment, Honey and Mumford (1986), using the Kolb theory, described four learning styles that were adapted to education by Alonso, Gallego and Honey in 2002, as noted by Kolb DA [2010], Swailes S, [1999], Delahoussaye M, [2002], Alonso GC [1995].

Escurra in [2005] carried out a study in 1250 students using the Honey–Alonso questionnaire on learning styles (CHAEA) with which the author validated once again that the construct and reliability are validated by internal consistency in the original proposal.

Learning Styles

- **Active.** Looks for new experiences, keeps an open mind, is not skeptical and enthusiastically accepts new tasks. *Characteristics:* Animated, improviser, risk taker and spontaneous.
- **Reflexive.** Places reflection before action, carefully observes different experiences. *Characteristics:* Thoughtful, conscientious, receptive, analytical and exhaustive.
- **Theoretical.** Seeks rationality and objectivity, avoiding the subjective and ambiguous. *Characteristics:* Methodical, logical, critical and structured.
- **Pragmatic.** Acts on ideas and projects that attract in a swift and safe manner. *Characteristics:* Experimenter, practical, direct and efficient; As can be seen by Kolb DA [2010], Swailes S, [1999], and mention by Escurra [2005] and Nevot [2001].

What professors think about the learning potential of the student without a doubt conditions the tools used for

the particular style and for professional practice. From here the significance is that the professor knows the learning styles and maintains a corresponding attitude in regard to the teaching–learning process as stated by Stitt-Gohdes [2003]. The attitude in regard to this generates the interest for developing didactic resources useful for the student to learn because the influence of the students' attitude on the teaching process contributes to consolidate learning or that it is significant learning that the student is able to apply what has been learned to different situations as reported by Armstrong E [2005] and Ten Cate [2004].

Objective

Using the Honey–Alonso questionnaire, to determine the learning styles of medical residents at the beginning of their chosen specialty in a third-level specialty hospital.

METHODS

This prospective study was conducted in full accordance with the principles of the Declaration of Helsinki and Good Clinical Practice guidelines, and approved by the local ethics committee, written informed consent was obtained prior to initiation of any procedure. Learning styles were determined using the CHAEA tool. The questionnaire consists of 80 brief questions with dichotomous responses where 20 questions correspond to each learning style and are randomly distributed. The score achieved indicates the type of style. This was an exploratory, cross-sectional, and analytical study applied to medical residents who were accepted at the medical specialties of a tertiary hospital such as Hospital General “Dr. Gaudencio González Garza” of Centro Medico Nacional “La Raza” in Mexico City during March 2014. The results of the questionnaire were reported to the professors and students with the objective of determining the learning style and to seek teaching/learning strategies that could contribute to facilitating learning. **Statistical Analysis.** Data were analyzed using the program SPSS-PC+, v.21 (SPSS, Chicago, Illinois). When performing univariate analysis, simple frequencies were obtained.

RESULTS

A total 102 questionnaires were applied; seven of them were eliminated as they were not completed. The total samples analyzed were 95. The participating specialties were medical and surgical and included anesthesiology, audiology, geriatrics, internal medicine, pediatric, radiology and imaging, pneumology, medical/surgical

Table 1. Learning styles by speciality of residents using the CHAEA

	Actives/ Pragmatists %	Reflexive/ Actives/Theorists %	Reflexive/ Pragmatists %	Reflexive/ Theorists %	Actives/ Reflexive %	Actives/ Reflexive/ Pragmatists %	Actives/ Reflexive/ Pragmatists %	Pragmatists/ Reflexive/ Theorists %	Pragmatists/ Theorists %	Total
Anesthesiology				10(47.7)	2(66.7)			1(1.9)	2(66.7)	15(15.8)
Clinical Pathology				1(4.8)				4(7.8)		5(5.3)
Pediatrics		4(66.7)				2(66.7)	1(33.3)	3(5.9)		10(10.5)
Radiology and Imaging		2(33.3)		3(14.3)	1(33.3)			6(11.7)		12(12.6)
Médical-surgical emergence	2 (66.7)						1(33.3)	7(13.6)		10(10.4)
Audiology				3(14.3)						3(3.1)
General Surgical			1(0.5)	1(4.7)				5(9.8)	1(33.3)	8(8.4)
Geriatrics				1(4.7)				2(3.9)		3(3.1)
Internal Medicine			1(50)	1(4.7)				5(9.8)		7(7.3)
Pneumology								8(15.6)		8(8.4)
Ophthalmology				1(4.7)			1(33.3)	7(13.7)		9(9.4)
Oncology	1(33.3)					1(33.3)		3(5.9)		5(5.2)
Total	3	6	2	21	3	3	3	51	3	95

emergency, ophthalmology, otorhinolaryngology and general surgery.

It has already been mentioned that there is no pure learning style. For this reason, we used the combinations that had the highest percentage among the four styles for each medical resident; 53.6% of 95 students are pragmatic reflexive, and 29/95, (30.5%) was reflexive. The combination of both was predominant. Learning style expressed through the questionnaire showed that residents of anesthesiology and pediatrics reflexive style predominated; pragmatists and reflexive were Radiology and imaging, Medical-Surgical Emergency, Pneumology and Ophthalmology. The other identified styles can be appreciated in the distribution by specialty (Table 1).

DISCUSSION

In general, students learn, process information in different ways, to see, hear, think and act and reason logically or intuitively. Identification of learning styles is part of an individual's needs. Once an individual is aware of his/her characteristics for learning, they can then develop them, take advantage of them and improve upon them. In practice, the medical resident, between his didactic academic activities consults 20 or more patients per day, sometimes alone and at other times with another higher level medical resident (who quickly has become a teacher) or with a physician assigned to the medical/surgical area. Each teacher has a different learning style,

which may not coincide with the student's own learning style. It is also possible that the student's own style predominates without learning additional styles, argued by Stitt-Gohdes WL [2003].

Hospitals are the ideal place for theoretical preparation and for the acquisition of dexterity and skills that allow the student to develop into the future professional highlighted by Billet S [2014, 2005]. Although, medical education is an enormous challenge, which could be analyzed by Ahumada [2006] and Viniegra [2005].

The results of this study suggest the following question: will the knowledge of the learning style be useful to the teacher and the student? Thus, does the first, may intervene in the educational

strategies used in curricula own specialty? As also mentioned Ten Cate [2004].

It can be seen that medical education represents a problem based on current forms of teaching and, therefore, development of teaching and learning. Should teaching be founded on the learning style of the physician in training or is it feasible that the physician, as their training in their specialty progresses, modifies his/her learning style? As noted by Brent R [2014] and Felder RM. [1988] .

The main finding of our study is that the results of the learning style expressed with the questionnaire were unrelated to the medical or surgical specialty. We identify predominance of the pragmatic reflexive style. What could be the pedagogical implications, studies have shown that greater learning may occur when teaching styles match learning styles than when they are mismatched what was argued by Kumar S [2011]. It is worth mentioning that the individual, with each learning style has an alternative to learn better, according to Felder RM. [2014], an example is the use of strategies such as mnemonics, abstract, conceptual map, mental map, semantic map, matrix classification, and matrix induction.

How do those who have the predominant style learn best:

- **Active:** Competing as a team, resolving problems and representing roles with diverse activities.
- **Reflexive:** Carefully investigating, listening, observing a group while working, exchanging opinions.
- **Theorists:** Participates in open discussions, in complex situations, in question and answer sessions, in structured sessions.
- **Pragmatist:** Imitates models, establishes plans of action. Mentioned by different authors as Kolb DA [2010], Swales S, [1999], Nevot [2001] and Stitt-Gohdes [2003].

Teaching requires sharing of techniques and conveys enthusiasm for learning arguments given by many authors including Felder RM. [2010]. Nevot [2001] noted that in teaching one should learn from day to day and that we learn from our students and the students learn from us.

The same as others authors we consider that Professors' attitudes about the learning styles of their students predispose to certain actions. Variables that intervene in the process are different. It may be the self-concept, the motivation, the disciplinary content, or the surgical or clinical training programs; all have an influence on the efficacy and academic efficiency. So that the approach is for teachers to recognize his speech as officials responsible for developing in students the skills and attitudes that enable them to act on their environment critically, analytical, reflective and creative.

The teaching aspect needs to consider the cognitive phenomenon of intelligence, memory and learning as elements for the development of the human potential. The student is a builder as well as being the principal reason for his/her own learning; learning when what is learned makes sense. The meaning of learning is achieved when students bring their experiences and adequately relate the concepts learned. Learning is an individual experience based on different learning styles mentioned by Juarez [2013]. The educational intervention must promote the ideas that students self-generate significant learning or the ability to "learn to learn."

Learning style as the learning process progresses can change according to various circumstantial factors, contexts and learning times that students will encounter. In general, we possess all learning styles. Although each is developed at a personal level, in the group studied, it was identified an amalgam of styles. We combine them and use them to different degrees in a personal and unique manner. It is thus beneficial to know the style and learning focus that one adopts throughout life.

It is of note to mention that the Honey-Alonso questionnaire (CHAEA) does not assess intelligence or personal aptitudes. It identifies preferences, which may vary at each moment. Learning styles can be developed and improved with the development of strategies that facilitate the consciousness and intention and can be constructs according to the goals and objectives we may have. The optimal choice of a learning strategy lies in establishing a relationship between what is known and new information presented. Consistent with previous observations as Felder RM [2010], our study allow reflect on that the teacher can orient learning strategies towards the development of thinking dexterity. The goal is to achieve significant learning and to acquire tools that allow students to "learn to learn" with didactic thought so as to establish patterns of interaction between teacher and student through educational practices carried out at the classroom level and will serve as a starting point for the selection of activities, materials, and educational methods as mentioned by Martin IG [2000] and Illeris K [2014]. These circumstances might be related to transformative learning concept, described by Jack Mezirow in 1978, who mentioned that learning involves qualitative changes in meaning student perspectives, as well as its frameworks and their habits memory, explains the relationship of transformative learning to autonomous responsible thinking, the central goal of adult education. We live in a time that involves change and transformation; teachers should be incorporated into the existing educational change; understanding the difference in the knowledge between students and teachers, noted by Felder R.M, [2005]; the usefulness of knowing learning style so far is controversial, differentiated instruction in adults (students of a specialty in medicine) is difficult, teachers consider and each of the

doctors has its well defined objective when choosing your specialty, so we thought that teachers can know the learning style of students and effective methods focus on your academic program, which involves combining different forms of instruction, between the student and the teacher how to strengthen knowledge.

The study propose has its limitations, which are related to the environmental and emotional state in which doctors were encountered during the implementation of the questionnaire; we believe if test were to be applied at a later time in the academic year, this would give equal or greater information

Like other authors as Felder we believe to be the most important application of learning styles, which is to help instructors design a balanced teaching approach that addresses the learning needs of their students. True instruction begins when instructors understand their students, so the difference is marked, as we agree with Vaughn L [2008].

CONCLUSION

It is difficult to apply a definition of learning style because it can change throughout life but is influenced by the social, emotional and physical environment. It is common to find a combination of different styles of learning. One learning style is not superior to others, being a matter of personal choice. We recognize that, in fact, most teachers and learners have a mixture of styles, even though one may predominate. As other authors, we consider that it is a good idea that the primary professor of the specialty knows the learning style of the students in order to adapt the teaching strategies to the students' needs. Teachers can use a better variety of educational strategies when they know the learning style of their students, even education to adults.

Practice points:

- It is common to find a combination of different styles of learning.
- One learning style is not superior to others, being a matter of personal choice.
- True instruction begins when instructors understand their students
- We live in a time that involves change and transformation; teachers should be incorporated into the existing educational change; understanding the difference in the knowledge between students and teachers

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