

Surgeons' Learning Style in Comparison to their Medical Colleagues

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ABSTRACT

Objectives: To present the learning style of surgeons and compare it to their medical colleagues.

Methods: This study was conducted at King Hussein Medical Center between 1-15/July 2014. An equal number of randomly selected surgeons and physicians received Honey and Mumford learning style questionnaire. The participants were asked to fill the questionnaire with their name initials, age, gender, specialty (surgeon or physician) and scientific medical level (specialist or consultant). The results between these two groups were compared using statistical methods.

Results: A total number of 40 participants filled the questionnaire, 20 in each group. Thirty six (90%) were males, with a mean age of 37.6 years (SD \pm 6.32). There were 7 consultants and 33 specialists. The majority (80-90%) of surgeons and physicians showed reflector and theorist learning styles. When grouping them into activist/ pragmatist, reflector/ theorist or mixed learning styles; 80% of surgeons and 90% of physicians demonstrated mixed learning style.

Conclusion: Both surgeons and physicians demonstrated a mixed learning style. This means that doctors in both specialties use all four learning styles which inevitably will bring the best learning results. We suggest the application and appreciation of all learning styles in the surgical curriculum as the most educational and practical approach.

Key words: Learning style, Surgeons, Physicians.

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Introduction

Learning style is the process by which a person understands and retains information, thereby gaining knowledge or skills.⁽¹⁾ Learning styles involve the cognitive processes that are implicated in learning, and can be thought of as "learning habits" that permit a learner to benefit more from some experiences than from others.⁽²⁾

Many types of learning styles have been

described in the literature,⁽³⁾ including Gardner's Multiple Intelligence Theory⁽⁴⁾ and Kolb's Learning Inventory.⁽⁵⁾ The Kolb model is the most widely used, statistically valid and reliable learning assessment tool. It function as a well-established model which allows the comparisons of learning styles across medical specialties and between training levels, and its experiential basis is particularly relevant to the apprenticeship model of surgical training.⁽⁶⁾

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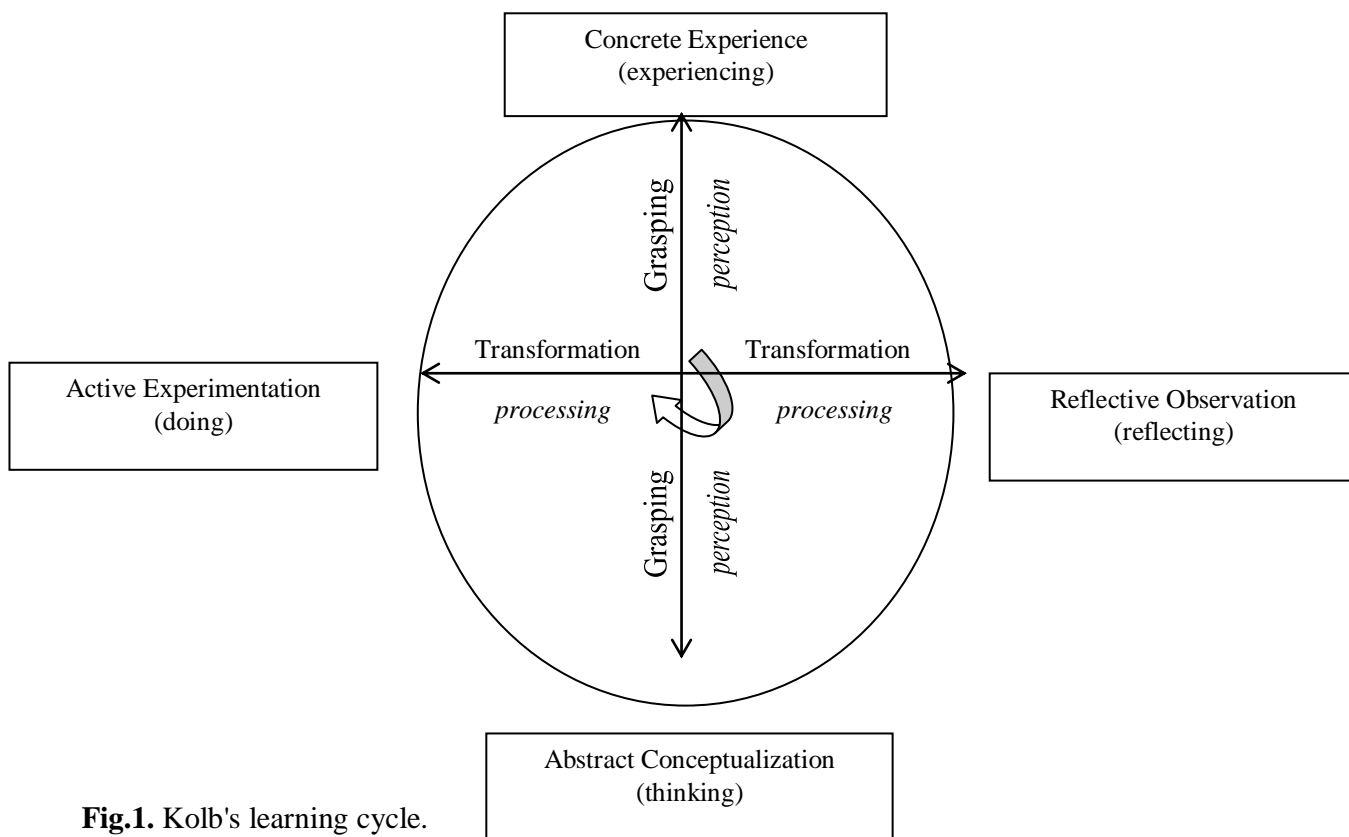


Fig.1. Kolb's learning cycle.

David Kolb⁽⁵⁾ hypothesized that differences in the way people learned had to do with the way they perceive and then process an experience.

According to Kolb, two dimensions are necessary for learning to occur. The first dimension is described as a grasping, or perceiving, and the second one as a transformation, or processing. He developed these dimensions into a learning cycle as a model of how people learn. The knowledge is gained by moving around a circular learning process involving four defined parts: concrete experience (experiencing), reflective observation (reflecting), abstract conceptualization (thinking) and active experimentation (doing).⁽⁶⁾ Fig. 1.

For example, the surgical trainee would experience the case during an operation in theater, reflect on this experience, read about the case and formulate ideas and, finally, experiment by applying change during his or her next encounter with the learning process.

Derived from experiential learning theory, Kolb developed a learning styles inventory to measure an individual's preferential learning style based

on the association between individual's preference for certain part of the cycle and his or her learning style.⁽⁷⁾ This inventory or list has been used in a number of studies on the learning styles of medical students, residents and health care professionals.⁽⁸⁻¹⁰⁾

Subsequently, Honey and Mumford developed their own validated learning style questionnaire (LSQ)⁽¹⁰⁾ that is based on Kolb's learning style inventory. They defined four overlapping learning styles: activist (concrete experience), pragmatist (active experimentation), reflector (reflective observation) and theorist (abstract conceptualization), Fig. 2. In their learning styles, activist prefer doing and experiencing, pragmatist like to "have a go", try things to see if they work, reflector observes and reflects and theorist wants to understand underlying reasons, concepts and relations.

The activists and pragmatists are located on one side of Honey and Mumford learning cycle, they prefer to learn by concrete experiencing and actively experimenting. On the other side of the learning cycle are the theorists and reflectors,

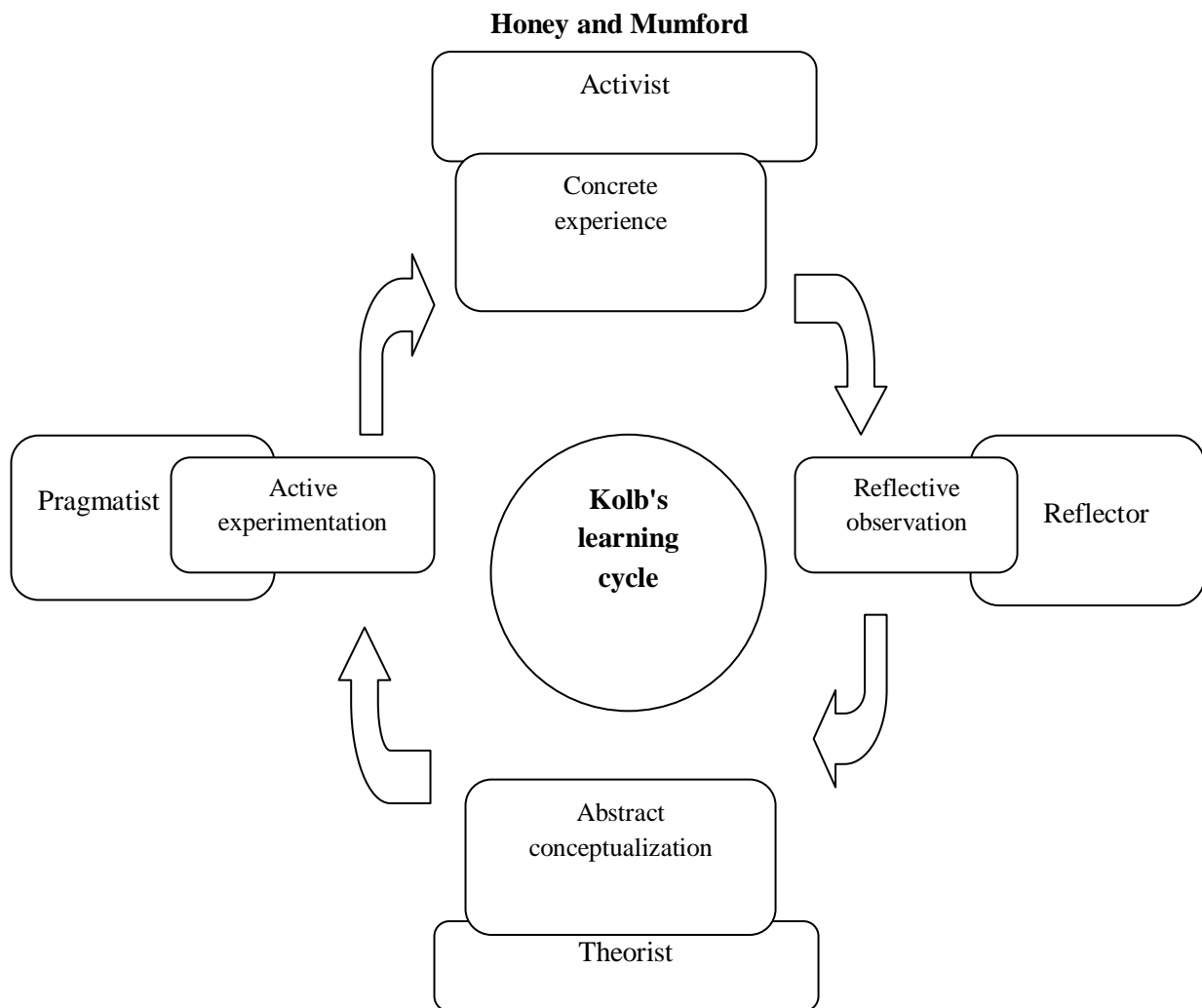


Fig. 2: Kolb's and Honey and Mumford learning cycles

they prefer learning by abstract conceptualization and reflective observation. Ideally, a learner should be able to use each of the four different kinds of styles in order to gain the most effective learning results for every particular situation. However, individuals tend to develop preferences for one or more of the four learning styles.

Most of surgical training involves "hands on" approach, which might show a preference for activist-pragmatist style of learning. This contrast to the medical training where the practice are more logical step-by-step thinking, collecting data, thoroughly reflecting on it before reaching a conclusion, i.e reflector-theorist learning styles.^(8,11)

The aim of our study was to identify surgeons' learning style at king Hussein Medical Center, and compare it to their medical colleagues.

Methods

This study was conducted between 1-15 July 2014 at King Hussein Medical Center. After obtaining ethical committee approval, the inclusion criteria to participate in the study was the completion of residency and achievement of the Jordan board exam in either general surgery or general medicine.

A Honey and Mumford LSQ was distributed among equal number of randomly selected surgeons and physicians. Learning styles were assessed anonymously. The participants were asked to fill the questionnaire with their name initials, age, gender, specialty (surgery or medicine) and scientific level (specialist or consultant), and return the questionnaire after completion. All LSQ answers were marked by one author (AU).

Table I: Demographics of the study population.

	Surgeons	Physicians	Total (%)	P
Males	19	17	36(90)	0.00005
Females	1	3	4(10)	
Mean age (years)	34.7	40.5	37.6	0.001
Consultant	1	6	7(17.5)	0.007
Specialist	19	14	33(82.5)	

Table II: Distribution of learning style preferences by specialty.

Style	Surgeons (%)	Physicians (%)	Total (%)	P
Activist	12 (60%)	13 (65%)	25 (63%)	0.74
Pragmatist	13 (65%)	11 (55%)	24 (60%)	0.52
Reflector	18 (90%)	18 (90%)	36 (90%)	NS
Theorist	16 (80%)	18 (90%)	34 (85%)	0.3

Table III: Distribution of learning style preferences by age, gender and scientific level.

Style	Mean age (years)	Gender M: F	Scientific level Consultant: Specialist
Activist	37.4	23: 2	5: 20
Pragmatist	37.2	22: 2	4: 20
Reflector	37.5	32: 4	6: 35
Theorist	38.2	32: 2	7: 27

This questionnaire consists of 80 questions that measures respondents' agreement with different statements to analyze their preference for particular learning style.⁽¹²⁾ One point was scored for the agreement of the statement and no points for disagreement. Then points were added and each individual's profile calculated (activist, pragmatist, reflector or theorist). The preference was graded as follow: very strong, strong, moderate, low and very low preferences. Participants with a very strong or strong preference for any learning style were selected as having a preference for that particular style of learning.

They were then grouped into three groups; first group with an activist / pragmatist preference, second group with reflector/ theorist preference and the last group with mixed learning style preference.

The results were analyzed using SPSS 16 (SPSS Inc. Chicago, IL, US). Chi-square test was used to determine any relationship between two variables ie. learning style and either specialty, scientific level, age and gender. Student's t-test was used to compare between surgeons and physicians in regard of age, gender and scientific

level. P-value less than 0.05 was considered significant.

Results

Overall survey response rate was 100% (40/40); 20 participants from each specialty returned their questionnaire. There were 36 (90%) males and the mean age for the whole group was 37.6 years (SD 6.32), with a total of 33 specialists and 7 consultants, Table I.

The LSQ results showed that reflector and theorist learning styles were favored by surgeons (90% for reflector and 80% for theorist styles) and by the physicians (90% for reflector and 90% for theorist styles), with no statistical differences between the two groups, Table II. The mean age among surgeon and physicians for different learning styles preference is reported in Table III. The mean age for the preference for the pragmatist style was 37.2 years, and it was 38.2 years for the theorist style. The preference of learning styles by gender showed that half of the female doctors preferred activist, pragmatist and theorist learning styles, while all 4 of them (100%) showed preference for reflector style. Male doctor's results ranged from 61%

Table IV: The difference of learning styles by specialty, age, gender and scientific level.

Style	Surgeon (%)	Physicians (%)	Mean age (years)	Gender (M: F)	Level (Consultant: Specialist)
Activist/ Pragmatist	2 (10%)	0	33.5	2: 0	0: 2
Reflector/ Theorist	2 (10%)	2 (10%)	38	3: 1	0: 4
Mixed	16 (80%)	18 (90%)	37.8	31: 3	7: 27

preference for pragmatist style to 89% preference for reflector style. In addition, all consultants preferred reflector learning style compared to only 82% of specialists, Table III.

When grouping the learning styles into activist/pragmatist, theorist/ reflector or mixed, we noticed that only two surgeons and no physicians have the preference for activist/ pragmatist learning styles. In addition, 2 surgeons and 2 physicians have the preference for theorist / reflector learning styles. However, 16 surgeons and 18 physicians have mixed learning styles. There was no statistical difference between learning style groups and specialty, age, gender and scientific level, Table IV.

Discussion

In order to produce competent and successful surgeons, it is important to consider not only what they are learning but how they are doing so. Many evidence demonstrated that surgical trainees have specific learning styles and identifying and focusing on these has the potential to improve the delivery of surgical education.^(13,14) Studies in general surgery have shown that the predominant learning styles of surgical trainees is activist and pragmatist, i.e they learn by doing, involve themselves fully and without bias in new experiences, they try out new ideas, theories and techniques to see if they work.⁽¹³⁻¹⁵⁾

Our study demonstrated that the main learning styles of surgeons are reflector and theorist, 90% and 80% respectively. These two learning styles were also predominant among physicians, 90% each. The reflector style was prevalent among specialists and consultants. This suggests that the majority of specialists and consultants in both specialties take time to think over experiences and observe them from many different perspectives. They collect data, both first hand and from others, and prefer to think about it thoroughly before coming to a

conclusion. However, we cannot make any solid conclusions regarding the preferred learning style of either surgeons or physicians, males or females, consultants or specialists because the majority showed mixed learning style.

The surgical specialty is a "hands on" profession. Surgeons spend most of their careers in theaters operating. We assume that during the first years of the residency, junior trainees learn the basic concepts of surgery, i.e anatomy, normal and abnormal physiology of the human body, etc, they see the operation, listen to explanation from the surgeon and read about it. At this time the theorist/ reflector learning style will dominate. In more senior years, residents will display the activist/ pragmatist styles, they will learn from the practical procedure itself. They will be able to learn efficiently from assisting in a demonstration and then performing the procedure under direct supervision and later by themselves. A study by Engels et al¹¹ showed significant differences in learning styles between undergraduate medical students and general surgery residents and faculty members. The undergraduates demonstrated a theorist learning style while the residents and faculty showed the activist/ pragmatist learning styles.

However, if a resident is struggling to learn how to perform a procedure in theaters, then it is important to consider if he or she has a more theorist/ reflector style. In this case, and prior to the operation, teaching should be focus on discussion of and reading the principles of the procedure prior to it and formalized reflection afterwards.

Our results showed two main differences to other reports^(1,16) that demonstrated that the predominant learning style of surgeons are activist and pragmatist. First, only 10% of surgeons showed activist/ pragmatist learning styles and second, the majority of participants in the survey demonstrated mixed style of learning. These variations in learning styles among

surgeons at our institution that is different from published literature could be explained by the variety of learning styles used by senior surgeons, trainers and consultants that are involved in training the surgical residents. In addition, the resident go through all learning styles during his progress from year one to year five of residency. As discussed earlier we presume that he or she starts with reflector/ theorist learning style and finishes with more practical training, i.e activist/ pragmatist style of learning. We need to understand the learning styles of the residents and how it evolves during the residency years, and how to manipulate it in order for the trainees to gain maximum benefit from their residency program.

Our recommendation is that the LSQ could be used to assess the learning style of the residents during different stages of training, and identify changes in the trainees' learning styles. In addition, knowing the range of the learning styles of residents will help to improve the teaching and learning process by alteration methods of teaching to adapt individual's learning capabilities.

Limitations of the study

Small number of participants and single institution participation in the survey.

Conclusion

Our study demonstrated that both surgeons and physicians have mixed styles of learning. Using all learning styles during residency and afterwards inevitably will bring the best learning results. For surgeons, the reflector/ theorist style will lead to better understanding the theories of surgical science and its applications, and the activist/ reflector style will produce a competent and confident surgeons in theaters. Future studies will highlight the learning styles of the residents and how it changes during their training years. This will guide to develop the residents' training curriculum for both specialties taking into consideration different learning styles.

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