Original Article

Learning Styles of Fresh Clinical Students in Ophthalmology at the University of Ibadan, Nigeria: A Pilot Study

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Abstract

Background: The College of Medicine, University of Ibadan, Nigeria, is using a new curriculum for its learners. Therefore, knowing the learning styles of the learners will help the teachers formulate appropriate teaching strategies. The aim of the pilot study was to determine the learning styles of the 1st-year clinical students rotating through ophthalmology with a view to recommending appropriate teaching strategies to the teachers for the smooth running of the new curriculum. **Methodology:** The first fifty set of students sent to the department of ophthalmology for ophthalmology rotation was used as a pilot. A total of 47 students completed the study. Three students voluntarily did not participate in the study. **Design:** VARK questionnaire-assisted testing of learning styles was used for the study. It consists of 16 questions with four options testing each domain of visual (V), auditory (A), write or reading (R), and kinesthetic (K) ways of learning. Multiple responses were allowed. The total responses were computed at the end to give an idea of the learning styles of the students. **Results:** A total of 1192 responses were received from 47 students (25 males and 22 females), with a male-to-female ratio of 1.1:1. The Auditory and kinesthetic ways of learning were responsible for 669 (56%) responses. There was no statistically significant difference among the sexes. **Conclusion:** The most preferred learning styles were the auditory and kinesthetic ways of learning. Teachers should consider direct instructions and more hands-on teaching of their students while formulating a teaching plan.

Keywords: Auditory, kinesthetic, learning styles, medical students, teaching, VARK questionnaire

Introduction

Medical education is evolving in the millennial era. The old traditional way of teaching needs to be reviewed. Whole-class teaching has been reported to be associated with the poor attention span of students.[1] Gardner,[2] in his work, found that learners are unique in their own way. They learn differently due to their different specific gifts and intelligence. Teachers need to know the learning styles of their students to be effective teachers. While some students prefer the visual way of learning (visual), some learn best when they hear specific instructions (auditory). A set of students prefer to read on their own (read), whereas some prefer hands-on learning (kinesthetic). The subject of the VARK learning styles of learners should be considered by teachers before teaching.[3]

The medical education curriculum of the University of Ibadan has just been reviewed to include system-based learning. This is geared toward improved learning. Whole-class teaching is still being practiced. However, knowing the learning styles of each student will further lead to improved learning. Individualized teaching is better than whole-class teaching.

The aim of this pilot study was to determine the learning styles of the new clinical students rotating through the ophthalmology department and suggest ways of modifying their teaching to suit their learning styles.

Methodology

Population

Fifty MBBS clinical students who had just completed their preclinical studies were used as a pilot into the study after

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informed consent was obtained. They were the first set of fifty students sent to the department of ophthalmology for their rotation. Three students refused to participate in the study for personal reasons. A total of 47 students completed the study.

Design

VARK questionnaire-assisted testing of learning styles was used for the study. The questionnaire is validated for testing learning styles.[4] The VARK questionnaire [attached to this paper as Appendix 1] consists of 16 multiple choice questions, each having four choices. Each choice corresponds to one of the four sensory modalities which are measured by VARK (i.e., visual, aural/auditory, read/write, and kinesthetic). Respondents are requested to select the option that best suits their preference. They are, however, allowed to choose more than one option if a single answer does not match their perception. Thus, each respondent is expected to give a minimum of 16 responses, and each response is allocated a score. The total number of responses corresponding to each of the VARK categories is then computed to give an idea of the learning styles of the students. The questionnaire provides a guide on computing the scores and is attached.

Results

A total of 1192 responses were received from 47 students (25 males and 22 females), with a male-to-female ratio of 1.1:1. Each question has four options; students are allowed to give multiple responses based on their learning styles. The range of the number of responses per student was between 12 and 52. The mean number of responses was 25.4, while the median was 23 with a mode of 16. The distributions of the responses are presented in Table 1a and b.

Fourteen (29.8%) students were unimodal in their learning preference, whereas the remaining 33 (70.2%) students were multimodal. The auditory (35.7%) and kinesthetic (28.6%) styles were the most preferred unimodal styles. Overall, the students preferred the auditory and kinesthetic way of learning more than the reading and visual styles. However, the majority of students use multiple ways of learning. The responses showed similar preferences from both sexes.

Further analysis of those scoring 10 and above per learning styles revealed that 12 of 33 (36.4%) students were predominantly kinesthetic learners, 11 of 33 (33.3%) students were auditory, 6 of 33 (18.2%) students were visual, and 4 of 33 (12.1%) students for reading. This is summarized in Figure 1.

Discussion

This study showed that most 1st-year clinical students in this study use a combination of learning styles for effective education, with some students having a preference for one or the other. This is supported by previous studies.[5-7] This may infer that students prefer a mixture of approaches for effective learning.

Table 1a: VARK questionnaire results

Student number	VARK responses	Total responses
1	V=4, A=6, R=7, K=6	23
2	V=13, A=9, R=9, K=13	44
3	V=1, A=9, R=3, K=8	21
4	V=6, A=11, R=7, K=11	35
5	V=9, A=7, R=12, K=10	38
6	V=4, A=7, R=6, K=6	23
7	V=12, A=10, R=7, K=10	39
8	V=9, A=11, R=7, K=9	36
9	V=3, A=7, R=1, K=4	15
10	V=2, A=5, R=4, K=5	16
11	V=1, A=5, R=2, K=10	18
12	V=2, A=7, R=5, K=3	17
13	V=8, A=1, R=8, K=8	25
14	V=4, A=4, R=3, K=5	16
15	V=4, A=4, R=5, K=9	22
16	V=5, A=14, R=9, K=11	39
17	V=10, A=12, R=11, K=12	45
18	V=5, A=9, R=6, K=4	24
19	V=5, A=5, R=5, K=9	24
20	V=9, A=7, R=3, K=5	24
21	V=5, A=9, R=4, K=10	28
22	V=3, A=4, R=3, K=5	15
23	V=7, A=7, R=5, K=6	25
24	V=5, A=7, R=3, K=5	20
25	V=3, A=11, R=2, K=9	25
26	V=14, A=13, R=14, K=11	52
27	V=2, A=8, R=4, K=7	21
28	V=3, A=7, R=6, K=8	24
29	V=5, A=1, R=9, K=7	22
30	V=1, A=5, R=2, K=8	16
31	V=8, A=7, R=13, K=5	33
32	V=7, A=3, R=3, K=3	16
33	V=6, A=4, R=2, K=4	16
34	No response	
35	No response	
36	V=2, A=6, R=1, K=7	16
37	V=7, A=8, R=5, K=8	28
38	V=5, A=4, R=2, K=2	13
39	V=4, A=13, R=4, K=8	29
40	V=8, A=11, R=9, K=10	38
41	V=3, A=1, R=8, K=4	16
42	V=10, A=6, R=6, K=7	29
43	V=2, A=8, R=4, K=5	19
44	V=2, A=4, R=6, K=4	16
45	V=10, A=14, R=13, K=10	47
46	V=2, A=3, R=3, K=4	12
47	V=4, A=3, R=8, K=5	20
48	V=4, A=12, R=8, K=12	36
49	No response	
50	V=4, A=6, R=4, K=2	16
Total	V=252; A=335; R=271; K=334	1192

V: Visual, A: Auditory, R: Write or reading, K: Kinesthetic

Two-third of the students had predominant learning styles with kinesthetic and auditory styles responsible for almost half of

Table 1b: Learning styles in fresh clinical students in Ibadan

Styles	Number of responses (%)
A	335 (28.1)
K	334 (28)
R	271 (22.8)
V	252 (21.1)
Total	1192 (100)

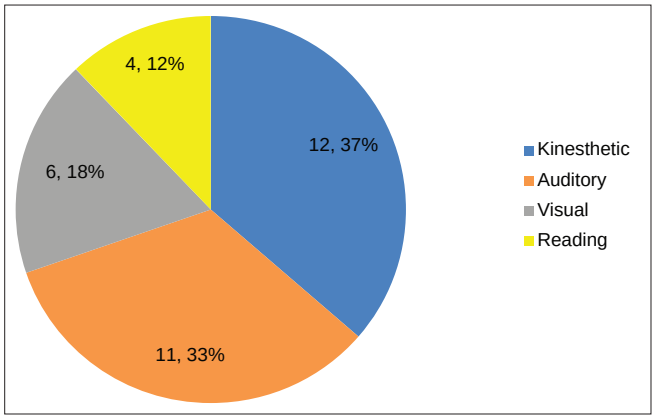

Figure 1: Predominant learning styles (students scoring 10 or more)

the responses. It is, therefore, noteworthy that students may prefer a hands-on system of teaching with direct instructions to maximize the learning process. Previous studies showed similar results.[5,7] Visual ways of learning were found to predominate among medical students in Saudi Arabia.[6] However, 8 of 47 (17%) students scored 7 and above in the four learning categories making them multimodal in their mode of learning. The teacher may need to identify this set of students and employ multiple teaching methods.

Among those that preferred the unimodal style of learning, auditory and kinesthetic styles were the two predominant learning styles. This is similar to a study by Balasubramaniam and Indhu,[5] but contrary to a study by Kharb *et al*.[7] where kinesthetic and visual modes were the most preferred styles of learning.

Surprisingly, the visual mode of learning was the least preferred by the students. The visual way of learning was found to predominate among clinical students in Saudi Arabia,[6] but the study found no identifiable reason why the visual mode of learning predominates. Conversely, in Iran, a neighboring country, the auditory mode of learning predominates.[8] The availability of audiovisual materials such as computers, tablets, and electronic boards may have contributed to the preference in Saudi Arabia. The use of PowerPoint presentation is a common mode of teaching in view of its visual components. This study suggests that students may not completely prefer this mode of learning. Therefore, this set of students may prefer other modalities of teaching. Hands-on teaching sessions and demonstration of clinical signs alongside bedside teachings may appeal to these set of students in ophthalmology.

In another study by Kharb *et al*.,[7] kinesthetic and visual modes were the most preferred styles of learning. It is, therefore, important for teachers in specific disciplines to identify the learning styles preferred before teaching. The dermatologist may prefer to utilize the visual mode of learning to teach, whereas the cardiologist may prefer the auditory mode.[9]

Medical educators need to change their orientation about teaching and learning. The first step is accepting to change and seek further training on modern teaching methods based on the learning preferences of learners. The teachers should identify the learning styles of their students before formulating a teaching plan. This can be done using validated questionnaires assessing learning styles. This will improve learning and teaching. In a study by Stasio,[10] about 65% of the millennial learners learn outside the formal classroom. The teachers need to develop new ways of teaching. Teachers often show resistance to change.[11,12] Furthermore, teachers should step down from being the "sage on the stage," allow the learners to air their views, learn from themselves, and construct knowledge.[13]

The use of media discussion platforms such as WhatsApp, Edmodo, and other established teaching platforms should be explored to improve contact time with the learners. The millennial learners are not ready to learn the traditional way in this digital age. They are the digitalized students in constant touch with mobile phones, pads, and social media. The teachers should then teach learners the way they want to be taught.

Conclusion

This pilot study has shown that first-year clinical students in ophthalmology posting from the University of Ibadan have multimodal ways of learning with a preference for kinesthetic and auditory ways of learning. The teacher needs to identify the learning styles of students to fully maximize the teaching. More studies in this area may be of benefit to medical educators. A more extensive study covering a wider study area of the remaining parts of the country is underway.

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Conflicts of interest

There are no conflicts of interest.

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Appendix

Appendix 1: VARK questionnaire

The VARK Questionnaire (Version 7.8)

How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it.
Please circle more than one if a single answer does not match your perception.
Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, the center of town or railway station. You would:
    a. go with her.
    b. tell her the directions.
    c. write down the directions.
    d. draw, or show her a map, or give her a map.
2. A website has a video showing how to make a special graph. There is a person speaking, some lists and words describing what to do and some diagrams. You would learn most from:
    a. seeing the diagrams.
    b. listening.
    c. reading the words.
    d. watching the actions.
3. You are planning a vacation for a group. You want some feedback from them about the plan. You would:
    a. describe some of the highlights they will experience.
    b. use a map to show them the places.
    c. give them a copy of the printed itinerary.
    d. phone, text or email them.
4. You are going to cook something as a special treat. You would:
    a. cook something you know without the need for instructions.
    b. ask friends for suggestions.
    c. look on the Internet or in some cookbooks for ideas from the pictures.
    d. use a good recipe.
5. A group of tourists want to learn about the parks or wildlife reserves in your area. You would:
    a. talk about, or arrange a talk for them about parks or wildlife reserves.
    b. show them maps and internet pictures.
    c. take them to a park or wildlife reserve and walk with them.
    d. give them a book or pamphlets about the parks or wildlife reserves.
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
    a. Trying or testing it.
    b. Reading the details or checking its features online.
    c. It is a modern design and looks good.
    d. The salesperson telling me about its features.
7. Remember a time when you learned how to do something new. Avoid choosing a physical skill, eg. riding a bike. You learned best by:
    a. watching a demonstration.
    b. listening to somebody explaining it and asking questions.
    c. diagrams, maps, and charts - visual clues.

d. written instructions – e.g. a manual or book.

8. You have a problem with your heart. You would prefer that the doctor:
   a. gave you a something to read to explain what was wrong.
   b. used a plastic model to show what was wrong.
   c. described what was wrong.
   d. showed you a diagram of what was wrong.
9. You want to learn a new program, skill or game on a computer. You would:
   a. read the written instructions that came with the program.
   b. talk with people who know about the program.
   c. use the controls or keyboard.
   d. follow the diagrams in the book that came with it.
10. I like websites that have:
   a. things I can click on, shift or try.
   b. interesting design and visual features.
   c. interesting written descriptions, lists and explanations.
   d. audio channels where I can hear music, radio programs or interviews.
11. Other than price, what would most influence your decision to buy a new non-fiction book?
   a. The way it looks is appealing.
   b. Quickly reading parts of it.
   c. A friend talks about it and recommends it.
   d. It has real-life stories, experiences and examples.
12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
   a. a chance to ask questions and talk about the camera and its features.
   b. clear written instructions with lists and bullet points about what to do.
   c. diagrams showing the camera and what each part does.
   d. many examples of good and poor photos and how to improve them.
13. Do you prefer a teacher or a presenter who uses:
   a. demonstrations, models or practical sessions.
   b. question and answer, talk, group discussion, or guest speakers.
   c. handouts, books, or readings.
   d. diagrams, charts or graphs.
14. You have finished a competition or test and would like some feedback. You would like to have feedback:
   a. using examples from what you have done.
   b. using a written description of your results.
   c. from somebody who talks it through with you.
   d. using graphs showing what you had achieved.
15. You are going to choose food at a restaurant or cafe. You would:
   a. choose something that you have had there before.
   b. listen to the waiter or ask friends to recommend choices.
   c. choose from the descriptions in the menu.
   d. look at what others are eating or look at pictures of each dish.
16. You have to make an important speech at a conference or special occasion. You would:
   a. make diagrams or get graphs to help explain things.
   b. write a few key words and practice saying your speech over and over.
   c. write out your speech and learn from reading it over several times.
   d. gather many examples and stories to make the talk real and practical.

The VARK Questionnaire Scoring Chart

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers

e.g. If you answered b and c for question 3, circle V and R in the question 3 row.

Question	a category	b category	c category	d category
3	K	V	R	A

Scoring Chart

Question	**a** category	**b** category	**c** category	**d** category
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A
7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

Calculating your scores

Count the number of each of the VARK letters you have circled to get your score for each VARK category.

Total number of **V**s circled =	
Total number of **A**s circled =	
Total number of **R**s circled =	
Total number of **K**s circled =	