

# RESEARCHING STUDENTS' LEARNING STYLES FOR IMPROVING TEACHING STRATEGIES

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## *Abstract*

*The present paper aims to achieve a qualitative marketing research on the learning styles of my group of students with the purpose of improving teaching strategies using the VARK questionnaire. On the one hand, it helps students know their own learning styles, and, on the other hand, it helps me, as a teacher, to differentiate my teaching strategies according to the class I teach.*

*In the end, the paper offers suggestions for classroom activities using teaching strategies according to students learning styles; and suggests avenues for future research.*

## **I. Introduction**

The role of the teacher is not limited to transmitting information, but extends to the use of strategies able to teach the students how to learn. Teaching strategies should be consistent with the learning styles of the class and contain activities that stimulate all students.

The ultimate criterion for evaluating teaching is student learning. John Dewey said, 'Teaching is like selling; you can't have a sale unless someone buys. You haven't taught unless someone has learned'. Not that student learning is simply a function of the teacher. Students need to work on knowing and improving their own learning style.

This paper aims to achieve a qualitative marketing research on the learning styles of my group of students with the purpose of improving teaching strategies using the VARK questionnaire. On the one hand, it helps students know their own learning styles, and, on the other hand, it helps me, as a teacher, to differentiate my teaching strategies according to the class I teach.

After presenting researches in the field of learning styles, the paper presents research methodology and research results after administering the VARK questionnaire to my group of

students. It also presents effective strategies for improving class learning styles and practical solutions in helping students recognize their learning styles. Accommodating different learning styles is a goal pursued by me as a teacher, since many times I had to work with students having different learning styles. Presenting the favorite strategies corresponding to each learning situation, students can perfect their learning style in order to become effective.

Differentiation - An approach to teaching and learning strategies is an attempt to customized teaching to all student learning styles, to offer and to use differentiated techniques and to conceive teaching strategies corresponding to each student's individual learning style.

In the end I offer suggestions for classroom activities using teaching strategies according to students learning styles; and suggest avenues for future research.

## **II. Learning styles state of knowledge**

The term *learning styles* refers to individuals' characteristic and preferred ways of gathering, interpreting, organizing, and thinking about information (Davis, 1993:185).

Learning styles approaches involve educating methods, particular to an individual that are presumed to allow that individual to learn best. It is commonly believed that most people favor some particular method of interacting with, taking in, and processing information. Based on this concept, the idea of individualized "learning styles" originated in the 1970s, and has gained popularity in recent years. It has been proposed that teachers should assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style.

The David Kolb styles model is based on the Experiential Learning Theory, as explained in David A. Kolb's book *Experiential Learning: Experience as the source of learning and development* (1984). The ELT model outlines two related approaches toward grasping experience: Concrete Experience and Abstract Conceptualization, as well as two related approaches toward transforming experience: Reflective Observation and Active Experimentation. According to Kolb's model, the ideal learning process engages all four of these modes in response to situational demands. In order for learning to be effective, all four of these approaches must be incorporated. As individuals attempt to use all four approaches, however, they tend to develop strengths in one experience-grasping approach and one experience-transforming approach. The resulting learning styles are combinations of the individual's preferred approaches. These learning styles are as follows: Converger, Diverger, Assimilator, and Accommodator.

In terms of classroom activities, convergers tend to prefer solving problems that have definite answers. Divergers may benefit more from discussion groups and working collaboratively on projects. Assimilators would feel more comfortable observing, watching role plays and simulations in class, and then generating concepts. Accomodators may prefer hands-on activities.

In the mid 1970's Peter Honey and Alan Mumford adapted David Kolb's model for use with a population of middle/senior managers in business. They published their version of the model in *The Manual of Learning Styles* (1982) and *Using Your Learning Styles* (1983).

Two adaptations were made to Kolb's experiential model. Firstly, the stages in the cycle were renamed to accord with managerial experiences of decision making/problem solving. The Honey and Mumford stages are: (1) Having an experience, (2) Reviewing the experience, (3) Concluding from the experience, and (4) Planning the next steps.

Secondly, the styles were directly aligned to the stages in the cycle and named Activist, Reflector, Theorist and Pragmatist. These are assumed to be acquired preferences that are adaptable, either at will or through changed circumstances, rather than being fixed personality characteristics. The Honey & Mumford *Learning Styles Questionnaire* is a self-development tool and differs from Kolb's Learning Style inventory by inviting managers to complete a checklist of work-related behaviors without directly asking managers how they learn.

Gregorc and Butler worked to organize a model describing how the mind works in their book entitle 'Applying What We Know: Student Learning Styles'. This model is based on the existence of perceptions - our evaluation of the world by means of an approach that makes sense to us (Gregorc, 1979). These perceptions in turn are the foundation of our specific learning strengths, or learning styles.

In this model, there are two perceptual qualities: (1) concrete and (2) abstract; and two ordering abilities: (1) random and (2) sequential.

Concrete perceptions involve registering information through the five senses, while abstract perceptions involve the understanding of ideas, qualities, and concepts which cannot be seen.

In regard to the two ordering abilities, sequential involves the organization of information in a linear, logical way and random involves the organization of information in chunks and in no specific order.

There are four combinations of perceptual qualities and ordering abilities based on dominance: 1) Concrete Sequential; 2) Abstract Random; 3) Abstract Sequential; 4) Concrete Random. Individuals with different combinations learn in a different ways, they have different

strengths, different things make sense to them, different things are difficult for them, and they ask different questions throughout the learning process.

Aiming to explain why aptitude tests, school grades, and classroom performance often fail to identify real ability, Robert J. Sternberg listed various cognitive dimensions in his book *Thinking Styles* (1997). Several other models are also often used when researching learning styles. This includes the Myers Briggs Type Indicator (MBTI).

Few teachers would deny that their students are very different individuals and that not only intelligence, aptitude, and prior preparation, but also personality differences frequently translate into diverse responses to teaching methods. Surely we remember professors who we found inspiring and effective when we were students but were not so admired by many of our peers. Did we, long ago, welcome group projects or dread them? Did we love discussions or prefer lectures? Did we like objective tests or pray for essays? Given the indisputable and often delightful personality differences among students today, can teachers turn these differences to their advantage – and, more to the point, to the students' advantages?

One of the best and most proven ways to take student personality factors into account in college teaching is with the psychological types as measured by the Myers-Briggs Type Indicator (MBTI). The growth in the use of this instrument over the last fifteen years has been dramatic. Students who have a disability, particularly a learning disability, are a rapidly growing population on college campuses. Though it is difficult to obtain accurate figures, between 3 and 10 percent of college students report having physical or learning disabilities that require compensatory classroom teaching accommodations (Davis, 1993:31). Such accommodations are neither difficult to provide nor distracting to the rest of the class. In fact, many of these may learn easier for all your students. Regarding this issue, *Montessori* is a revolutionary method of observing and supporting the natural development of children. Montessori educational practice helps children develop creativity, problem solving, critical thinking and time-management skills, to contribute to society and the environment, and to become fulfilled persons in their particular time and place on Earth.

One of the most common and widely-used categorizations of the various types of learning styles is Fleming's VARK model which expanded upon earlier Neuro-linguistic programming (VAK) models: (1) visual learners, (2) auditory learners, (3) reading/writing learners, (4) kinesthetic learners.

Fleming claimed that visual learners have a preference for seeing (think in pictures; visual aids such as overhead slides, diagrams, handouts, etc.). Auditory learners' best learn through listening (lectures, discussions, tapes, etc.). Tactile/kinesthetic learners prefer to learn via experience – moving, touching, and doing (active exploration of the world; science projects; experiments).

Its use in pedagogy allows teachers to prepare classes that address each of these areas. Students can also use the model to identify their learning style and maximize their educational experience by focusing on what benefits them the most.

Learning-style theories have been criticized by many. Some psychologists and neuroscientists have questioned the scientific basis for these models and the theories on which they are based. Writing in the Times Educational Supplement Magazine (29 July 2007), Susan Greenfield said that ‘from a neuroscientific point of view the learning styles approach to teaching is nonsense’.

According to Stahl, there has been an ‘utter failure to find that assessing children's learning styles and matching to instructional methods has any effect on their learning’. Guy Claxton has questioned the extent that learning styles such as VAK are helpful, particularly as they can have a tendency to label children and therefore restrict learning.

In their book, ‘Teaching Students through Their Individual Learning Styles: A Practical Approach’, Rita Dunn and Kenneth Dunn give a background of how learners are affected by elements of the classroom and follow it with recommendations of how to accommodate students’ learning strengths. Dunn and Dunn write that ‘learners are affected by their: (1) immediate environment (sound, light, temperature, and design); (2) own emotionality (motivation, persistence, responsibility, and need for structure or flexibility); (3) sociological needs (self, pair, peers, team, adult, or varied); and (4) physical needs (perceptual strengths, intake, time, and mobility)’.

Although learning styles will inevitably differ among students in the classroom, Dunn and Dunn say that teachers should try to make changes in their classroom that will be beneficial to every learning style. Some of these changes include room redesign, the development of small-group techniques, and the development of Contract Activity Packages. Redesigning the classroom involves locating dividers that can be used to arrange the room creatively.

Analyzing the different theories and models of learning styles a question arises: ‘Is there any connection between these theories?’ We can say that VARK is about preferences which are a part of the Myers-Briggs Personality Type Indicator but VARK is structured specifically to improve learning and teaching. David Kolb's Experiential Cycle is a model of cognitive processing – how we process learning in the brain whereas VARK is about our preferences for taking information into the brain and communicating them ‘outside’. Gardner's Multiple Intelligences Theory is another cognitive model and it includes some of the VARK modalities as ‘intelligences’ and extends that list to at least five other dimensions. Sometimes the link between VARK and these theories appears to be quite strong but VARK has its own focus, rationale and strategies.

### **III. Researching learning style preferences among undergraduate economics students**

Students have individual learning style preferences including visual (V; learning from pictures, posters, graphs, diagrams, charts, and flow charts), auditory (A; learning from speech, attending discussions and tutorials, discussing topics with others), read-write (R; learning from reading and writing notes, handouts, and textbooks), and kinesthetic (K; learning from touch, hearing, smell, taste, and sight). These preferences can be assessed using the VARK questionnaire.

#### **3.1 Research methodology**

I administered the VARK questionnaire to my undergraduate economics students (the questionnaire is presented in annex no.1) from Faculty of Commerce, 2<sup>nd</sup> year of study, group 323, discipline of study Tourism Economy. The questionnaire was completed in class during the last seminar (date: 20 of January 2010) and the sample size (**n**) was 30 students (the entire class returned the completed questionnaire voluntarily). I announced before that in the last seminar I will present the score for each student for the Tourism Economy discipline and that they can complete a learning style questionnaire only if they wish to participate in my research.

The method used in this study defines the preference in learning style based on the sensory modality in which a student prefers to take in new information. The three major sensory modalities are defined by the neural system that is preferred when receiving information: visual (V), aural (A), and kinesthetic (K), collectively known as VAK. In other words, VAK categorizes student learning based on the sensory preference of the individual. This classification system was recently expanded by Fleming to VARK to include another category: read-write (R, a mixed sensory modality that is not assessed under VAK).

Students with a V preference learn best by seeing or observing (drawings, pictures, diagrams, demonstrations, etc). Learners that prefer A are best suited to learn by listening to or recording lectures, discussing material, and talking through material with themselves or others. R-type learners learn through interactions with textual materials. K-style learners perform best by using physical experiences: touching, performing an activity, moving, lessons that emphasize doing, and manipulation of objects. Student learners are capable of using all of these sensory modes of learning; however, each individual has a unique preference, or set of preferences, in which one mode is often

dominant. Learners with a single learning style preference are referred to as unimodal, whereas others preferring a variety of styles are known as multimodal. Of the multimodal learners, there are subclassifications for bi-, tri-, and quadmodal learners, who prefer to use two, three, or four styles, respectively.

**My research objective:** I was interested in assessing the preferred learning styles of my class 323 in order to adapt my teaching strategies to the learning particularities of my group of students. The knowledge of student preferred learning styles is vital if we, as teachers, are to provide tailored strategies for individual students. Knowing students' preferred learning style also helps to overcome the predisposition of many teachers to treat all students in a similar way as well as motivate teachers to move from their preferred mode(s) to using others. In so doing, they can reach more students because of the better match between teacher and learner styles. It is essential that a lecturer's teaching style provide access for students with different learning styles during the experiences of a course.

Regarding the research type is qualitative research (only apply to my class and it's used for that particular reason). The hypotheses are generated according to the research findings and results. My research can help teachers to follow my example and recognize their students' learning preferences.

The respondents' profile: *gender* - male 40%, female 60%; *age* - 20 to 21; *environment* - 63.33% urban and 36.67% rural; and 13.33% with *scholarship*.

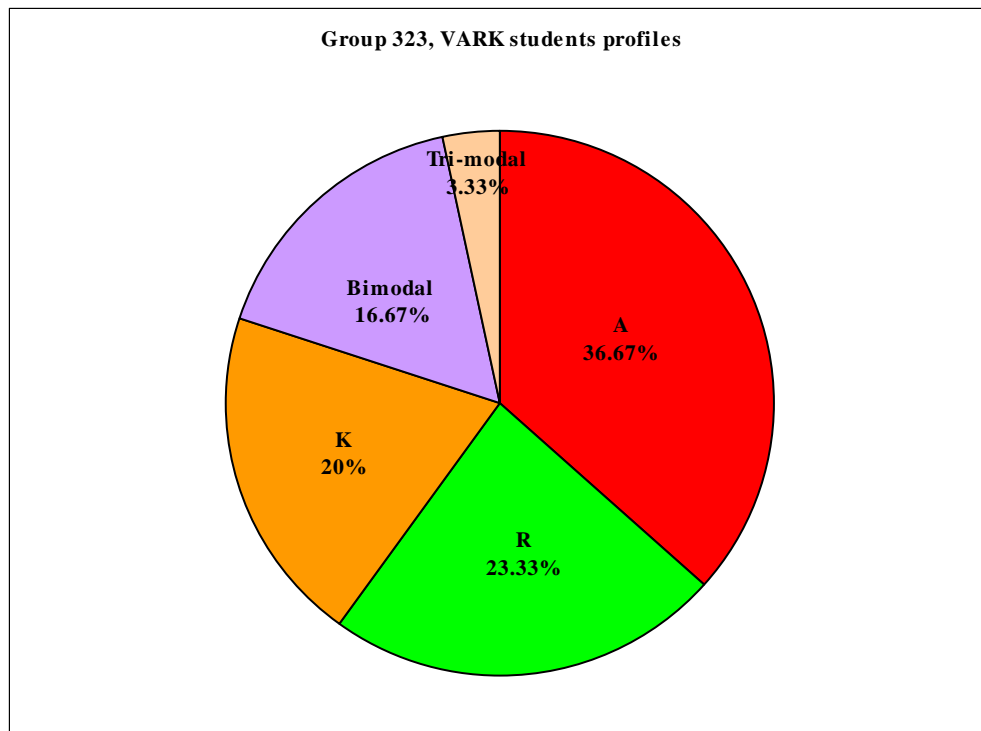
### 3.2 Results

My class results presented in the following table show that 80% of my students are using a unimodal learning style and 20% of my students are using multimodal learning styles (a combination between A and K, A and R-W, V and K and V, A and K). From students with unimodal learning style 36.67% preferred aural learning style, 23.33% read-write learning style and 20% kinesthetic learning style, whereas 0% of the students preferred visual learning style. From students with multimodal preferences 16.67% preferred bimodal learning style (A-K, V-K and A-RW) and 3.33% preferred tri-modal learning style (V-A-K).

**Table 1- VARK profiles of group 323**

n = 30, of which No. of students who prefer	Unimodal learning style				Multimodal learning style			
					Bi-modal			Tri-modal
	Visual (V)	Aural (A)	Read-write (R-W)	Kinesthetic (K)	A-K	V-K	A-RW	V-A-K
	0	11	7	6	3	1	1	1
Total students profiles:	24				6			
Percentages* of students	0	36.67	23.33	20	10	3.33	3.34	3.33
	80				20			

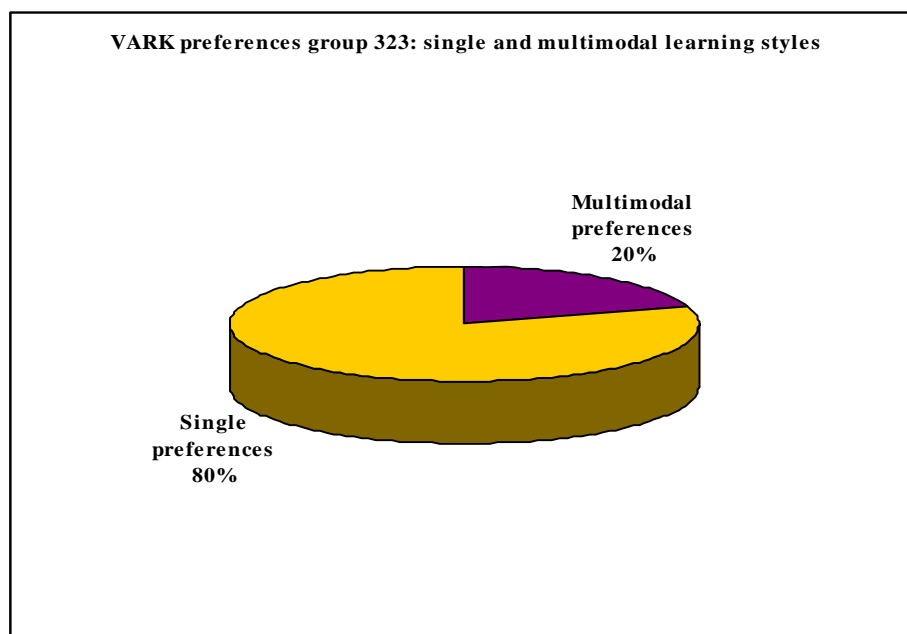
\*The number of students who preferred each mode of learning was divided by the total number of responses to determine the percentage.



**Fig.1** VARK students 323 profiles – Source: Research findings



Regarding the students' multimodal preferences for learning, in my group 323 there are 20% with this particular preference. For a student is good to be multimodal because there are more flexible about how they take in and give out information than those with a profile that emphasizes a single preference. They tend to be able to match their preferences with whatever mode(s) are being used. On the other hand multimodal learners need to have at least two, three or four modes involved in learning before they are satisfied and this could be see as a disadvantage. For example, someone with an AR profile would want to read about it and talk about it with others before they would "trust" the incoming information. A single preference learner would "get it" from just their preferred mode - if it was available in that form. In my teaching activity I must be very careful in provide the best strategy for my group taking in count both the single and multimodal learning students.



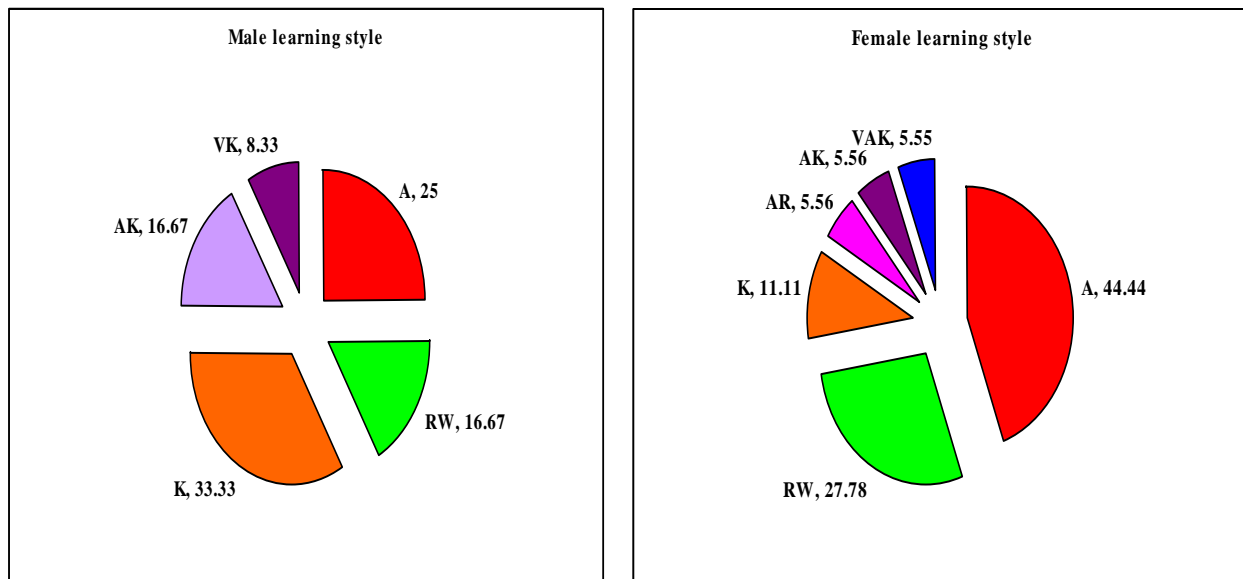
**Fig. 2** VARK single and multimodal preference of group 323

Regarding gender research the results are presented in the next table. The class is formatted by 12 male (40% from the total respondents) and 18 female (60% from the total respondents).

**Table 2- Gender distribution of VARK learning styles of group 323**

n = 30, of which	Students Male learning style						Students Female learning style								
	Unimodal				Bimodal		Unimodal				Bimodal		Trimodal		
	V	A	RW	K	AK	VK	V	A	RW	K	AR	AK	VAK		
No. of students who prefer	0	3	2	4	2	1	0	8	5	2	1	1	1		
Percentages	0	25	16.67	33.33	16.67	8.33	0	44.44	27.78	11.11	5.56	5.56	5.55		
Percentages regarding single or multiple learning preferences	75						25		83.33				11.12		5.55

The research results indicated that 83.33% of females and 75% of males preferred a single mode of information presentation. Among the female students, 44.44% of the students preferred A, 0% of the students preferred V, 27.78% of the students preferred printed words (R), and 11.11% of the students preferred using all their senses (K). In contrast, male students were different distributed in preference, with 25% of the students preferring A, 16.67% preferring R, 33.33% preferring K, respectively, while 0% of the students preferred V.



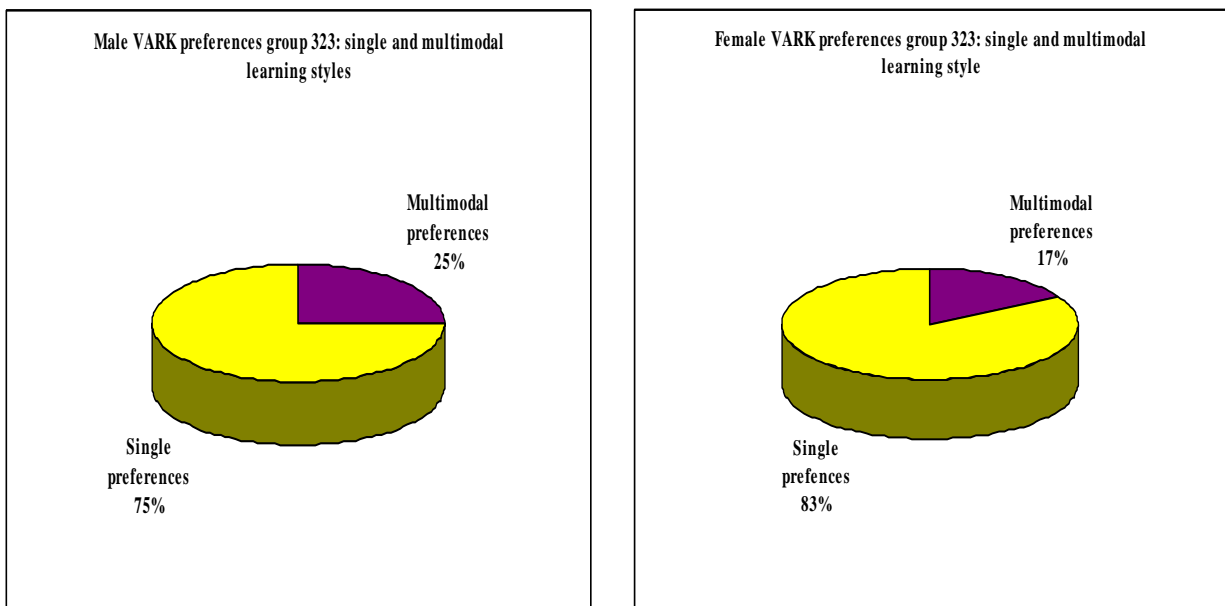
**Fig.3** Differences between male and female learning style of group 323

According to recent research VARK database shows significant differences between males and females. Men have more kinesthetic responses and women more Read/write responses.

In group 323, 33.33% of the male students' preferred kinesthetic learning style and only 16.67% preferred RW learning style. Regarding female learning style 44.44% preferred aural learning style, 27.78% preferred RW learning style and only 11.11% preferred kinesthetic learning style. The research results match the recent research from VARK database given a plus of security in my findings.

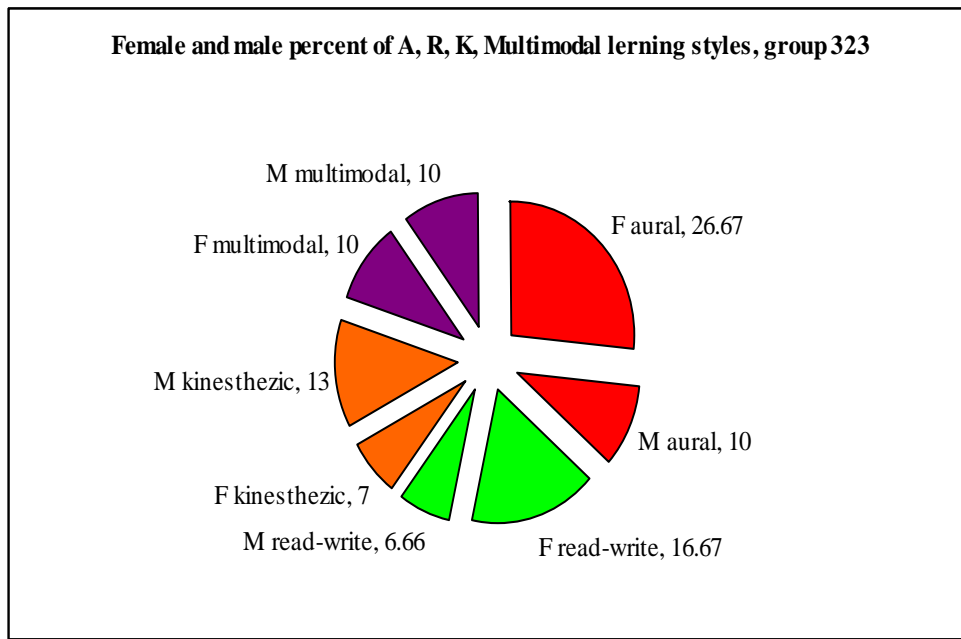
Furthermore, my research results pointed out that 16.67% of female and 25% of male respondents preferred multiple modes [female: 2 modes (11.12%), 3 modes (5.55%); males: 2 modes (25%)] of presentation.

The female students 2 models of learning are *aural and read-write (AR)* and *aural and kinesthetic (AK)*, and the 3 model includes *visual, aural and kinesthetic (VAK)*. The male students multi preference 2 models are *aural and kinesthetic (AK)* and *visual and kinesthetic (VK)*.



**Fig.4** Differences between single and multimodal male and female learning style of group 323

In addition, 75% of male students preferred unimodal instruction, with a preference toward **K**, whereas 83.33% of female students preferred single-mode instruction with a preference toward **A**. The female learning styles are more fragmented than the male learning style so we can assume that there are differences between male and female learning styles.



**Fig. 5** Female and male students' percent of A, R, K, and multimodal learning style

Creating the class learning profile we can see that 36.67% of students (27% female and 10% male students) have strong preference for learning by **Aural** methods, 23.33% of students from classroom used the RW preference (16.67% of female and 6.66% of male students), 20% of the students preferred kinesthetic learning style (7% of female and 13% of male students), and 20% of students used multimodal preferences (of which 10% female and 10% male students).

Quite interesting is the fact that a part of the female students from classroom is using in the exactly same proportion the following learning styles: aural and read-write (5.55%), aural and kinesthetic (5.55%), and visual, aural and kinesthetic (5.55%). Female students preferred single learning style with 8% more than the male students, and the male students preferred multimodal preferences with 8% more than the female students.

### 3.3 Research limitations

VARK survey has not been statistically validated and that represents a limitation to this study. Educational investigators have been attempting to find a way to validate VARK. Unfortunately, they have not been able to find a satisfactory statistical method that validates the four-factor model that is the basis of VARK. The originators of the questionnaire ask each person who completes the questionnaire on their website (<http://www.vark-learn.com/english/index.asp>) to

provide information about themselves. Most do. One question asks whether their VARK profile matches their perception of their preferences for learning. The other options are "don't know" and "no match". The percentages for those aged 19 or older are as follows: match = 58%, don't know = 38% and no match = 4%. Although self-perceptions are not always reliable, these results support the value of the VARK questionnaire.

My research limitation arise form the fact that research were relied to a determined period in which were applied (the last seminar) and only a single class 323 was the subject of my investigation.

### **3.4 Research strengths using VARK**

Importantly, a number of strengths emerge from VARK analysis. For example, it offers a positive, inclusive affirmation of the learning potential of all students. The VARK philosophy encourages a belief that everyone can learn if their preferences are addressed. This view of learning encourages teachers to ask themselves an insightful and critical question, namely: 'How can we teach our students if we do not know how they learn?'

VARK encourages flexibility and imagination in designing resources and in changing environmental conditions. It changes the teachers focus as they begin to respond more sensitively to the different learning preferences of their students. VARK also encourages teachers to reexamine their own learning and teaching styles.

Fortunately, related with my research there was no eliminated and no compromise questionnaires. All students completed the questionnaires, and this fact is there own benefits too.

## **IV. Differentiation – An approach to teaching and learning strategies**

Differentiation is about teaching and learning styles and teachers should be using differentiation in order to have a variety of teaching approaches to accommodate the different learning styles in the classroom. Differentiation of teaching, customizing assessments and course material for different learning styles of students, is vital today. Providing choices is the key.

The assembly line model of the teacher handing out identical tests to all students has faded away with the twentieth century. *Differentiation of teaching* is what this shift away from giving all students the same assessments or materials despite their diverse learning styles, capabilities, and needs.

My research result helped me to accommodate teaching strategies with the students' individual learning style. My plan consists in:

1. Identify the learning styles of each student from your group
2. Choose the 'Goal of teaching' for my lesson
3. Choose the 'teaching strategy' that I intended to use
4. Use the 'Strategies for the teachers involved in the learning process', taking into consideration that a particular strategy may be strength to certain students, but keeping in mind that the others should be involved as well
5. Use the work sheets to plan and include each of my students' learning styles.

Following are presented several ideas regarding the strategies that can be used to properly adapt teaching strategy to each student's individual learning style. This can be a model to other teachers too.

The goal of teaching – What do I wish to accomplish?  
Generating enthusiasm and interest towards a particular subject

Teaching strategy -  
How will I proceed?  
ORAL PRESENTATION

### Strategies for the teacher involved in the learning process

Visual type	Auditory type	Read-write type	Kinesthetic type
<ul style="list-style-type: none"> <li>• Express yourself clearly and identify the main ideas</li> <li>• Encourage the use of colored pencils and of students' own frameworks ("spider grams", "flowcharts") in order to take notes</li> <li>• Use colored pencils and slides</li> <li>• Allow students to tape-record their presentations</li> <li>• Associate a key issue with a visual image from a book or that is shown on the screen</li> </ul> <p>Graphs / tables are useful</p>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• It is possible that students would like to tape-record the session</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable only if they will take notes</li> </ul>	<ul style="list-style-type: none"> <li>• A tactile ability such as text editing can prove useful for taking notes</li> <li>• Provide the students with a copy of the notes</li> <li>• Speak in an animated manner</li> <li>• Encourage the use of "spider grams" and frameworks in order to take notes</li> <li>• If there is a need for volunteers during the presentation, ask these students to participate</li> <li>• Provide the students with a tangible object which they can study</li> </ul>

The teacher doing the presentation can use a video projector, which show a comic strip that encompassed the whole presentation. This will enhance the involvement of the visual-dominated students. The practical-type students can be asked to volunteer themselves in conducting specific tasks during the session.

The goal of teaching – What I wish to accomplish?  
 Exploring and shaping views, emotions, beliefs, and attitudes

Teaching strategy -  
 How will I proceed  
 ROLE-PLAY / CASE STUDY

### Strategies for teachers involved in the learning process

Visual type	Auditory type	Read-write type	Kinesthetic type
<ul style="list-style-type: none"> <li>Ask these students to observe body language and facial expressions and use these issues as starting points for further discussion</li> </ul>	<ul style="list-style-type: none"> <li>This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>Encourage students to write a scenario or key phrases which can be used to express different opinions during a role-play and use these students as story-tellers</li> </ul>	<ul style="list-style-type: none"> <li>This is a learning situation where students will feel comfortable and will trust this strategy if they will have the opportunity to write down notes under the form of sentences</li> <li>They have to be able to write down what has been discussed during the case study and to make observation and to provide feedback</li> </ul>	<ul style="list-style-type: none"> <li>This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>Encourage some students to perform in role-plays, and others to make observations, than conduct a brainstorming session regarding their reactions</li> </ul>



During their stage-play, students can perform roles regarding job application interviews. They sequentially can play the role of the one conducting the interview, than of the person who was being interviewed, and that of the observer, and will later be assessed by their colleagues.

**The goal of teaching – What do I wish to accomplish?**  
**Teamwork**

**Teaching strategy - How will I proceed?**  
**ASSIGNMENTS/ INTEGRATED PROJECTS**

**Strategies for teachers involved in the learning process**

<b>Visual type</b>	<b>Auditory type</b>	<b>Read-write type</b>	<b>Kinesthetic type</b>
<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Integrate visual elements in the assignment’s description</li> <li>• Encourage students to use different visual procedures regarding their notes, for example underlining</li> <li>• Record the final project on video</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Read the description of the homework / project together with the students</li> <li>• Require students to think, both individually and / or in groups, about questions regarding the assignment and afterwards discuss them in larger groups</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Give students the possibility to write the project and to read the project aloud in class</li> <li>• In the project let students to turn reactions, actions, diagrams, charts and flows into words</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Introduce a practical activity in the assignment, which requires teamwork and leadership skills, therefore an activity which cannot be completed by a single person.</li> </ul>

	<ul style="list-style-type: none"> <li>• Encourage students to discuss the assignment with each other or with the teacher</li> <li>• Encourage the audio-recording of information</li> <li>• Record the final project on video or audio tape</li> </ul>		
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An assignment regarding tourism can required that students, grouped in teams, gather information about the local transport and entertainment facilities. Every person will decide which of the two aspects he or she want to approach, and then each groups will discusses the necessary actions that will to be taken and what every person will supposed to do. The kinesthetic students can came up with a step-by-step action plan. Every student is required to perform a specific task, according to his strengths, for example the kinesthetic students will supposed to collect date, the visual type students will supposed to interpret the data and draw graphs and tables for the presentation, while the auditory-type students will required to prepare and make the oral presentation.

**The goal of teaching – What do I wish to accomplish?**  
**Analyzing and assessing learning**

**Teaching strategy - How will I proceed?**  
**ASSESSMENT QUESTIONS**

### Strategies for teachers involved in the learning process

Visual type	Auditory type	Read-write type	Kinesthetic type
<ul style="list-style-type: none"> <li>• Make the set of questions as visual as possible</li> <li>• Include graphical elements or images to extend the written information</li> <li>• Come up with several questions, mainly visual, with minimum text.</li> <li>• Prepare a written version of the questions, so as to allow students to individually follow the questions on the sheet of paper when they are read aloud</li> <li>• Use computer applications to put together the set of assessment questions</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Read all the questions aloud</li> <li>• Repeat and read again from beginning to end</li> <li>• Encourage students to repeat the questions in their thoughts</li> <li>• Use computer applications to put together the set of assessment questions</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Create examination tests with multiple choice questions</li> <li>• Write your test questions using a, b, c, d and 1,2,3,4</li> <li>• Arrange your questions into hierarchies and points</li> </ul>	<ul style="list-style-type: none"> <li>• This is a learning situation where students will feel comfortable and will trust this strategy</li> <li>• Develop the set of questions do as to include practical activities, such as fulfilling a task or demonstrating a certain skill</li> <li>• Provide students with a certain degree of freedom of choice in what concerns the means through which a question can be answered (e.g. practical, in writing)</li> <li>• Use computer applications to put together the set of assessment questions</li> </ul>

Within an IT program, the lesson can begin with a rehearsal through assessment questions of what has been learned in a previous session. The group can be divided in two teams, the questions will be projected on a screen so as they could be read by all the students. The questions will also verbally formulated.

## **Conclusions**

Student learning style preferences can be determined by the use of the VARK questionnaire, which can assist both the learner and teacher in identifying individual student preferences in the manner in which information is presented.

This paper attempted a qualitative marketing research in order to determine the individual learning styles of my group of students with the purpose of better understanding the class and being able to use differentiated teaching strategies.

I was interested in assessing the preferred learning styles of my class 323 in order to adapt my teaching strategies to the learning particularities of my group of students.

For university teachers, understanding learning styles is useful for three reasons. First, knowing about learning styles may help you understand and explain the differences you observe among students. Second, you may want to develop a range of teaching strategies to build on the different strengths individual students bring to the classroom. Third, knowing how students differ may help you help students expand their repertoire of learning strategies.

Students have individual learning style preferences including visual (V; learning from pictures, posters, graphs, diagrams, charts, and flow charts), auditory (A; learning from speech, attending discussions and tutorials, discussing topics with others), read-write (R; learning from reading and writing notes, handouts, and textbooks), and kinesthetic (K; learning from touch, hearing, smell, taste, and sight). These preferences can be assessed using the VARK questionnaire.

My class results show that 80% of my students are using a unimodal learning style and 20% of my students are using multimodal learning styles (a combination between A and K, A and R-W, V and K and V, A and K). From students with unimodal learning style 36.67% preferred aural learning style, 23.33% read-write learning style and 20% kinesthetic learning style, whereas 0% of the students preferred visual learning style. From students with multimodal preferences 16.67% preferred bimodal learning style (A-K, V-K and A-RW) and 3.33% preferred tri-modal learning style (V-A-K).

The class is made of 12 male (40% from the total respondents) and 18 female (60% from the total respondents). The research results indicated that 83.33% of females and 75% of males preferred a single mode of information presentation. Among the female students, 44.44% of the students preferred A, 0% of the students preferred V, 27.78% of the students preferred printed words (R), and 11.11% of the students preferred using all their senses (K). In contrast, male students were differently distributed in preference, with 25% of the students preferring A, 16.67% preferring R, 33.33% preferring K, respectively, while 0% of the students preferred V.

In group 323, 33.33% of the male students preferred the kinesthetic learning style and only 16.67% preferred the RW learning style. Regarding female learning style 44.44% preferred aural learning style, 27.78% preferred RW learning style and only 11.11% preferred kinesthetic learning style. The research results match the recent research from VARK database given a plus of security in my findings.

Furthermore, my research results pointed out that 16.67% of female and 25% of male respondents preferred multiple modes [female: 2 modes (11.12%), 3 modes (5.55%); males: 2 modes (25%)] of presentation.

The female students 2 models of learning are aural and read-write (AR) and aural and kinesthetic (AK), and the 3 model includes visual, aural and kinesthetic (VAK). The male students multi preference 2 models are aural and kinesthetic (AK) and visual and kinesthetic (VK).

In addition, 75% of male students preferred unimodal instruction, with a preference toward **K**, whereas 83.33% of female students preferred single-mode instruction with a preference toward **A**. The female learning styles are more fragmented than the male learning style so we can assume that are differences between male and female learning styles.

Creating the class learning profile we can see that 36.67% of students (27% female and 10% male students) have strong preference for learning by Aural methods, 23.33% of students from classroom used the RW preference (16.67% of female and 6.66% of male students), 20% of the students preferred kinesthetic learning style (7% of female and 13% of male students), and 20% of students used multimodal preferences (of which 10% female and 10% male students).

Quite interesting is the fact that a part of the female students from classroom is using in the exactly same proportion the following learning styles: aural and read-write (5.55%), aural and kinesthetic (5.55%), and visual, aural and kinesthetic (5.55%). Female students preferred single learning style with 8% more than the male students, and the male students preferred multimodal preferences with 8% more than the female students.

My research results helped me to accommodate teaching strategies with the students' individual learning style. My plan consisted in:

1. Identify the learning styles of each student from your group
2. Choose the 'Goal of teaching' for my lesson
3. Choose the 'teaching strategy' that I intended to use
4. Use the 'Strategies for the teachers involved in the learning process', taking into consideration that a particular strategy may be strength to certain students, but keeping in mind that the others should be involved as well
5. Use the work sheets to plan and include each of my students' learning styles.

The paper presented several ideas regarding the strategies that can be used to properly adapt teaching strategy to each student's individual learning style. This can be a model for other teachers too.

As teachers, we need to assess and understand how to reach all students by understanding how to present information in multiple modes. If we are aware of their learning style, we can help them to learn more effectively both in and out of the classroom and can assist them in determining their preferences. As a student, it is vital to be self-aware of preferences to adjust study techniques to best fit each individual, even when the information and instruction provided does not match the preferred style.

It has been established that there are a variety of learning styles present in the classroom, and, as such, there are some students that are not reached by the standard lecture format.

As future research directions we can ask ourselves the following questions: does learning style preference correlate with performance? Does student knowledge of their learning style allow them to perform better by adapting the information to their own preferred modality while studying or by finding study partners that can present the material in an alternative manner? Do K-style learners have the advantage in hands-on laboratory courses? Do A-style learners excel in the standard lecture format? Importantly, how does the instructor tailor the lesson to accommodate all learners and does accommodating to learning preference really alter learning outcomes?

The use of learning style instruments should allow the students and the faculty to consider and seek out more carefully the factors and activities that are conducive to more effective and deeper learning.

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