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# The Discourse on Learning Styles in Online Education

Ermira Idrizi, Sonja Filiposka and Vladimir Trajkovik

**Abstract** — Online learning is a contemporary concept in which ideas, models, and traditional teachings have changed. We examine how learning style affects the learner's academic achievements in online lessons and gender-specific environments. This research investigates whether VARK styles are associated with course results, regardless of the actual VARK results, and whether any study techniques are associated with course results. The results indicate that almost all students did not report on research approaches after their VARK assessment and that the students' achievement is not associated with their results in each VARK category. This provides additional evidence that the usual teaching styles should be redefined for Online classes where the styles corresponding to the willingness of learners are more difficult to be defined.

**Keywords** — Gender, Online Learning, VARK learning styles.

## I. INTRODUCTION

THE continual increase in the number of courses and programs on distance learning had an intensive impact on learning and teaching views and ideas. Distance education is a system of teaching that allows students to engage in studying without being physically located near the same place as the lecturer. The use of internet-based coursework is becoming an integral method of teaching in distance education, especially in higher education. The growing number of attendees, the courses, and the accessibility of distance education refer to the importance of this teaching method. Online education seems to have been able to change the landscape of education.

However, while technological innovation is essential for the growth of distant education, the effectiveness of distance training is not sufficient. The way of categorizing learners and adapt techniques of instruction for learning styles has been for a long time, an ongoing discussion about how related teaching styles are, that if the student says he prefers a learning style, they learn by this style better [1] [2].

Given the considerable interest in learning styles, the theory and the events created for students based on theory

[3][4] pose several issues. In education, the expression of teaching styles is used to define the different approaches of learners to teaching [5]. The issues include the lack of influential expressive theory, lack of theoretical research, lack of reliability and validity of ideas, and lack of linkages between education and accomplishment. We are analyzing whether this discussion also exists in online education, how teaching styles impact the academic achievement of learners, and whether there is any distinction between male and female learners.

## II. VARK MODEL OF LEARNING STYLES

Although a wide variety of teaching styles exist [5], we have chosen to use Fleming and Mills' visual, auditory, reading/writing and kinesthetic VARK model [6] because of its adequacy, shortage, and comprehensive student appreciation. The VARK model has been studied extensively and is maybe the most well-known learning style theory. Regrettably, the discussion about the model was created as the VARK model expanded the advertising and popularity in mainstream education [7].

The VARK model was first set up as an instrument to encourage debate and reflection on teaching approaches. This note was primarily lost, and Fleming recalled to readers that the VARK assessment was never a diagnostic instrument [8]. Furthermore, many authors of diverse article show that several of them continue to use VARK learning styles as "a support" for why they can't learn well (e.g., "I am simply not a visual learner"). Pashler et al.'s (2009) report on a shortfall in proof of significant learning styles utilizing serious techniques and other comparable research at the time [7].

The VARK questionnaire [9] is easily accessible online and includes only 16 questions, which allows a student to finish the survey more probably than to do a more extensive learning style study.

The VARK model categorizes learners according to the sensory mode of presentation of data. Visual (V): Students are classified as visual (V) who prefer to see data as pictures, diagrams, and flowcharts. Studying by looking at images, graphs, and flowcharts are suggested. Auditory (A): Auditory students prefer to receive audio data (A) Studying by attending courses, debating with others, and reading notes or text out loud in a tape recorder is suggested. Reading / Writing (R): students tend to use text or tables to understand data better. They are suggested to study by writing notes in their own words or by arranging data lists and tables. Kinesthetics (K): if students want new data to be applicable, or something they can operate by their hands, they are categorized as kinesthetic learners

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[9].

In the VARK model, the learner is said to be unimodal if an individual has a favorite in one of these categories. The preferences of individuals can be over one of those categories, and the student is classified as bimodal [10]. If a person has preferences for three of the four categories, the student has a tri-modal category and so on, more people fall into one of those multimodal categories.

### III. IDENTIFYING LEARNING STYLES IN ONLINE EDUCATION

There are methods that the teacher can use to acknowledge the particular learning style of a student in the traditional classroom environment.

The first step is to do a primary assessment through short private interviews with learners and formal observation of their particular behaviors in the classroom. A profound private interview with the student is another step in evaluating a student's style of teaching.

Using checklists and the VARK questionnaire [11] is the next step in identifying teaching styles. Observation and in-depth personal interviews cannot be handled in online courses, but the VARK questionnaire can be used to determine the learning styles of learners taking part in online courses. Therefore, even if a particular student has some learning styles, a diverse range of learning experiences should be considered in order to be a more flexible learner. When learning styles of learners are recognized, a proper learning context can be defined [12].

### IV. METHODOLOGY

The present research compares academic achievement in distance learning courses based on teaching styles across genders. This research used a field experiment to empirically test our view that various kinds of delivery of educational products combined with learning styles can influence the academic achievement of the student.

The preliminary number of students who started this project was 155, of whom 61 were female, and 94 were male. Before the courses began, students had to fill out various questionnaires based on their teaching preferences [2][13]. Ninety-seven students filled out the VARK questionnaire, although the number of students that drop the experiment is 101 from whom 74 male and 27 female students. Altogether 54 students ended the case study and took the final test.

#### A. Participants

For the above case study, the sample populations were students registered in two classes one offered in second year and the other one offered in third year of the studies, at the Faculty of Computer Science and Engineering, Ss, Search Engine (C1) and Dynamic Websites (C2), University of Cyril and Methodius in Skopje.

On the MOODLE interactive e-learning platform of the faculty, the two distance learning courses "Search Engines" and "Designing Dynamic Web Sites" were established. Students were informed about the experiment before the beginning of the course. A few of them decided not to partake in this experiment; some discarded the

experiment.

Thus, the total number of participants in this experiment was 54 (34 females and 20 males). Participants were divided randomly into two groups of 35 students (group A and B). For one semester, the selected students attended both courses. Their outcomes of learning were evaluated at the final examination [14]. They earned extra credit for their course grade based on their results to motivate learners to engage seriously.

#### B. Course Delivery

We have developed two experimental courses (C1 and C2) with two student groups (group A and group B) for this study. The first course (C1) can be regarded as a less sophisticated course on computer science, while the second course (C2) is a more sophisticated course requiring some prior computer science expertise. Students enrolled in both classes, and the participants were randomly selected [15].

In order to investigate the preferred student learning styles, we used different presentation types, for delivering the educational content of each course: Offline document content- PDF documents, presentations, and url links with related content were spread to students, this method of delivery corresponds with the Read/Write modality. Offline video content - video presentations were recorded and delivered in the form of a streaming video. This method of delivery corresponds with Visual and Audio modality. Online video conferencing - live video conferences were prepared with the professor of each course. The lectures were scheduled at a fixed time, and students needed to be enrolled for the appropriate course. This delivery method differs from the previous delivery methods where the students had the freedom of organizing their time at their own [16][17]. However, at the end of the lecture, students have the opportunity to cooperate with the professor and among themselves. This corresponds with the Kinesthetic modality.

The A group that attended the C1 course were asked to choose their preferred content delivery type. According to their choice, they were divided into three stereotypes, and to each stereotype, the lectures were presented according to their preferences, the B group of students that attended the C1 course, had no chance to choose the preferred content delivery type. The choice of the type of education materials delivery was made by the professor [13]. For the C2 course, students from B group choose their preferred content to deliver type; while students from A group were given the content delivery type chosen by the professor.

#### C. Procedures

This experiment was carried out at the Computer Science and Engineering Faculty, Ss. Cyril and Methodius University in Skopje. For comparison reasons, two major student groups (A and B) were structured, each comprising three subgroups as outlined in the prior section.

The interactive interface of Moodle was used during the experiment to manage the student content as well as to interact with the teacher content. None of the learners had previously accessed the test material. During one semester,

all students attended both classes. Students were asked to finish questionnaires during the study: personality questionnaire, questionnaires about their preferred teaching styles, questionnaire stating their intention to use multiple instructional content delivery on an ongoing basis. The experiment was finished with a final examination that tested the learning results of students. For this study, we processed and analyzed the data collected from the final exam and their preferred learning styles. We compared the final test results in terms of correlation coefficient of test results and learning styles according to gender [18][19].

## V. RESULTS ANALYSIS

Learning styles express how students like receiving data according to the VARK model. They may prefer a single (unimodal) mode, two (bimodal), three (trimodal) modes, or all four (quadrimodal) methods.

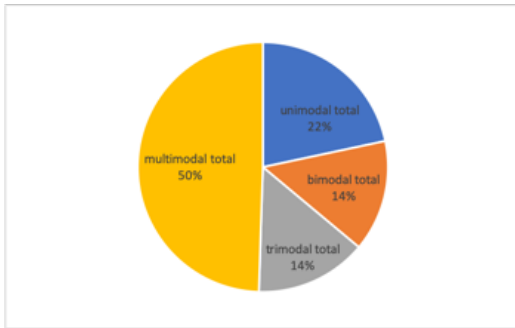


Fig. 1. VARK modality of students.

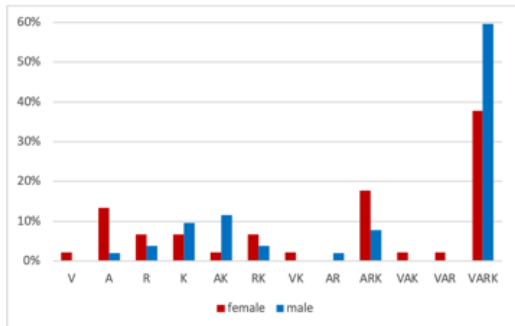


Fig. 2. VARK styles distribution among students.

Fig. 1 shows that 50% of students in the case study had preferences for multimodal teaching style and that only 22% of learners had unimodal preferences, where bimodal are 22% and trimodal 14% of students.

For the 22% of learners with unimodal teaching styles, only 2% of female learners preferred V, A preferred 13% of female and 2% of male learners, R 7% of female learners and 4% of male learners, K 7% of female learners and 10% of male learners, see Fig. 2. We also need to note that all R female show strong sustenance for R. The preferences of the female learners were diffused, with all the styles of teaching in bimodal (AK, RK, VK) and trimodal (ARK, VAK, VAR), while V and VK, VAR combinations were not represented for male students.

As we can observe in Table 1, results for both male and female students do not correlate with the style they picked. For the test results, it is even the opposite where students

had better test outcomes for the styles they did not pick, but if we look at the overall GPA, there is a slight positive correlation of preferred and provided material. This indicates that students regardless of gender, do not specify properly what learning style they are better at studying, and therefore, their test results do not match with the VARK questionnaire.

TABLE 1: CORRELATION OF PREFERRED AND PROVIDED RESULTS.

	count			Test avg			GPA avg		
	F	M	T	F	M	T	F	M	T
Gender/Total	42	24	66	3.22	3.65	3.38	7.65	7.36	7.54
Pref. = prov.	26	16	42	3.67	3.99	3.79	7.39	7.27	7.34

Table 2 shows the preferences evaluation for the four VARK student modalities. It was noted that the read/write mode of the learning style was preferred by a considerably higher percentage of female learners compared to men; whereas a considerably higher proportion of male students preferred kinesthetic mode, as the p-value is more significant than 0.05 suggests that proof is insufficient to support our finding (p-value < 0.05).

TABLE 2: VARK StDev AND P-VALUE TEST.

VARK mode	Mean		StDev		p-value
	F	M	F	M	
Visual	4.20	4.74	2.31	2.90	0.44
Auditory	6.64	7.30	2.52	2.61	0.46
Read-Write	7.18	6.32	3.00	2.61	0.47
Kinesthetic	7.09	8.32	2.80	2.26	0.50

## VI. DISCUSSION AND CONCLUSION

The VARK style inventory enables individuals to think about how they learn and promotes students to adopt study methods that can work better than their present strategies. The goals of this study were to assess whether students are developing and using study approaches that are compatible with their teaching styles and if so, the alignment with course outcomes.

Of course, while many students find the VARK test interesting, the students in this research have not used the VARK results to alter their research. Students may be sensitive to past research methods which are comfortable and easy or become actual habit [20] and maybe uncomfortable in how they think they learn best or should improve their knowledge. Instead, they are aware of their misunderstandings. However, there is hope that these students will be helped. Explicit assistance on proof-based study strategies can help students develop beneficial study strategies [21].

This study shows no clear evidence that students differ by gender of how the VARK inventory affects their academic performance. Therefore, these empirical approaches to research in the future should continue to be identified. This present study also demonstrates that even those students with studies consistent with their dominant VARK category did not achieve more significant achievement.

These findings, combined with extensive prior studies

into the myth of learning styles [22], provide strong evidence that educators and learners should not promote the idea of learning styles for studying and/or for teaching. Teachers need to be able to learn, perceive, and process information in order to support students' success in online education.

In every online course, every type of student needs to be accommodated. The blend of methods and teaching technologies allow online students to choose which writing style best fits their styles of learning. Effective teaching happens when teachers reach students who are unhappy with their teaching style [23][24].

To reduce the gaps between research and practice in this field, education research can be articulated by providing arguments which question the methods employed by individual study styles rather than question the existence of teaching styles with statements of power [12]. This would enhance the educators' professional decision-making ability and offer them more professional space.

#### REFERENCES

- [1] H. Pashler, M. McDaniel, D. Rohrer, and R. Bjork, "Learning styles: Concepts and evidence," *Psychological science in the public interest*, vol. 9, no. 3, 2008, pp. 105–119.
- [2] B. De Raad, and H. C. Schouwenburg, "Personality in learning and education: a review," *European Journal of Personality*, 1996, pp. 303–336.
- [3] F. Coffield, D. Moseley, E. Hall, and K. Ecclestone, *Learning styles and pedagogy in post-16 learning: A systematic and critical review*, Learning and Skills Research Centre London, UK, 2004.
- [4] A. Donggun and M. Carr, "Learning styles theory fails to explain learning and achievement: Recommendations for alternative approaches," *Personality and Individual Differences*, vol. 116, 2017, pp. 410–416.
- [5] P. R. Husmann and V. D. O'Loughlin, "Another nail in the coffin for learning styles? Disparities among undergraduate anatomy students' study strategies, class performance, and reported VARK learning styles," *Anatomical sciences education*, vol. 12, no. 1, 2019, pp. 6–19.
- [6] T. F. Hawk and A. J. Shah, "Using learning style instruments to enhance student learning," *Decision Sciences Journal of Innovative Education*, vol. 5, no. 1, 2007, pp. 1–19.
- [7] N. Fleming and D. Baume, "Learning Styles Again: VARKING up the Right Tree!," *Educational Developments*, vol. 7, 2007, pp. 4–7.
- [8] T. L. Russell, "The no significant difference phenomenon: A comparative research annotated bibliography on technology for distance education," *IDECC*, 2001.
- [9] N. D. Fleming, (2012), *Facts, fallacies and myths: VARK and learning preferences*, Available: <http://vark-learn.com/Introduction-to-vark/the-vark-modalities>.
- [10] C. Scott, "The enduring appeal of 'learning styles'," *Australian Journal of Education*, vol. 54, no. 1, 2010, pp. 5–17.
- [11] G. Falloon, "Making the connection: Moore's theory of transactional distance and its relevance to the use of a virtual classroom in postgraduate online teacher education," *Journal of Research on Technology in Education*, vol. 43, no. 3, 2011, pp. 187–209.
- [12] A. Zapalska, and D. Brozik, "Learning styles and online education," *Campus-Wide Information Systems*, vol. 23, no. 5, 2006, pp. 325–335.
- [13] N. Koceska, and V. Trajkovik. "Quality of experience using different mediapresentation types," *2017 16th International Conference on Information Technology Based Higher Education and Training (ITHET)*, IEEE, 2017.
- [14] E. Idrizi, S. Filiposka, and V. Trajkovik, "Character Traits in Online Education: Case Study," *International Conference on Telecommunications*, Springer, Cham, 2018.
- [15] E. Idrizi, and S. Filiposka. "VARK Learning Styles and Online Education: Case Study," *Learning*, 2018, pp. 5–6.
- [16] S. Tucker, "Distance Education: Better, Worse, or As Good As Traditional Education?," *Online Journal of Distance Learning Administration*, vol. 4, no. 4, 2001.
- [17] C. J. Bonk, L. M. Miyoung, K. Xiaojing, X. Shuya, and S. Feng-Ru, "Understanding the self-directed online learning preferences, goals, achievements, and challenges of MIT OpenCourseWare subscribers," *Journal of Educational Technology & Society*, vol. 18, no. 2, 2015, pp. 349–368.
- [18] E. A. Wehrwein, H. L. Lujan, and S. E. DiCarlo, "Gender differences in learning style preferences among undergraduate physiology students," *Advances in physiology education*, vol. 31, no. 2, 2007, pp. 153–157.
- [19] T. Vasileva-Stojanovska, M. Vasileva, T. Malinovski, and V. Trajkovik, "An ANFIS model of quality of experience prediction in education," *Applied Soft Computing*, vol. 34, 2015, pp. 129–138.
- [20] R. Rogers, I. Schaenen, C. Schott, K. O'Brien, L. Trigos-Carrillo, K. Starkey, and C. C. Chasteen, "Critical discourse analysis in education: A review of the literature, 2004 to 2012," *Review of Educational Research*, vol. 86, no. 4, 2016, pp. 1192–1226.
- [21] P. A. Kirschner, "Stop propagating the learning styles myth," *Computers & Education*, vol. 106, 2017, pp. 166–171.
- [22] D. Garland, and B. N. Martin, "Do gender and learning style play a role in how online courses should be designed," *Journal of Interactive Online Learning*, vol. 4, no. 2, 2005, pp. 67–81.
- [23] E. Fitkov-Norris, and A. Yeghiazarian, "Assessing the learning style preferences postgraduate general business management students using VARK," *Proceedings of the 12th European Conference on Research Methodology for Business and Management Studies*, Reading, UK: Academic Conferences and Publishing International Ltd. 2013.
- [24] J. McCabe, "Metacognitive awareness of learning strategies in undergraduates," *Memory & Cognition*, vol. 39, no. 3, 2011, pp. 462–476.