
Satisfaction of Medical Students of Different Learning Styles to Online Education During the COVID-19 Pandemic*

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ABSTRACT

Objective: To determine the satisfaction of medical students of different learning styles in terms of organization/structure, learner interaction, student engagement, instructor presence, and perceived learning to online education during the COVID-19 pandemic.

Method: A descriptive cross-sectional study was conducted among the second-year and third-year medical students of FEU-NRMF enrolled in the school year 2020-2021. The data were collected through a survey questionnaire made by the researchers and was distributed through google forms.

Results: With the data obtained from 300 participants, most of the learning styles of second-year and third-year medicine students of FEU-NRMF were moderately satisfied within the 6 categories of the SLS-OLE questionnaire. In Course Structure/Organization, the highest percentage was garnered by Read/Write; Learner's Interaction and Instructor's Presence, the highest percentage was obtained by Visual learners; Student Engagement, Student Satisfaction, and Perceived Learning categories, the highest percentage belonged to Multimodal learners.

Conclusion: More than half of the respondents had the Kinesthetic type of learning style and majority of the learning styles were only moderately satisfied with online education.

Key words: COVID-19 pandemic, learning styles, learning satisfaction, V.A.R.K questionnaire, student learning satisfaction in online learning environment (SLS-OLE) instrument

Worldwide, it is estimated that there are currently more than 1.2 billion children in 186 countries affected by school closures due to the COVID-19 pandemic.¹ In March 2020, schools, including medical institutions, in the Philippines were forced to stop the traditional face-to-face learning activities and abruptly shift to online learning wherein it is still unclear whether the original learning outcomes will still be achieved through online learning.² According to Drago, et al.,³ it has become evident that students have diverse preferred learning

styles, which refer to an individual's preferential way of processing new information for efficient learning. This includes visual, aural, read-write, and kinesthetic, which may be unimodal or multimodal, as they apply to online education. Each individual has different learning processes, and despite the same educational environment, learning does not occur to all students at the same level and quality. In 2009, a study by Hermans, et al., stated that the common learning outcomes involve student satisfaction. Student satisfaction is crucial to learner success. Alqurashi (2018)³ states that student satisfaction reflects how learners view their learning experience and several studies show that it is associated with learner success rates. Since online education is now prevalent, student satisfaction with it must be evaluated, and the knowledge in students' learning

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styles is relevant in the evaluation. Since online learning requires independent student participation, it is plausible to explore the students' satisfaction with online education^{4,5} (Sit, Chung, Chow, & Wong, 2005). Hermans, et al. (2009) reported that measuring student satisfaction in eLearning courses is a significant aspect of successfully promoting higher education.

A study conducted by Chen, et al.⁶ has tested user satisfaction on online education platforms in China as the research object. However, a limitation regarding this study is that the questionnaire design and algorithm prediction need to be further improved. Assessment of immediate satisfaction with regards to online courses during the COVID-19 pandemic was conducted by Dinh and Nguyen (2020).⁷ Students encountered problems with internet connectivity and quality sound disrupting their access to quality learning. Several limitations were encountered by this study which includes a relatively small sample size and the data collection was done within a two-month time frame before transferring to online learning.⁷ Fearing & Riley (2005)⁸ support their statement that there's a smaller amount of research that has taken learning styles into consideration when studying students' satisfaction with online education. Moreover, another study conducted by Klingner (2003)⁹, shows that while there is no noticeable pattern between learning style preference and satisfaction with online learning yet, there is a clear trend of satisfaction among almost all of the adult learners who participated in the study.

Based on previous related studies that evaluate student satisfaction, results show an overall satisfactory response. Similarly, the authors hypothesized that the medical students of different learning styles are satisfied with current online education during the COVID-19 pandemic. This study seeks to determine the satisfaction of medical students of different learning styles in terms of organization/ structure, learner interaction, student engagement, instructor presence, and perceived learning to online education during the COVID-19 pandemic. The findings of this study benefit the students in addressing their satisfaction with online education - how it helps them to better understand and comprehend, with the emphasis on their respective learning styles. The greater demand for this knowledge justifies the current global situation, where undertaking online education is no longer a choice, but is considered the new normal. Moreover, this study opens a line

of discussion for future adaptations in the medical education system in response to uncertain times such as the COVID-19 pandemic.

MATERIALS AND METHODS

This study was reviewed and given approval by the FEU-NRMF Institutional Ethics Review Committee (IERC). A was utilized and was conducted from January to June 2021. Participants who were eligible for inclusion were second year and third year medical students at FEU-NRMF. The medical students who took a leave of absence for the second semester were excluded and students who could not be contacted during the data collection were withdrawn from the study.

Simple random sampling was utilized for participant selection using "Randomize Range" in Google Sheets. Sample size calculation was based on the assumption that the overall satisfaction of students with different learning styles resulted in a 67% satisfaction rate (Meyers, J.L., 2010), a confidence interval of 95% with 5% margin of error and $p = 0.763$ (from previous study) was used which yielded an estimated sample size of 278, maximized to 300 participants.

A complete record of the names of all the second year and third year medical students currently enrolled at FEU-NRMF (S.Y. 2020-2021) was requested from the Year level executive officer (YLEO) of each year. Further communication was done between the YLEOs and the presidents of each section. After collection of the classlists, the participants for the study were selected at random using the Google sheets. The randomized names were then divided into sets of 15 and were prioritized accordingly.

Google forms, containing the informed consent and survey questionnaires, were utilized for data collection via social media messaging through Facebook Messenger and/or Telegram. Participants were provided with full disclosure of information regarding the study, the voluntary nature of participation, and the assurance of anonymity and confidentiality of their data. Two types of questionnaires were included: the VARK questionnaire which determines the participant's learning style, and the SLS-OLE instrument that determines their satisfaction with online learning.

The participant's learning style was initially determined by using the VARK questionnaire-scoring chart, and was assessed using percentage and frequency

distribution. The VARK Questionnaire is equal to Visual (V), Auditory (A), Read/Write (R), Kinesthetic (K), and Multimodal. For every question, each letter choice corresponded variously to a particular learning style which was represented as V.A.R.K letters. The students selected letter/s that corresponded to their answers and were counted depending on the number of each V, A, R, K letters selected to get the score for each category. The highest number obtained from V, A, R, K letters determined the learning style of the respondent. Two or more V, A, R, K results that were equal were categorized as Multimodal. Each of the participants' learning styles was established. Student Learning Satisfaction in Online Learning Environment instrument (SLS-OLE) was then used for the assessment of the participants' satisfaction. The outcome measures for satisfaction were categorized into Low satisfaction (less than 49%), Moderate satisfaction (50-69%), and High satisfaction (70% or more) depending on the score generated after getting the percentages of the six categories, namely Course Structure/Organization, Learner Interaction, Student Engagement, Instructor Presence, Student Satisfaction and Perceived Learning. Study was conducted on 0.5 level of significance.

RESULTS

A total of 300 responses from the second-year and third-year medical students of FEU-NRMF were obtained from the google forms that were disseminated. Among these, 53.2% were represented by the second-year medical students and 46.8% of the population were composed of third-year medical students.

The V.A.R.K. questionnaire version 8.01 is composed of 16 questions that were used to determine the learning style of each respondent. Each answer corresponds to Visual, Aural/Auditory, Read/Write, or Kinesthetic and Multimodal was the term used in this study when two or more learning styles were equal. In this descriptive study, the authors evaluated the satisfaction of FEU-NRMF Medicine Students towards online learning and recognized the learning styles of each. Majority of the respondents are classified as Kinesthetic learners followed by Multimodal learners and the least are Auditory/Aural learners (Table 1).

Student Learning Satisfaction in Online Learning Environment instrument (SLS-OLE) was then used for the assessment of the participants' satisfaction. The

result revealed that the majority of the respondents, comprising second-year and third-year students, were moderately satisfied with the overall online learning experience (Table 2).

Table 1. Learning styles of the second-year and third-year medicine students of FEU-NRMF.

Learning Styles/Modalities	n (%)
Visual	17 (5.7)
Auditory/Aural	19 (6.3)
Read/Write	27 (9.0)
Kinesthetic	192 (64.0)
Multimodal	45 (15.0)
Total	300 (100.0)

Table 2. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of overall satisfaction.

Level of Satisfaction	n (%)
High Satisfaction	34 (11.3)
Moderate Satisfaction	213 (71.0)
Low Satisfaction	53 (17.7)
Total	300 (100.0)

Table 3. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of course structure/organization.

Level of Satisfaction	n (%)
High Satisfaction	71 (23.0)
Moderate Satisfaction	208 (69.3)
Low Satisfaction	21 (7.0)
Total	300 (100.0)

Table 4. Level of satisfaction of different learning styles of second-year and third-year medicine students of FEU-NRMF in online learning environment in terms of course structure/organization.

Course Structure /Organization	Low	Moderate	High
Visual (17)	2 (11.76%)	12 (70.59%)	3 (17.65%)
Aural (19)	1 (5.26%)	15 (78.95%)	3 (15.79%)
Read/Write (27)	2 (7.41%)	17 (62.96%)	8 (29.63%)
Kinesthetic (192)	14 (7.29%)	132 (68.75%)	46 (23.96%)
Multimodal (45)	2 (4.44%)	32 (71.11%)	11 (24.44%)

Majority of the students were moderately satisfied under the category Course Structure/Organization (Table 3). The results showed that students classified as Read/Write learners had the highest percentage satisfaction among all the learning styles. This was followed by Multimodal learners and Kinesthetic learners, respectively (Table 4).

Table 5. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of learner interaction.

Level of Satisfaction	n (%)
High Satisfaction	77 (25.7)
Moderate Satisfaction	141 (47.0)
Low Satisfaction	82 (27.3)
Total	300 (100.0)

Table 6. Level of satisfaction of different learning styles of second-year and third-year medicine students of FEU-NRMF in online learning environment in terms of learner interaction.

Learner Interaction	Low	Moderate	High
Visual (17)	3 (17.65%)	7 (41.18%)	7 (41.18%)
Aural (19)	3 (15.79%)	12 (63.16%)	4 (21.05%)
Read/Write (27)	6 (22.22%)	13 (48.14%)	8 (29.63%)
Kinesthetic (192)	66 (34.38%)	86 (44.79%)	40 (20.83%)
Multimodal (45)	4 (8.89%)	23 (51.11%)	18 (40%)

Most of the respondents were moderately satisfied in their interactions with their respective learners (Table 5). Students who are classified as Visual learners obtained the highest percentage from the high satisfaction level, followed by Multimodal learners (Table 6).

Multimodal learners were the most satisfied of all of the learning styles in terms of student engagement (Table 8). Majority of these learners were all moderately satisfied with their engagement to their co-students (Table 7).

Table 7. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of student engagement.

Level of Satisfaction	n (%)
High Satisfaction	53 (17.7)
Moderate Satisfaction	172 (57.3)
Low Satisfaction	75 (25.0)
Total	300 (100.0)

Table 8. Level of satisfaction of different learning styles of second-year and third-year medicine students of FEU-NRMF in online learning environment in terms of student engagement.

Student Engagement	Low	Moderate	High
Visual (17)	4 (23.53%)	10 (58.82%)	3 (17.65%)
Aural (19)	6 (31.58%)	10 (52.63%)	3 (15.79%)
Read/Write (27)	6 (22.22%)	16 (59.26%)	5 (18.52%)
Kinesthetic (192)	49 (25.52%)	112 (58.33%)	31 (16.15%)
Multimodal (45)	10 (22.22%)	24 (53.33%)	11 (24.44%)

Table 9. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of instructor presence.

Level of Satisfaction	n (%)
High Satisfaction	43 (14.3)
Moderate Satisfaction	171 (57.0)
Low Satisfaction	86 (28.7)
Total	300 (100.0)

Table 10. Level of satisfaction of different learning styles of second-year and third-year medicine students of FEU-NRMF in online learning environment in terms of instructor presence.

Instructor Presence	Low	Moderate	High
Visual (17)	2 (11.76%)	11 (64.71%)	4 (23.53%)
Aural (19)	6 (31.58%)	11 (57.89%)	2 (10.53%)
Read/Write (27)	5 (18.52%)	18 (66.67%)	4 (14.81%)
Kinesthetic (192)	61 (31.77%)	105 (54.69%)	26 (13.54%)
Multimodal (45)	12 (26.67%)	26 (57.78%)	7 (15.56%)

Majority of the students were moderately satisfied with their instructor's presence during online learning (Table 9). Visual learners garnered the highest percentage for this category and it was followed by Multimodal learners (Table 10).

Table 11. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of student satisfaction.

Level of Satisfaction	n (%)
High Satisfaction	46 (15.3)
Moderate Satisfaction	171 (57.0)
Low Satisfaction	83 (27.7)
Total	300 (100.0)

Table 12. Level of satisfaction of different learning Styles of Second-Year and Third-Year Medicine Students of FEU-NRMF in Online Learning Environment in terms of student satisfaction.

Student Satisfaction	Low	Moderate	High
Visual (17)	2 (11.76%)	12 (70.59%)	3 (17.65%)
Aural (19)	4 (21.05%)	12 (63.16%)	3 (15.79%)
Read/Write (27)	5 (18.52%)	18 (66.67%)	4 (14.81%)
Kinesthetic (192)	64 (33.33%)	101 (52.60%)	27 (14.06%)
Multimodal (45)	8 (17.78%)	28 (62.22%)	9 (20%)

Students were mostly moderately satisfied with the online learning setting (Table 11). Majority of the Multimodal learners were highly satisfied and were followed by Visual learners (Table 12).

Table 13. Level of satisfaction of second-year and third-year medicine students of FEU-NRMF in terms of perceived learning.

Level of Satisfaction	n (%)
High Satisfaction	82 (27.3)
Moderate Satisfaction	187 (62.3)
Low Satisfaction	31 (10.3)
Total	300 (100.0)

Table 14. Level of satisfaction of different learning styles of second-year and third-year medicine students of FEU-NRMF in online learning environment in terms of perceived learning.

Perceived Learning	Low	Moderate	High
Visual (17)	1 (5.88%)	10 (58.82%)	6 (35.29%)
Aural (19)	2 (10.53%)	12 (63.16%)	5 (26.32%)
Read/Write (27)	3 (11.11%)	22 (81.48%)	2 (7.41%)
Kinesthetic (192)	24 (12.50%)	120 (62.50%)	4 (2%)
Multimodal (45)	3 (6.67%)	31 (68.89%)	11 (24.44%)

Majority of the students were moderately satisfied with the learning that they perceived during the online learning setting (Table 13). Students that were classified as Visual learners obtained the highest percentage of being highly satisfied and were followed by Aural learners (Table 14).

DISCUSSION

All universities, including medical schools, here in the Philippines were forced to stop regular face-to-face classes and shift to online classes because of the

COVID-19 pandemic. This abrupt shift caused a lot of significant changes in the environment of the students thus, affecting their satisfaction on the course.

Using the V.A.R.K questionnaire, the results indicated that the majority of second-year and third-year medicine students were primarily kinesthetic learners. This signifies that they were more inclined to lean towards tactile, immersive, and interactive types of experiences in order to associate the cause and effect. Practical work and training are the best times to accumulate ideas or concepts for this kind of learners. Kinesthetic learners tend to become more immersed when face-to-face interaction is practiced. Furthermore, a noticeable portion of respondents, though smaller in number, were also kinesthetically inclined but had other modalities equally utilized. The students with multimodal learning styles were more significant in number than those with single modalities, excluding kinesthetic learners.

Using the SLS-OLE questionnaire, the results have shown that most of the students of different learning styles were moderately satisfied with online education. In the course structure/organization, it showed that the students classified under Read/Write learning style have the highest percentage of being satisfied. This denotes that read/write learners have understood the instructions and the purpose of the topics more and were better hands-on towards the course navigation. For the learner's interaction and instructor's presence categories, students with Visual learning style garnered the highest percentage of high satisfaction. This showed that Visual learners were more satisfied in their communication with their instructor and received more feedback from their classmates than the other learners. Lastly, in terms of student engagement, student satisfaction and perceived learning, it was revealed that students with Multimodal learning style were more highly satisfied than the others. This means that Multimodal learners were more satisfied with the frequent discussion of what they learned in class together with their other classmates and with their overall engagement in the activities that were required by the course. Multimodals have the advantage to easily adapt to changes due to their flexible learning style.

In an online setting, learner interaction and student engagement were not maximized as other students did not have the luxury of having a reliable and stable internet connection leading to missed class sessions. Also, student interaction after online class hours is seldom, as other students chose to conserve their

allocated internet data to be used on the following day. Pre-recorded lectures were sometimes inefficient and students may tend to lose interest when listening to recordings as they did not feel the presence of their instructors. Moreover, recordings were time consuming so students were left with unanswered queries as recorded lectures were exactly allocated in the given time frame. Moderate satisfaction was seen with perceived learning as medicine, in actual practice, is a skill-based course which aims to improve, adapt and educate students in preparation for continuously changing technology and chosen profession. Lapses in the above mentioned affected the satisfaction of students. This study has shown that materials and resources given were insufficient as face-to-face interaction was needed for students to learn and become competent.

The concept that different students have different learning style preferences is already established in several studies (Messick, 1976; Mestre, 2006; Dekker et al., 2012; Alkhasawneh, 2013; Mills, 2002; Fleming, 2002). Similarly, the results of this study also recorded different learning styles among medical students, with kinesthetic learning (64%) being the most preferred among the 2nd and 3rd year medical students at FEU-NRMF. Similarly, a study by Bokhari & Zafar (2019)¹⁰ yielded the same results as the majority of their participants, which also consisted of medical students, preferred kinesthetic learning with auditory, visual, and read/write next. Khanal, Shah, and Koirala (2014)¹¹ also stated that in the unimodal presentation, kinesthetic learning was preferred most by their participants. In contrast to this, a study by Busan (2014) stated that the majority of the medical students that participated in her study were visual learners, yielding 33% of the distribution of learning styles.¹²

Kinesthetic learners learn best through direct experience. They learn more from what was done rather than what was said or read. This type of learning was previously known as “experiential learning”. David Kolb’s “Experiential Learning Theory” revolves on the idea that learning is best achieved through experiences. This theory is best characterized as having four stages - concrete learning, reflective observation, abstract conceptualization, and active experimentation. Based on Kolb’s theory, learning can be best achieved through experiences. Being in a situation where classes are being conducted online, limited hands-on learning can be done. This can be a plausible explanation as to why the overall

satisfaction of the majority of the participants (71%) with regards to online learning is only moderate. Moreover, according to Jean Piaget’s theory of cognitive development, children learn by doing or through various means of actions or movement. Thus, they grow based on the knowledge of those actions, structuring them to their own understanding. Given that kinesthetic intelligence forms information based on bodily activities, it follows the Piagetian theory. In addition, as stated in the Meshing hypothesis, individuals improve best when the learner’s favored sensory preference or learning style is employed, owing to the satisfaction of knowledge perceived.

Overall, the results in this study showed that the majority (71%) of the respondents were moderately satisfied with online education. Similar to this study, Cole, et al., (2014)¹³ conducted a study that showed that students were moderately satisfied with their online instructions. A study by Sampson, et al., (2010)¹⁴ showed that the students were satisfied with their online courses however, the level of satisfaction was not measured. Furthermore, Kuo, et al., (2013)¹⁵ concluded that overall, students in their study were moderately satisfied with online education. In contrast to this study, Hamdan, et al., (2021)¹⁶ found out that the mean score of the students’ satisfaction with online education during pandemic crises of COVID-19 was low.

Hermans, et al., (2009) reported that measuring student satisfaction in e-Learning courses is a significant aspect of successfully promoting higher education. It is noteworthy to mention that the results obtained were able to assist students in assessing their satisfaction with online education, specifically how it helps them better understand and comprehend, with a focus on their individual learning styles. The increased demand for this information justifies the current scenario in the society, in which online education is no longer considered an option, but rather the new standard. Moreover, this study opens a line of discussion for future adaptations in the medical education system in response to uncertain times such as the COVID-19 pandemic.

Since the majority of the respondents were only moderately satisfied, it is important to consider that effective classroom management is a prominent factor with regards to higher student satisfaction. An understanding of factors that influence student satisfaction with online learning in a particular context can be applied to the appropriate design of learning environments, and for the provision of

targeted support to students, with an aim to positively influence the student online learning experience.

Although some participants were highly satisfied with the course structure, the majority of the participants were only moderately satisfied with the structure of their courses, and a number were not very satisfied as their scores for this category were revealed to be low. To improve the satisfaction of the students in this category, the intended learning outcomes and purpose of the courses, both general and specific for each topic or activity, should be pinpointed and clearly stated, and they should be thoroughly explained first before the start of the actual classes or activities. In addition to this, asking the students for feedback about how the course structure can be improved could help increase the satisfaction of the students when it comes to this category. In terms of learner interaction, student leaders of each block can facilitate a meeting at least once a week for every section in order for them to interact with each other. It can be by playing games in groups or by just having casual conversations. Opportunities for active learning of the students should be equally available to each student.

Total satisfaction with synchronous classes was not met considering factors such as poor internet connection, thus there should be a balance between both synchronous and asynchronous lectures for each topic given as to necessitate the situation of each student in order to increase the satisfaction in terms of student engagement. Understandably, there is a big difference between professor-student ratio, thereby contributing to the difficulty with regards to effective communication. However, the instructor's presence is deemed to be necessary and essential to the overall learning and satisfaction of the students. Student coordinators per subject are assigned to help ease this problem. As it is already the task of the coordinators to regularly check for announcements and updates, direct feedback from the professors with regards to assignments and progress of specific groups or students would still be a great aid to the learning of the students in the specific course. It is also noteworthy to mention that amidst the hectic schedule of medical students, some professors do not comply with timely feedback regarding the instructions/ materials needed for reporting and small group discussions, thus contributing to overpiling of tasks to finish as they are unable to accomplish them earlier.

In a pandemic, applying one's medical skills can be hard. For this reason, a high percentage

of respondents are not highly satisfied with their perceived learning. Professors can use different methods such as downloading medical applications that can help the students to, at least, apply their learnings on actual events. Through this study, the administrators will know what changes to consider and whether those changes will work well with their students. Tailoring the structure of the education system based on the students' needs could help make sure that the students are getting the best out of the courses that they take, thus improving their learning and eventually, their satisfaction with online education.

However, this study has potential limitations. First, study participants consisted of only second year and third year medical students of FEU-NRMF, limiting the generalizability of the data. The results rendered from this data might not translate to medical students of other universities and other year levels. Second, other issues of students regarding their online learning environment such as internet connectivity and conduciveness of their environment to learning were not addressed in the study, this information might have a direct impact on the results of their satisfaction. Lastly, cross-sectional studies are observational and descriptive in nature, thus they do not determine cause-and-effect relationships between the two variables.

Based on the limitations cited, this study could be further improved by considering other factors that might affect the student's online learning process such as internet connectivity issues, conduciveness of the student's environment to learning or prolonged screen time. Students with low connectivity or who are frequently disconnected from their zoom classes can be excluded from future studies in order to control this factor. Furthermore, satisfaction of students to different online teaching methods, such as synchronous and asynchronous, may also be addressed. The authors believe that this will give more definite results. In addition, they suggest using a correlational study design to further establish a statistically corresponding relationship between the variables. For future researchers, a different setting for specific context, location and/or culture may be done addressing the same research problems. They advise expanding the scope of participants by including all year levels of medicine to further improve statistical data. In line with this, they propose executing the research in various universities to extend the reach of the study.

Due to the COVID-19 pandemic that is happening right now, all universities, including medical schools, were forced to shift to online learning. This study provided descriptive data on satisfaction of medical students and their learning style towards online education. It highlighted that the majority of the students followed a single mode learning style which is Kinesthetic and revealed that the vast majority of medical students of different learning styles have a moderate satisfaction towards online education. From this, we can say that the abrupt shift from face-to-face to online classes affected the satisfaction of the students of different learning styles towards the course.

REFERENCES

1. Li C & Lalani F. The COVID-19 pandemic has changed education forever: This is how. World Economic Forum 2020. Retrieved from <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>
2. Baticulon RE, Sy JJ, Alberto N, Baron M, Mabulay R, Rizada L, Tiu C, Clarion CA, Reyes J. Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Med Sci Educ* 1–12. Advance online publication. <https://doi.org/10.1007/s40670-021-01231-z>
3. Alqurashi E. Predicting student satisfaction and perceived learning within online learning environments. *Distance Education* 2019; 40: 133-48.
4. Debourgh GA. Predictors of student satisfaction in distance-delivered graduate nursing courses: what matters most?. *J Prof Nurs* 2003; 19(3): 149–63. [https://doi.org/10.1016/s8755-7223\(03\)00072-3](https://doi.org/10.1016/s8755-7223(03)00072-3)
5. Sit JW, Chung JW, Chow MC & Wong TK. Experiences of online learning: students' perspective. *Nurse Education Today* 2005; 25(2): 140–7. <https://doi.org/10.1016/j.nedt.2004.11.004>
6. Chen T, Peng L, Yin X, Rong J, Yang J & Cong G. Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. *Healthcare (Basel, Switzerland)* 2020; 8(3): 200. <https://doi.org/10.3390/healthcare8030200>
7. Dinh L & Nguyen T. Pandemic, social distancing, and social work education: students' satisfaction with online education in Vietnam. *Social Work Educ* 2020; 39(8): 1074-83, DOI: 10.1080/02615479.2020.1823365
8. Fearing A & Riley M. Graduate students' perceptions of online teaching and relationship to preferred learning styles. *Medsurg Nurs* 2005; 14(6): 383–9.
9. Klingner JK, Ahwee S, Pilonieta P & Menendez R. Barriers and facilitators in scaling up research-based practices. *Exceptional Children* 2003; 69(4): 411–29. <https://doi.org/10.1177/001440290306900402>
10. Bokhari NM & Zafar M. Learning styles and approaches among medical education participants. *J Health Prom Educ* 2019; 8: 181. DOI: 10.4103/jehp.jehp_95_19.
11. Khanal L, Shah S & Koirala S. (2014). Exploration of preferred learning styles in medical education using VARK model. *Russian Open Med J* 2014; 3(3): DOI: 10.15275/rusomj.2014.0305
12. Busan A. Learning styles of medical students - Implications in education. *Curr Health Sci J* 2014; 40(2): 104-10. DOI: 10.12865/CHSJ.40.02.04.
13. Cole M & Shelley D. Online instruction, e-learning, and student satisfaction: A three year study. *Int Rev Res in Open and Distance Learning* 2014; 15: 111-31.
14. Sampson PM, Leonard J, Ballenger JW & Coleman JC. Student satisfaction of online courses for educational leadership. *Online J Dis Learning Adm* 2010; 13(3).
15. Kuo YC, Walker AE, Belland BR & Schroder KEE. A predictive study of student satisfaction in online education programs. *Int Rev Res Open and Distributed Learning* 2013; 14(1): 16-39.
16. Hamdan KM, Al-Bashaireh AM, Zahran Z, Al-Daghestani A, AL-Habashneh S & Shaheen AM. University students' interaction, internet self-efficacy, self regulation and satisfaction with online education during pandemic crises of COVID-19 (SARSCoV-2). *Int J Educ Manag* 2021; 35 (3): 713-25.