The Relationship Between Learning Style and Psychomotor Performance of Undergraduate Nursing Students in Medical-surgical Nursing in North-west, Nigeria

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***Abstract*- Background:** Medical-surgical nursing course is a critical component of the undergraduate nursing programme which provide foundations for clinical practice. Literature suggests that learning style can affect psychomotor performances of students in medical surgical nursing.

Aim: This study was aimed to assess the relationship between learning style and undergraduate nursing students' psychomotor performances of medical surgical nursing courses in North-west Nigeria. 4 objectives were achieved in the study.

Methodology: Survey design was used to collect data from Departments of Nursing Science of Bayero University, Kano and Usman Danfodio University, Sokoto. The study population comprise of 812 undergraduate nursing students. A sample size of 233 students were recruited for the study. Multistage sampling technique was used in the recruitment of the study participants. Two (2) instruments were used for data collection. A total of 176 students' questionnaires were retrieved and analyzed. Data was analysed by using Statistical package for the social sciences (SPSS) version 23 using descriptive and inferential statistics.

Results: The result revealed that 57.4% of the students were females with mean age of 24.95 years. Visual (29.5%) and Kinesthetic (28.4%) learning styles were the most commonly used learning styles among undergraduate nursing students in North-west, Nigeria. The psychomotor performances of the students in medical-surgical nursing was very good with mean score of 68.00. There is a significant negative correlation between learning style and students' psychomotor performances in medical-surgical nursing (p-value < 0.05). There is significant mediation effect of students' mode of entry on students' psychomotor performance in medical-surgical nursing (p value < 0.05).

Conclusion: The study concluded that learning style is significantly related to psychomotor performance. Students' mode of entry is a significant mediator between learning style and psychomotor performance.

***Index Terms*-** Learning style, psychomotor performance, undergraduate students, medical-surgical nursing course, Northwest Nigeria.

I. Introduction

Learning styles are the behaviours or actions that students display during the learning interaction and they play a central role in the lives of students. Students vary in the way they receive, process, store and retrieve information; some students learn through visualizing, hearing, reading and writing, (Fleming, 2001) acting, reflecting, experimenting (Kolb, 1984), competing, collaborating, avoiding, participating, depending and many more, (Rollins, 2015). Literature suggests that learning style can affect psychomotor performances of students in medical surgical nursing. Psychomotor skill is of vital importance for undergraduate nursing students. Developing clinical skill in nursing education has been viewed as a huge task. Lecturers need to be aware of students' learning styles so as to meet students' individual learning preferences and enhance knowledge and comprehension. (Amaniyan, Pouyesh, Bashiri, Snelgrove, & Vaismoradi, 2020).

Medical-surgical nursing course is a critical component of the undergraduate nursing programme which provide foundations for clinical practice. Undergraduate nursing students' performance in medical-surgical nursing has been found to be relatively low compared to other courses (Sze, Baaska, & Martin, 2020). Effective styles of learning medical-surgical nursing need to be identified in order to improve students' performance (Adepeju & Euphemia, 2019).

Ever since the commencement of Bachelor of nursing science degree in Nigeria, several unconfirmed statements are being passed by nurses working in the clinical areas expressing their dissatisfaction with the performance of the undergraduate nursing students. During the researcher's life as an undergraduate nursing student in the university, the researcher observed that many of the nurses in the clinical areas lack confidence in

undergraduate nursing students. Most of them believe that nurses who studied in the university are less in psychomotor skills compared to those who studied in Colleges of Nursing.

It is worrisome to note that many students are unaware of their learning styles, and therefore, do not take it into consideration during the learning process. This may have negative consequences on students. Effort must be made to raise awareness as well as the application of the concepts of learning style among undergraduate nursing students in order to help in enhancing their psychomotor performance in medical-surgical nursing.

II. Aim of the Study

The aim of this study is to examine the relationship between learning style and undergraduate nursing students' psychomotor performance of medical surgical nursing in North-west, Nigeria.

III. Objectives of the Study

The study intends to achieve the following Objectives:

1. To identify the learning styles of undergraduate nursing students in North-west, Nigeria.
2. To find out the psychomotor performance of undergraduate nursing students in medical-surgical nursing in North-west, Nigeria.
3. To discover the relationship between learning style and psychomotor performance of undergraduate nursing students' in medical-surgical nursing in North-west, Nigeria.
4. To determine the mediation effect of students' mode of entry on the relationship between learning style and psychomotor performance of undergraduate nursing students' in medical-surgical nursing in North-west, Nigeria.

IV. Materials and Methods

Correlational survey design was applied to obtain data on the relationship between learning style and undergraduate nursing students' psychomotor performance of medical- surgical nursing course in North-west, Nigeria. The researcher obtained data through the use of Fleming's VARK Learning Style Questionnaire (FVLSQ) and students' recent academic score sheet on psychomotor performance in medical surgical nursing. The research setting is the nursing departments of North-west, Nigerian Universities. North-west zone is one of the six geopolitical zones of Nigeria. The study population for this study comprise of all the 296 undergraduate nursing students in the area of the study. A sample size of 222 undergraduate nursing students (Isaac & Michael, 1981; Smith, 1983) was used for this study at 0.05 margin of error and 95% level of confidence. Sample size was increased by 5 percent to 233 (Creswell, 2014) at 5% margin of error and 95% confidence level. Multi-stage sampling technique was used in this study.

Stage One: Cluster sampling was applied where North-west universities that run bachelor of nursing science programme were divided into four (4) clusters. Then two out of the four clusters (universities) were randomly selected for the study. Each University in the two states was made to contribute to the study sample according its percentage contribution to the study population

Stage Two: Stratified sampling technique was then applied where undergraduate nursing students in each university were divided according to level of study into two (2) smaller groups called strata. The students in each level of study were made to contribute proportionately to the study sample according to their percentage contribution to the study population.

Stage Three: Simple random sampling using computer random number generator was then applied to select participants from each stratum.

The instruments used for data collection include:

1. Self-administered student sociodemographic questionnaire
2. Fleming's VARK Learning Style Questionnaire (FVLSQ)
3. Students' academic score sheet

The Fleming's VARK Learning Style Questionnaire (FVLSQ) was developed by Neil D. Fleming. The instrument was subjected to scrutiny by its developers and was already validated. The researcher adapted the instrument for this study. The instrument developed by the researcher was also subjected to scrutiny by handing it over to group of research experts (3 supervisors and 4 juries) to ensure its expert, face, content and cultural validity and some items were reconstructed to ensure its cultural relevance. The FVLSQ has been tested by its developers and was found to be reliable. The Cronbach's alpha for the scores of the VARK subscales were 0.85, 0.82, 0.84, and 0.77 for the visual, auditory, read/write, and kinesthetic subscales, respectively, which are considered adequate (Leite, Svinicki, & Shi, 2015). The sociodemographic instrument developed by the researcher was pre-tested among twenty (20) students and it was found to be reliable with Cronbach's alpha of 0.66 to 0.88.

The data was collected in phases:

1. *Phase One*: Ethical approval was obtained from the Research and Ethics Committee (REC) of Bayero University Kano before the commencement of the study. Approval letters were collected from the institutions where the study was carried out before the commencement of the study. One research assistant was recruited from each of the institutions where the study was carried out and trained on data collection and management for a period of one week. Informed consent was obtained from the study participants (students) before they were enrolled into the study.
2. *Phase Two:* Sociodemographic characteristics questionnaire was administered to the undergraduate nursing students to obtain data on the sociodemographic characteristics of the undergraduate nursing students. VARK Learning Style Questionnaire version 8.01 was administered to the undergraduate nursing students to obtain data on the learning styles of undergraduate nursing students.
3. *Phase Three:* Most recent academic record sheet of undergraduate nursing students in theoretical medical surgical nursing examinations was retrieved and reviewed to obtain data on the present psychomotor

performances of undergraduate nursing students in medical surgical nursing.

4. *Phase Four:* The filled questionnaires were retrieved and stored in a safe place under lock and key. The questionnaires were coded, entered into SPSS and cleaned for data analysis.

Ethical approval was obtained from Health Research Ethics Committee (HREC) of Bayero University Kano before the commencement of this study. Also, institutional approval was obtained from the authorities of Usman Dan Fodio University Sokoto before the commencement of this study. Autonomy was ensured in this study. The researcher fully explained the nature and objectives of the research to the respondents which enabled them gave informed consents. It was also ensured that the respondents participated voluntarily in this study. The respondents were also informed of their rights to withdraw from the study at any time during the study if they so wish. Privacy was also maintained during the administration of the questionnaires to the respondents by administering the questionnaires at places where the respondents felt free to express their views without any external influence. Confidentiality of the information provided by the respondents was also ensured by keeping the filled consent forms and questionnaires under lock and key where only the researcher and some research assistants will have access to them. A total of 233 students' learning style questionnaires were distributed to the students. One hundred and seventy-six (176) students learning style questionnaires were retrieved and analysed. This indicates a response rate of 75.5%.

The completed questionnaires were coded, entered, cleaned and analysed by using statistical package for the social sciences (SPSS) version 23.

1. Descriptive statistics, correlation and regression analyses were used to analyze data in this study. All tests were conducted at the fixed p-value of 0.05.

V. Results

Table 1: Students' socio- demographic characteristics (N=176)

Variable	Frequency	Percent (%)	Mean
Age			**24.95**
Gender			
Male	75	42.6	
Female	101	**57.4**	
Marital status			
Single	134	**76.1**	
Married	42	23.9	
Tribe			
Hausa	116	**65.9**	
Igbo	4	2.3	
Yoruba	19	10.8	
Others	37	21.0	
Religion			
Christianity	28	15.9	
Islam	148	**84.1**	
Level of study			
300L	86	48.9	
400L	90	51.1	
Mode of entry			
D.E.	49	27.8	
U.T.M.E.	127	**72.2**	

Table 1 shows the socio-demographic characteristics of undergraduate nursing students in the selected schools. The mean age of the students was 24.95years with a standard deviation of 3.259years the minimum age among the students was 20years and the maximum age was 35years. Among the students, 42.6% were males and 57.4% were females. Of the total number of students involved in the study, only 23.9% were married the remaining 76.1% were singles. For the students, 65.9% were of the Hausa Ethnic group, 2.3% were Igbo, 10.8% were Yoruba and 21.0% from other ethnic groups like Igala, Tiv among others. The two groups were basically of the major religions of Christianity and Islam. For the students 84.1% were of the Islamic faith and 15.9% belongs to the Christian faith. Out of the 176 students involved in the study, 9 (5.0%) did not indicate their actual ages. Students who were below 21years of age were 3.0% and 58.8% were between 21 and 25years while 38.4% of the students were above 25years.

Of the total number of students involved in the study, 48.9% were in their third year of study (300level) in the school while 51.1% were in their fourth year (400 level). The mode of entry of 72.2% of the students was through the UTME. Only 27.8% of them entered through direct entry.

Table 2: Learning styles of undergraduate nursing students in the study setting (n=176)

Learning styles	Frequency	Percentage (%)
Uni-modal		
Visual	52	29.5
Auditory	31	17.6
Read and Write	43	24.4
Kinaesthetic	50	28.4
Bi-modal (59.7%)		
Kinaesthetic and Auditory	18	10.3
Kinaesthetic and Read/write	16	9.0
Kinaesthetic and Visual	24	13.5
Auditory and Read/Write	15	8.3
Auditory and Visual	19	10.8
Visual and Read/Write	13	7.7
Multi-modal (40.3%)		
Kinaesthetic, Auditory and Read/Write	16	9.0
Auditory, Read/Write and Visual	11	6.4
Read/Write Kinaesthetic and Visual	15	8.3
Auditory, Kinaesthetic and Visual	13	7.7
Visual, Auditory, Read/Write and Kinaesthetic	16	9.0

Table 2 shows the frequencies and percentages distribution of the learning styles employed by the undergraduate nursing students according to the four learning styles. The result of the study revealed that all the four learning styles (VARK) were employed by the undergraduate nursing students in the study area. Among these four learning styles, Visual was the most utilized learning style among the students with 29.5% followed by Kinaesthetic style with 28.4%. Read/Write and Auditory styles followed with 24.4% and 17.6% respectively.

Some of the students however used a combination of two (bi-modal) learning styles. For example, 10.3% of the students used a combination of Kinaesthetic and Auditory, 9.0% used a combination of Kinaesthetic and Read/Write while 13.3% used the Kinaesthetic and Visual combination. Students who were found to have used a combination of Auditory and Read/Write were 8.3% while 10.8% used a combination of Auditory and Visual. Only 7.7% of the students used a combination of Visual and Read/write learning styles.

Other students used a combination of three to four (multi-modal) learning styles. The combination of Kinaesthetic, Auditory and Read/Write was used by 9.0% of the students and 6.4% used a combination of Auditory, Read/Write and Visual while 8.3% of the students used a combination of Read/Write, Kinaesthetic and Visual as their learning style. Students who used a combination of Auditory, Kinaesthetic and Visual were 7.7%. and only 9.0% of the students used a combination of all the four learning styles; Visual, Auditory, Read/Write and Kinaesthetic. In the overall, 59.7% of the total students involved in the study used the bi-modal learning styles while 40.3% of the students were found to have used multi-modal learning styles.

Table 3: Psychomotor performance of undergraduate nursing students in medical-surgical nursing (n=176)

Psychomotor performance	Frequency	Percent (%)
70 - 100 (Excellent)	20	11.4
60 - 69 (Very Good)	**83**	**47.2**
50 - 59 (Good)	59	33.5
0 - 49 (Poor)	**14**	**8.0**

Table 3 shows the psychomotor performance of Undergraduate nursing students in the selected schools. The mean psychomotor performance obtained for all the students was 60.36. The minimum score was 26 while the maximum score was 89. The table showed the classification of the scores by performance categories for all the students involved in the study. As shown in

Table 4.5, only 11.4% of the students performed excellently with scores between 70 and 100%. Those who fall within very good category were 47.2% of the students and 33.5% of the students had good performance while 8.0% had a poor performance with score range between 0 and 49%. From the observation here, the students could be said to have a very good psychomotor performance in medical-surgical nursing courses in North-west, Nigeria.

Table 4: Relationship between learning style and psychomotor performance of undergraduate nursing students in medical-surgical nursing

Variables		Psychomotor Performance
Learning styles	Pearson Correlation	-0.435**
	Sig. (2-tailed)	0. 000

**Correlation is significant at the 0.05 level (2-tailed).

Table 4. shows the relationship between learning styles of undergraduate nursing students and their psychomotor performances in medical-surgical nursing. The finding showed a significant negative correlation between learning style and psychomotor performance at 95% confidence level, r(176) = -0.435, P = < 0.01 as indicated in table 4.7 above. The Pearson product moment correlation coefficient obtained for the test was -0.435. The p-value observed was 0.000 (p < 0.01). This finding indicates that there is a significant relationship between the learning styles of undergraduate nursing students' and their psychomotor performance in medical-surgical nursing. This implies that an increase in the learning style will lead to a decrease in psychomotor performance of undergraduate nursing students and vice versa.

To better understand the above relationship, the researcher performed cross tabulation of learning style with psychomotor performance. The result of the cross tabulation is shown in table 5 below:

Table 5. Mediation effect of students' mode of entry on the relationship between learning styles and psychomotor performance of undergraduate nursing students

	Unstandardized Coefficients		Standardized Coefficients		
Variables	B	Std. Error	Beta	T	p-value
(Constant)	2.387	0.185		12.935	0.000
Learning styles	-0.325	0.048	-0.488	-6.737	0.000
Students' Mode of entry	-0.262	0.128	-0.149	-2.056	0.041
Dependent Variable: Psychomotor performance					

Table 5 shows the mediation effect of students' mode of entry on the relationship between learning styles and psychomotor performance of undergraduate nursing students.

A mediation of students' mode of entry into the school and their learning styles significantly contributed to their psychomotor performances as revealed in Table 4.10.2. The observed F-value for the test which explain the model was 22.771 obtained at 2, 173 df and the p-value for the model was 0.041 (p < 0.05). The observed coefficient of determination (r^2) was 0.208 which means that students' mode of entry and learning styles could explain 20.8% of the total variance for students' psychomotor performance in the selected schools. The multiple R which is the Pearson Product Moment correlation coefficient was -0.435 which showed a weak relationship between the combined explanatory variables and the students' psychomotor performance. The functional relationship for the model could thus be estimated as: Students' psychomotor performance = 2.387 - 0.325Learning styles - 0.262Students' mode of entry into the schools. Based on these observations, undergraduate nursing students' mode of entry has significant mediation effect on the relationship between students' learning styles and students' psychomotor performance in medical-surgical nursing. The result showed that students' mode of entry has significant mediation effect on the relationship between students' learning styles and their psychomotor performance.

VI. Discussion

The result of the study indicated that the mean age of the students was 24.95years. The minimum age among the students was 20years and the maximum age was 35years. Also, 42.6% of the students were males and 57.4% were females. For mode of entry, 72.2% was through UTME and only 27.8% of the students were direct entry students. Also, 48.9% of the students were 300 level students while 51.1% were 400 level students. The age and level of the study of the undergraduate nursing students indicates their ripeness to be able to provide useful information regarding their learning style and its relationship with their psychomotor and psychomotor performances in medical surgical nursing.

The result of the study revealed that all the four learning styles (Visual, Auditory, Read and write and Kinaesthetic) were employed by the undergraduate nursing students in the study area. Among these four learning styles, Visual was the most utilized learning style among the students followed by Kinaesthetic learning style. Read/Write and Auditory styles came third and fourth respectively. Some of the students however, used a combination of two (bi-modal) learning styles. Other students used a combination of three to four (multi-modal) learning styles. In the overall, 59.7% of the total students involved in the study used the bi-modal learning styles while 40.3% of the students used multi-modal learning styles. The finding here is consistent with Rollins (2015) who reported that students vary in the way they receive, process, store and retrieve information; some students learn through visualizing, hearing, reading and writing, competing, collaborating, avoiding, participating, depending and many more. The findings here are agreed with finding from previous study by Lucia, Dale, Lois, Mary, Susie, Karen, Jacqueline, Noelle, Kim and Jillian (2017), who reported that "the predominant learning styles were: sensing – 82.7%, visual – 78.7%, sequential – 65.8%, and active - 59.9%. They concluded that "Predominant learning styles described students as being concrete thinkers oriented toward facts (sensing); preferring pictures, diagrams, flow charts, demonstrations (visual); being linear thinkers (sequencing); and enjoying working in groups and trying things out (active). The finding agreed with previous study by Cetin and Suat (2018) who found that students mostly used VARK (Visual, Aural, Read-write, Kinesthetic) with Kinesthetic the leading learning style. The finding of this study that undergraduate nursing students used all the four learning styles either singly or in combination may be related to their maturity (age and level of study) and could also serve as an explanation to their psychomotor and psychomotor performances in medical-surgical nursing courses.

The study found the psychomotor performance of the undergraduate nursing students to be very high. The mean psychomotor performance obtained for all the students was 60.36. A total of 11.4% of the students had excellent psychomotor performance, 47.2% had very good performance while 33.5% of the students had good performance. Up to 8% of the students had poor psychomotor performance in medical-surgical nursing. From the observation here, the students could be said to have a very good psychomotor performance in medical-surgical nursing courses in North-west, Nigeria. This could be as a result of two factors related to the lecturers and students mentioned above. That is the utilization of blended teaching style by the lecturers and the use of bi-modal as well as multimodal learning styles by the students. The finding of this study contradicted the report of a previous study by Sze, Baaska and Martin (2020) who found that undergraduate nursing students' performance in medical-surgical nursing is relatively low compared to other courses.

The finding of this study found a significant negative correlation between learning style and psychomotor performance of undergraduate nursing students, r (176) = -0.435, P = < 0.05. The Pearson product moment correlation coefficient obtained for the test was -0.435. The p-value observed was 0.000 ($p < 0.05$). This finding indicates that there is significant relationship between the learning styles of undergraduate nursing students' and their psychomotor performance in medical-surgical nursing. This implies that an increase in the learning style will lead to a decrease in psychomotor performance of undergraduate nursing students and vice versa.

The result of cross tabulation of learning style with psychomotor performance revealed that most of the students who had excellent and very good psychomotor performances in medical-surgical nursing are Read and write learners. Also, most of the students who performed poorly in medical-surgical nursing psychomotor performance are Visual learners. The study also found that undergraduate nursing students' mode of entry has significant mediation effect on the relationship between students' learning styles and their psychomotor performance in medical-surgical nursing. The findings here are consistent with previous studies by Nahid, Zahra, Farkhondeh, Camellia, and Majid, (2016); Nicolette, Cailee, and Welch, (2019); Norhidayah, Kamaruzaman, Ali, Syafena and Andin, (2019) who respectively found from their studies that factors influencing students' performance at university did not include entry mode but that such factors have positive effect on psychomotor performance when their learning styles and proper use of learning facilities are being combined together. The result of cross tabulation of students' learning style with psychomotor performance shows that 11 (55.0%) of the students who scored excellent in psychomotor performance of medical-surgical nursing are Read and write learners. Also 31 (37.3%) of the students who scored very good in psychomotor performance of medical-surgical nursing are read and write learners. Out of the 14 students who had poor psychomotor performance in medical-surgical-nursing, 11 (78.5%) are Visual learners.

This study found significant mediation effect of undergraduate nursing students' mode of entry on the relationship between students' learning styles and psychomotor performance in medical-surgical nursing. The finding here is in line with Addis, Shahrazad, and Nooroodin (2015) who revealed in their study that 52.8% academic achievements were at the level of Good (the Median score were between 13-16)". There was no significant relationship between Learning styles and Academic Achievement (P> 0.01). The finding here is reflective of previous study by Nicolette, Cailee, and Welch, (2019) who reported that the five factors that may affect psychomotor academic performance in developing strategies for student enhancement in academic performance are: test anxiety, academic competence, test competence, time management and strategic studying methods on students' performance.

The result of cross tabulation of students' mode of entry with their psychomotor performance further confirmed that students' mode of entry has significant mediation effect on psychomotor

performance of undergraduate nursing students. This is because 14.2% of the direct entry (DE) students had excellent psychomotor performance while only 10.2% of the UTME entry students had excellent psychomotor performance in medical-surgical nursing. Also, 38.8% of the DE students had very good psychomotor performance but 50.4% of the UTME students had very good psychomotor performance in medical-surgical nursing. Furthermore, 13 out of the 14 students who had poor psychomotor performance in medical-surgical nursing were UTME entry students.

VII. Conclusion

Visual and Kinaethetic learning styles are the most utilized learning styles among undergraduate nursing students in North-west, Nigeria. Psychomotor performance of the students is very good. Learning style is significantly correlated with psychomotor performance of the students. Students' mode of entry has a significant mediation role on the relationship between learning style and psychomotor performance.

References

[1] Addis, A. G., Shahrazad, G., & Nooroodin, M. (2015). The relationship between learning style and undergraduate Nursing students' Academic Achievement in school of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran. American Journal of Nursing, 147-153.

[2] Adepeju, M. L., & Euphemia, M. M. (2019). Factors influencing nursing education & Teaching methods in nursing institutions: A case study of south west Nigeria. Global journal of health science, 13-17.

[3] Allen, E. C., Mary, G. K., Kristeen, J. A., Kristhel, J. G., Regie, H. U., & Myra, C. B. (2015). Changing learning needs of students nurses: input to the nursing curriculum. Asia pacific journal of multidisciplinary research , 108-119.

[4] Amaniyan, S., Pouyesh, V., Bashiri, Y., Snelgrove, S., & Vaismoradi, M. (2020). Comparison of the Conceptual Map and Traditional Lecture Methods on Students' Learning Based on the VARK Learning Style Model: A Randomized Controlled Trial. SAGE Open Nursing, 6, 1-9.

[5] Bhat, A. (2020). Research Design: Definition, Characteristics and Types. Retrieved from QuestionPro: https://www.questionpro.com/blog/author/adityabhat/amp/

[6] Cetin, S. Y., & Suat, E. (2018). Determining the learning preferences of the students of the faculty of health sciences in Cyprus international university. SHS web of conferences (pp. 40-49). Antalya, Turkey: EDP Sciences.

[7] Creswell, W. J. (2014). Research Design, Qualitative, Quantitative and Mixed Method Approaches. Los Angeles, USA: SAGE Publications Ltd.

[8] Fleming, N. (2001). Teaching and learning style. In VARK strategies. Christchurch, New Zealand: Neil D. Fleming.

[9] Isaac, S., & Michael, W. B. (1981). Hand Book in Research and Evaluation. San Diego: EdITS Publishers.

[10] Kolb, D. A. (1984). Experience as the source of learning and Development. Experiential Learning. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

[11] Leite, W. L., Svinicki, M., & Shi, Y. (2015). Attempted Validation of the Scores of the VARK: Learning Styles Inventory With Multitrait–Multimethod Confirmatory Factor Analysis Models. Educational and Psychological Measurement, 70(2), 323-339.

[12] Lucia, K. G., Dale, G., Lois, H., Mary, J. C., Susie, H., Karen, M., . . . Jillian, W. (2017). Assessing learning styles of graduate entry nursing students as a classroom research activity: A quantitative study. Nurse Education Today, 55-61.

[13] Nahid, J., Zahra, M., Farkhondeh, S., Camellia, T., & Majid, N. K. (2016). The challenges of nursing students in the clinical learning environment: A qualitative study. The scientific World Journal, 92-98.

[14] Nicolette, H., Cailee, E., & Welch, B. (2019). Developing psychomotor skills through active learning: A systematic review of health care professions. Athletic training education journal, 135-148.

[15] Norhidayah, A., Kamaruzaman, J., Ali, M. N., Syafena, A., & Andin. (2019). The factors influencing student's performance at university Teknologi MARA, Kedah Malaysia. Can.Res.Deve.Can.Sci.Cul., 3(4), 81-90.

[16] Rollins, M. (2015). Learning Style Diagnostics: The Grasha-Riechmann Student Learning Styles Scale. Retrieved from e Learning Industry: https://elearningindustry.com

[17] Smith, M. F. (1983). Sampling Considerations in Evaluating Cooperative Extension Programs. Florida: Cooperative.

[18] Sze, W. W., Baaska, A., & Martin, G. (2020). The effect of concept mapping on the student nurses' learning of Medical-Surgical nursing. Journal of Nursing Education & Practice, 2-9.

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