

The Learning Style and Flexibility of allied health students: Groundwork for Custom-made Learning Resource

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Abstract: In order to understand the overall learning style, learning flexibility and its influencing factors of medical students, this study adopted Kolb Learning Style Scale 4.0 to conduct a questionnaire survey on related questions in a medical college in China. The results show that imagining, experiencing and balancing are three kinds of learning styles of medical students, and the dominant learning styles of girls and boys are significantly different. The study flexibility of medical students is higher on the whole, and the study flexibility of male students is significantly higher than that of female students, and that of students over 18 years old is significantly higher than that of students under 18 years old. These research results are of great significance for the customization of learning resources based on students' learning styles and the enhancement of medical students' professional skills and employment competitiveness.

Keywords: Allied Health Students, Learning Style, Learning Flexibility.

1. Introduction

Learning style is a continuous and consistent way of learning with individual characteristics, which is the sum of learning strategies and learning tendencies. Since the concept was first proposed by American scholar Herbert Thelen in 1954, learning style has quickly attracted the attention of educators, and has become another important topic in the field of learning after motivation, anxiety, cognitive style, and other hot topics. The theory of learning style and its model construction have gradually attracted the attention of researchers. In order to further understand the types of learners' learning styles, Kolb put forward the experiential learning cycle theory in 1984, which divides learning styles into four types:accommodating,diverging, converging, and assimilating. On this basis, Kolb published the Learning Style Scale (Kolb D A, 1984) . In 2011, based on years of research data, Kolb's team further refined the 4 learning styles into 9 learning styles: reflecting, analyzing, experiencing, balancing, initiating, thinking, imagining ,and acting (Kolb A Y, 2013), so as to describe learners' unique learning styles in a more detailed way. Kolb Learning Style Inventory 4.0 (KLSI 4.0) came into being as a good measurement tool for reliability and validity. The continuous development of learning style measurement tools has promoted the wide application of learning style theory. In the medical education with outstanding characteristics and distinctive characteristics, in order to enable students with different styles to achieve the expected teaching goals, it is more necessary to realize the organic matching of teaching resources, teachers' teaching methods and students' learning styles (Zhi li,2021). Therefore, it is necessary to carry out systematic research on the learning style of professional medical students to provide an important basis and reference

for personalized and targeted medical education resources matching (Gao Jianghong,2021).

1.1. Participants

The participants in the study were from a medical university in China and were aged 18-25. A total of 150 medical subjects were selected by stratified sampling

1.2. Procedure

In this study, Kolb Learning Style Scale (KLSI4.0) was used to obtain the basic information, learning style types and learning flexibility of survey subjects. The content of the questionnaire is divided into three parts. The first part is the demographic data of the respondents, including the basic information of age, gender, major, grade ,and residence; The second part is the learning style of the respondents; The third part is used to evaluate the learning flexibility of the survey subjects. The full score of learning flexibility is 1.00, the higher the score, the stronger the flexibility. (Kolb A Y, 2013).

1.3. Data analysis

SPSS 22.0 was used for data analysis. Descriptive statistics are used to describe demographic characteristics, and Chi-square test, T-test ,and F-test are used to analyze the influencing factors of learning style and learning flexibility.

2. Results

2.1. Demographic characteristics

Among the 150 participants in this study, 62.0% were female and 38.0% were male. The majority were 19-24 years old, accounting for 79.3%. In terms of majors, 50 were clinical medicine, nursing and preventive medicine majors, respectively. 61.3% of the students' families are located in cities, 38.7% of the students' families are located in rural areas.

Table 1. Analysis of differences in the distribution of learning styles among survey subjects

Profile	R (n,%)	A (n,%)	E (n,%)	B (n,%)	In (n,%)	T (n,%)	Im (n,%)	A (n,%)	X ²	P
Sex:										
male	7 (14.6)	3 (6.3)	4 (8.3)	8 (16.7)	2 (4.2)	2 (4.2)	18 (37.5)	4 (8.3)	25.62	0.00*
female	4 (3.9)	5 (4.9)	26 (25.5)	21 (20.6)	10 (9.8)	5 (5.4)	23 (22.5)	8 (8.6)		
Age:										
<19	1 (3.2)	2 (6.5)	8 (25.8)	7 (22.6)	1 (3.2)	2 (6.5)	8 (25.8)	2 (6.5)	3.40	0.87
19-24	10 (8.4)	6 (5.0)	22 (18.5)	22 (18.5)	11 (9.2)	5 (4.2)	33 (27.7)	10 (8.4)		
Maioir:										
Nursing	5 (10.0)	1 (2.0)	13 (26.0)	10 (20.0)	4 (8.0)	2 (4.0)	12 (24.0)	3 (6.0)	9.20	0.84
Clinical medicine	3 (6.0)	3 (6.0)	11 (22.0)	7 (14.0)	3 (6.0)	2 (4.0)	17 (34.0)	4 (8.0)		
Preventive medicine	3 (6.0)	4 (8.0)	6 (12.0)	12 (24.0)	5 (10.0)	3 (6.0)	12 (24.0)	5 (10.0)		
Grade:										
Lower grade	7 (6.0)	7 (6.0)	24 (20.7)	20 (17.2)	9 (7.8)	4 (3.4)	34 (29.3)	11 (9.5)	7.23	0.47
Higher grade	4 (11.8)	1 (2.9)	6 (17.6)	9 (26.5)	3 (8.8)	3 (8.8)	7 (20.6)	1 (2.9)		
Resident:										
City	7 (7.6)	5 (5.4)	19 (20.7)	21 (22.8)	7 (7.6)	6 (6.5)	21 (22.8)	6 (6.5)	5.74	0.58
Village	4 (6.9)	3 (5.2)	11 (19.0)	8 (13.8)	5 (8.6)	1 (1.7)	20 (34.5)	6 (10.3)		

(Note:R=Reflecting,A=Analyzing,E=Experiencing,B=Balancing,In=Initiating,T=Thinking,Im=Imagining,A=Acting;
X²=Chi-square test.p<0 .05)

Table 2. Analysis of differences in learning flexibility of medical students

Profile	LFI		T/F	P	
	Mean	S.D.			
sex	male	0.85	0.08	7.87	0.006*
	female	0.80	0.13		
Age	<19	0.78	0.13	6.56	0.011*
	19-24	0.84	0.10		
Major	Nursing	0.84	0.10	0.70	0.496
	Clinical medicine	0.81	0.11		
	Preventive medicine	0.82	0.11		
Grade	Lower grade	0.82	0.10	0.23	0.629
	Higher grade	0.83	0.12		
Residence	City	0.81	0.11	2.82	0.095
	Village	0.8421	0.09		

(Note: T= T-test, F = F-test statistic.p<0 .05)

2.2. Distribution of learning styles

The results showed that among the 150 medical professional groups investigated, all of them had a certain distribution except the decision type, but the imagination type, experience type and balance type of medical students accounted for more three categories, accounting for 27.3%, 20.0% and 19.3% respectively. The other six learning styles accounted for less than 8% of the comparison, and the number of decisive learning styles was 0.

After continuity correction Chi-square test, it was found that the distribution of different genders in the eight learning styles was different, and the difference was statistically significant (X²=25.622, P=0.000). However, the difference of eight learning styles was not statistically significant among respondents of different age, major, grade and residence.

At the same time, the research results also show that the dominant learning style of boys is mainly imagination, followed by balance and reaction, while the learning style of girls is mainly experience, and imagination and balance are also important learning styles of girls. In the further pairwise comparison, it is found that the proportion of boys' imaginary learning style is significantly higher than that of girls, and girls' experiential learning style is obviously for boys, and the differences are significant.

2.3. Respondents' learning flexibility and its influencing factors

The results showed that among the 150 participants, the mean score of the learning flexibility index was 0.82 with a standard deviation of 0.11, indicating that the learning

flexibility of medical students was higher overall. In the further analysis of differences, it is found that the learning flexibility of students of different genders and different ages is significantly different, with male students significantly higher than female students ($t=7.872, p=0.006$) and students over 18 years old significantly higher than students under 18 years old ($t=6.556, p=0.011$). However, the differences in learning flexibility were not statistically significant for different majors, grades and residence.

3. Discussion

This study found that the learning styles of students majoring in professional health are diverse, but the distribution is not balanced, and the trend of centralization is obvious. They pay more attention to and rely on experience in learning, tend to actively experiment, but are not good at logical reasoning and problem reflection when solving problems, and lack of initiative. This will undoubtedly have an adverse impact on clinical practice, which requires a high degree of judgment and logical thinking ability.

Moreover, the study found that there are some differences in the learning styles of allied health students of different genders. During the learning process, boys are more likely or accustomed to imagining possibilities through observation and reflection on experiences, while girls are more likely to find meaning from deep engagement. This may have something to do with boys' and girls' personalities and early parenting styles.

In addition, the study found that the learning flexibility of allied medicine students was generally higher, but there were gender and age differences.

Learning style is a relatively stable characteristic of individual students, but it is not static. Allied health students adjust their learning strategies according to different situations and their own characteristics, and strive for better learning results. This shows the necessity of individualized allocation of educational resources and reform of teaching methods.

4. Conclusion

In the context of modern education, the interaction between teachers' teaching and students' learning has accumulated important academic concerns. An overall picture of the learning style and learning flexibility of professional medical students is obtained from the case study.

Our results elucidate the propensity of medical students at the learning style level, and also reveal the association between learning styles and subjects' profiles. Relevant data show that medical students, due to the particularity of their subject, tend to be more concentrated in their learning style and show outstanding advantages in imagining, experiencing, and balancing. However, the lack of learning style on Analyzing, Thinking and deciding also affects their learning effectiveness to some extent, which means that medical students are not good at systemizing thoughts through

reflection, conducting abstract reasoning and logical analysis, and using theories and models to decide solutions and action policies.

Our data also show that there are significant differences in the distribution of learning styles of medical students of different genders. Specifically, male students tend to prefer imaginative learning while female students prefer experiential learning. In terms of learning flexibility, compared with female students, male students show higher learning flexibility. At the same time, the learning flexibility shows a decreasing trend with the increase of age, which is partly related to the gradual entry of patterned medical education. (Shi Xue,2022)

In sum, our study emphasizes the significance of learning style research for the allocation of teaching resources in personalized education, and reveals the distribution and differences of learning style and learning flexibility among college students. These insights may prove to be invaluable for students' learning effectiveness and effective use of learning resources (Xia Xulin,2019). The core purpose is to pay attention to making up for the weak and differentiated factors in students' learning, improve students' learning ability, matching custom-made resources, and maximize the professional quality and employment competitiveness of professional medical students (Xiao GUI,2021).

References

- [1] Kolb D A. *Experiential Learning: Experience as the Source of Learning and Development* [M]. Englewood Cliffs, NJ: Prentice Hall, 1984:83-85.
- [2] Kolb A Y, Kolb D A. *The Kolb Learning Style Inventory 4.0: A Comprehensive Guide to the Theory, Psychometrics, Research on Validity and Educational Applications* [M]. Boston, MA: Hay Resources Direct, 2013.
- [3] Gao Jianghong, Gong Jing. & Wang Xiaozhong.(2021). Investigation and research on the learning styles of stomatology undergraduates based on the Grascha-Riechmann learning style scale. *Journal of Medical Diet and Health*. Volume 19. No.25.
- [4] Shi Xue,Ding Yang, &Kong Xiangguo.(2022) Implications of quantitative analysis of learning styles of students majoring in Traditional Chinese Medicine for improving Intercultural Communication Curriculum ECM, Volume41No.1.
- [5] Xia Xulin, Li Haojun, & Yao Luxia,(2019) .Research on the Influence of Learning Style on Learning Effectiveness in Blended Learning. *Journal of Contemporary Vocational Education*. No.6.
- [6] Xiao GUI, Chen Xingxing, & Yang Minghang. (2021). Investigation and comparative analysis of learning styles between nursing college students and undergraduates. *Journal of Empirical Research*.No.5
- [7] Zhi li, Li Yan, & Sun Yan. (2021). Study on the relationship between learning style and learning behavior in network environment of hearing impaired college students. *Journal of Suihua University*. Volume 41. No.1.