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Impact of MBTI on Teaching Effectiveness in Internal Medicine Nursing: Teaching Performance, Teaching Quality, and Occupational Identity

Qingxia Yu, Shifeng Chen, Xiaofeng Hou, Mengyan Ma*

Tianfu College of Southwestern University of Finance and Economics (SWUFE), Chengdu 610066, Sichuan, China

**Author to whom correspondence should be addressed.*

Abstract: *Introduction:* This study examined the application of targeted education strategies for nursing students of different MBTI types to enhance students' theoretical and practical grades. Nursing students have different personalities, therefore learning behaviors are significantly different. It is worth exploring whether teaching methods influence these differences and can be improved through specific education strategies. *Methods:* Experimental research methods and Questionnaire survey methods were used to test the effect of MBTI with different personality types on the implementation of targeted education strategies. *Results:* There was a significant correlation between MBTI and teaching effect ($p < 0.005$). Targeted changes in education strategies could effectively improve teaching effect ($p < 0.005$), improve teaching quality ($p < 0.005$), and improve nursing students' professional identity ($p < 0.005$). *Conclusion:* The results showed that targeted changes in education strategies can effectively improve teaching effectiveness, teaching quality, and nursing students' sense of occupational identity.

Keywords: MBTI; Nursing students; Teaching effect; Nursing education

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1. Introduction

With the vigorous development of modern information technology, thousands of information content outbreaks, brought about by the awakening of self-consciousness of students in colleges, cognitive and decision-making abilities continue to improve, prompting the students of colleges on the education mode and teaching methods to build a set of unique self-knowledge and insights [1]. This phenomenon not only promotes the development of teachers' teaching ability but also highlights the importance of respecting the individual differences of college students to realize the importance of tailored teaching. However, previous studies have shown a long-term mismatch between students' and teachers' teaching styles, and it is not easy to achieve consistency in the development of the two [2]. Although the traditional teaching strategy of "teaching students according to their aptitude" has been advocated to improve the quality of teaching and learning for students in higher education, its

implementation as a stand-alone teaching strategy will lead to a thin presentation of teaching effects [3].

Research and teaching are considered core requirements of medical education and continuing professional development [4]. The efficacy of pedagogical methods is pivotal in shaping the trajectory of medical personnel training. Numerous scholars have recognized that a comprehensive understanding of student's teaching requirements, facilitated by preparation, enables the development of personalized education strategies. Implementing these strategies within the educational process has enhanced teaching effectiveness [5]. A group of scholars, led by Edafe, has devised a novel clinical teaching methodology grounded in the FAIR principle (i.e. Feedback, Activity, Individuality, and Relevance). This innovative approach investigated the impact on students' clinical internship learning. The findings of this study indicated that an understanding of the teaching needs of one's peers can yield positive outcomes in the form of feedback, activity, and individual experiences.

MBTI Myers-Briggs Type Indicator (MBTI Myers-Briggs Type Indicator) is a personality type assessment tool widely used in career planning, education, and psychological counseling. The assessment of the content of the four dimensions of the eight endpoints, a total of 16 different personality types, is an essential indicator of the current understanding of individual behavioral differences [6]. This assessment tool can be used in the teaching and learning process to gather information about students in colleges, understand the basic cognition of students in colleges, make judgments based on cognition and other mental activities, and predict students' academic behavior and grades is possible by comprehensively understanding their personality traits [7, 8]. Li *et al.* have demonstrated a correlation between the various MBTI profiles of software engineering students and their programming styles, attitudes, and research personalities [9]. Internal medicine nursing is designed to develop college nursing students' professional competence, practical skills, and professionalism. It is an integral part of the medical and nursing disciplines and is a core course that lays the foundation for subsequent clinical nursing work. The contents and theories of the course are relatively abstract and complex, and the degree of mastery of students could be better. Internal medicine nursing is not only to strengthen the theoretical teaching of students but also to take into account the cultivation of students' practical ability, which has become a crucial and challenging point in the teaching process [10]. However, educators are only concerned with the improvement of students' professional competence in internal medicine nursing education. This teaching method, which prioritizes the dissemination of professional knowledge over students' individual learning needs, will ultimately result in suboptimal student development. Therefore, this study was conducted to investigate the relationship between MBTI and teaching effectiveness in internal medicine and to elucidate the impact of tailored teaching strategies on teaching effectiveness among both introverted and extroverted nursing students at our university.

2. Methods

2.1. Sample and setting

This study consists of two distinct research components, with consistent sample size control and preliminary screening criteria. However, the subsequent research methods differ, where the first part is a survey study, while the second part is an experimental study.

For the survey study, third-year undergraduate nursing students 178 in the university from August 2023 to January 2024 were selected as the study subjects, and the inclusion criteria were: (1) All of them were third-year nursing students; (2) Informed consent and voluntary participation in this study. Exclusion criteria: (1) Students who were absent during lectures, took leave, withdrew, and failed to complete the study as required. After that,

MBTI information was collected from the study participants, and no control group was set up. The data collected was used as agreed with those being studied.

For the experimental study, third-year undergraduate nursing students 171 in the college from February 2024 to June 2024 were selected as the study subjects, and the inclusion criteria were: (1) all of them were third-year nursing students; (2) informed consent and voluntary participation in this study. Exclusion criteria: students who were absent during lectures, took leave, withdrew, and failed to complete the study as required. After that, MBTI information was collected from the study subjects, and two classes were randomly selected as the control group and two as the experimental group. (3)The data collected was used as agreed with those being studied.

2.2. Research methodology

Both adopt the traditional theoretical teaching mode and case study practical teaching mode.

(1) Theory teaching: According to the requirements of the internal medicine nursing syllabus, before the class by the teacher according to the teaching requirements of the production of heart failure courseware, the application of multimedia routine teaching, and finally by the teacher to summarize the teaching experience and Q&A, then to organize the students to complete the "questionnaire star" assessment of heart failure.

(2) Practical training teaching: According to the requirements of the internal medicine nursing syllabus. Before the class, the teacher will make the courseware on respiratory failure according to the teaching requirements, apply multimedia to guide the students to discuss the cases, determine the diagnosis of the disease according to the information of the cases, and put forward the corresponding nursing measures, then organize the students to complete the examination of respiratory failure through the "questionnaire star."

The control group adopted the traditional theoretical and case study practical training teaching modes. The experimental group adopts the theoretical teaching mode of "Mind map + BOPPPS": students are guided to learn about leukemia and complete the mind map drawing before the class. Students were guided to learn about leukemia and complete the mind map drawing before the class. Before the course, they completed the pre-course test based on their self-understanding of leukemia knowledge points; during the course, teachers produced leukemia courseware according to teaching requirements and conducted real-time assessment tests during the course; and at the end of the course, they summarized the course and completed the post-course test.

According to the average score of the three assessment results as one of the standards for testing teaching results, the experimental group adopts a "Progressive case study" practical training teaching mode. Before the class, the teacher will make endocrine courseware according to the teaching requirements. According to the different episodes of the patient's progressive storyline for the question and answer competition, the correct answer group can get points and part of the patient's case information. Ultimately, according to the case information obtained for the organization of the discussion, the first group to come up with a diagnosis of the disease won. The total number of points earned by each group was used as one of the criteria to test the teaching results.

In addition, an occupational identity questionnaire was distributed to both groups of students at the end of the course to understand the change in the Occupational identity of the nursing students, as well as a feedback questionnaire on the quality of teaching and learning to understand the level of satisfaction with the change in education strategies.

2.3. Statistical methods

Data were analyzed with the help of SPSS 23.0 software, using descriptive information, independent samples t-test, and correlation analyses, and differences were considered statistically significant at $P < 0.05$.

3. Results

Based on the 16 MBTI personality types, this study mainly categorized the nursing student group into the well-known introvert (I) and extravert (E) categories. It was found that introverted (I) nursing students had a higher theoretical mean score compared to extroverted (E) nursing students and were more adept at applying theoretical knowledge (**Table 1**), while extroverted (E) nursing students had a higher practical training mean score compared to introverted (I) nursing students (**Table 2**).

Table 1. Appraisal of introverted (I) nursing students analysis.

Appraisal project		n	%	M ± SD
Theoretical grades	66–70	3	3%	90.32 ± 6.54
	81–85	17	20%	
	86–90	25	29%	
	91–95	24	28%	
	96–100	17	20%	
Total		86	100%	
Practical grades	66–70	1	1%	86.1 ± 8.55
	71–75	8	9%	
	76–80	17	20%	
	81–85	33	38%	
	86–90	4	5%	
	91–95	4	5%	
	96-–100	19	22%	
Total		86	100%	

Table 2. Appraisal of extroverted (E) nursing students analysis.

Appraisal project		n	%	M ± SD
Theoretical grades	66–70	2	2%	83.72 ± 5.05
	71–75	4	4%	
	71–80	1	1%	
	76–80	13	14%	
	81–85	50	55%	
	86–90	15	16%	
	91–95	6	7%	
	96–100	1	1%	
Practical grades	81–85	6	7%	94.02 ± 5.27
	86–90	16	17%	
	91–95	31	34%	
	96–100	37	40%	
Total		92	100%	
Practical grades	76–80	2	2%	

Therefore, this study analyzed the correlation between MBTI and assessment scores in linear regression and found that **(Table 3**)there was a significant correlation between theory assessment scores, practical training assessment scores, and different personality types ($p < 0.005$)

Table 3. Comparison of differences between different types of MBTI students and each of the test items.

Variable	MBTI(`X±SD)		*t*	*p*
	I(`X±SD)	E(`X±SD)		
Theoretical grades	90.320 ± 6.539	83.723 ± 5.048	7.497	0.001
Practical grades	86.105 ± 8.554	94.022 ± 5.267	-7.375	0.001

*P < 0.05, **P < 0.01

To further understand the specific effects of different MBTIs and performance on teaching assessment an independent samples t-test was conducted on the theory and practical training scores between introverted (I) and extroverted (E) nursing students, and it was found that there was a significant difference between the theory scores and practical training scores for the different types of MBTI. In theory assessment scores (**Table 4**), introverted (I) nursing students ($\bar{X} = 83.723$, $SD = 5.048$) had a better presentation of teaching and learning outcomes than extroverted (E) ($\bar{X} = 90.320$, $SD = 6.539$), $t = 7.497$, $p = 0.001 < 0.01$. In practical assessment scores (**Table 5**), compared to introverted (I) nursing students ($X = 86.105$, $SD = 8.554$), the Extroverted (E) nursing students ($X = 94.022$, $SD = 5.267$) will have a better presentation of teaching results, $t = -7.375$, $P = 0.001 < 0.01$.

Table 4. Correlation analysis between different types of MBTI students and theoretical grades.

	Unstandardized coefficients		Standardized coefficients	*t*	*p*
	B	SE	Beta		
	90.32	0.627		144.011	.001
MBTI	-6.597	0.872	-0.495	-7.562	.001

a. Dependent variable: Theoretical grades

*$P < 0.05$, **$P < 0.01$

Table 5. Correlation analysis between different types of MBTI students and practical grades.

	Unstandardized coefficients		Standardized coefficients	*t*	*p*
	B	SE	Beta		
	94.022	0.735		127.941	.001
MBTI	-7.917	1.057	-0.492	-7.488	.001

a. Dependent variable: Practical grades

*$P < 0.05$,**$P < 0.01$

Based on the above findings, the internal medicine course team, in the subsequent reflection on teaching work, suggested that the teaching effect affected by different types of MBTI could be improved by changing the intervention of education strategies and that the correlation model between “personality type, education strategies, and teaching effect” could be established.

A comparison is to be made of the results obtained by two groups of students in each assessment. In the theoretical grades (**Table 6**), the introvert (I) nursing students in the control group had an assessment score of (79.3 ± 14.963) and the introvert (I) nursing students in the experimental group had an assessment score of (81.62 ± 8.599), with no statistically significant difference ($P = 0.405 > 0.05$); the extrovert (E) nursing students in the control group had an assessment score of (79.95 ± 9.063) and the extrovert (E) nursing students' assessment scores were (85.52 ± 6.96). The difference was statistically significant ($P = 0.002 < 0.05$).

Table 6. Comparison of theoretical grades scores of different types of MBTI in control and experimental groups.

Variable	Group	X±SD	*t*	*p*
Introvert nursing students	CG(n=37)	79.3 ± 14.963	-0.840	0.405
	EG(n=47)	81.62 ± 8.599		
Extrovert nursing students	CG(n=43)	79.95 ± 9.063	-3.219	0.002
	EG(n=44)	85.52 ± 6.960		

*$P < 0.05$ **$P < 0.01$

In the practical grades (**Table 7**), the assessment results of introverted (I) nursing students in the control group were (68.59 ± 4.14), and those of introverted (I) nursing students in the experimental group were (75.64 ± 3.626), and the differences were statistically significant ($P = 0.001 < 0.05$); the assessment results of extroverted (E) nursing students in the control group were (72.53 ± 2.658), and those of extroverted (E) nursing students' assessment scores were (74.43 ± 3.914), and the difference was statistically significant ($P = 0.010 < 0.05$).

Table 7. Comparison of practical grades scores of different types of MBTI in control and experimental groups.

Variable	Group	X±SD	*t*	*p*
Introvert nursing students	CG(n=37)	68.59 ± 4.14	-8.303	0.001
	EG(n=47)	75.64 ± 3.626		
Extrovert nursing students	CG(n=43)	72.53 ± 2.658	-2.650	0.010
	EG(n=44)	74.43 ± 3.914		

*$P < 0.05$ **$P < 0.01$

In the theoretical achievement, the theoretical teaching under the implementation of the "Mind map+ BOPPPS" teaching mode can effectively improve the theoretical achievement of the extroverted (E) nursing students. However, the theoretical achievement of the introvert (I) nursing students did not show a significant difference in the change, but it can also improve the theoretical teaching achievement of the introvert (I) nursing students; in the practical training achievement, the implementation of the "Progressive case study" teaching mode can effectively improve the theoretical achievement of the E people. Implementing the "Progressive case study" teaching model of practical training can significantly improve the practical training performance of people I and E, and there is a significant difference.

Based on the questionnaire on teaching quality and occupational identity, in the feedback of teaching quality (**Table 8**), the score of the control group was (90.06 ± 17.511), and the score of the experimental group was (95.55

± 10.553), and the difference was not statistically significant ($P = 0.016 > 0.005$). In the score of Occupational identity (**Table 9**), the score of the control group was (33.58 ± 5.509), and the score of the experimental group was (37.18 ± 5.425), the difference is statistically significant ($P = 0.000 < 0.005$). Based on the analysis of MBTI personality type, the implementation of targeted education strategies can significantly improve the nursing students' sense of identity for the nursing profession, and enhance the cognitive orientation of the self-professional; similarly, to a certain extent, it can improve the satisfaction of the nursing students with the quality of teaching, and enhance the interest of the course.

Table 8. Teaching quality feedback questionnaire scores.

Group	X±SD	*t*	*p*
CG(n=80)	90.06 ± 17.511	-2.440	0.016
EG(n=91)	95.55 ± 10.553		

$^{*}P < 0.05$ $^{**}P < 0.01$

Table 9. Occupational identity questionnaire scores.

Group	X±SD	*t*	*p*
CG(n=80)	33.58 ± 5.509	-4.299	0.000
EG(n=91)	37.18 ± 5.425		

*P < 0.05 **P < 0.01

4. Discussion

4.1. Different personality types of students present different instructional results

The above results show that students with introverted (I) and extroverted (E) personality types performed differently in theory and practical training scores. They can be the key factors affecting the study of internal medicine, and there is a significant correlation between them and internal medicine scores. This performance may be related to differences in learning styles, learning interests, and behaviors due to personality differences [11]. This study's results are consistent with Kim's findings that non-cognitive factors, such as learners' personalities are significantly associated with postgraduate dental students' academic achievement and clinical performance [12]. Similarly, Li's findings suggest significant learning differences between academic achievement and MBT and that educators can adjust curriculum design and teaching style to help students with different MBTIs adapt to the teaching and learning process [13]. Therefore, there are limitations in the correlation between learners' major cognitive factors, personality factors, and college teaching outcomes in the traditional education model [14]. Also indicates that there is a demand for differentiated learning modes for students with different personality types and preferences and that the design of education strategies based on the MBTI perspective can break through the teaching law of "there is a way to teach, but there is no definite way."

4.2. Optimizing theoretical teaching models improves systematic knowledge presentation

Students with an extrovert (E) preference have a positive attitude toward learning, love to study exciting content, are highly practical, and often come up with innovative ideas. However, these students have weak learning

habits, are often weak in the reception of stereotypical and rigid theoretical knowledge, and need more systematic knowledge organization. The application of the "Mind Map + BOPPPS" theoretical teaching mode for students with extrovert (E) preference is to organize and preview the knowledge points in the form of a "Mind Map" before class and activate the original knowledge and demonstrate the new knowledge in class, During the lesson, students activate the original knowledge, demonstrate the new knowledge, try to apply the practice, and integrate the knowledge in a continuous cycle, to improve the students' active learning ability. Their ability to understand and master the content and organize the content systematically [15]. The results of the above studies also show that this teaching mode can significantly improve the theoretical performance of this type of student group, and meeting students' basic psychological needs creates positive attitudes towards teaching and learning and promotes constructive teacher-student relationships in the teaching and learning process, with far-reaching effects on students' approaches to self-learning [16].

Therefore, in the face of students with extroversion (E) preference, teachers need to develop diversified teaching thematic activities in the teaching process to stimulate learning interest and realize all-round, multi-faceted, and systematic knowledge sorting in the teaching process, to exercise their ability to pay attention to the theme and to cultivate their ability to think logically.

4.3. Optimizing the practical training model improves teaching motivation

Students with an introverted (I) preference are more independent in their learning, more inclined to self-exploratory learning, often set up unique learning methods for themselves, and have strong independent judgment and the ability to think and analyze problems. However, these students are weak in divergent thinking due to their established learning patterns. The application of "Progressive case study" practical training teaching mode for students with introverted (I) preference, through the group combined with the case storyline progressive scenario mode practical training, inspires nursing students to discover problems and solve problems layer by layer, promote nursing students to feel the actual clinical work atmosphere, better realize the theory link to practice, improve the learning effect, to cultivate nursing students' independent learning ability and improve their ability to think and analyzing. Learning effect: To cultivate nursing students' independent learning abilities, nursing students need evidence-based thinking and critical thinking [17]. The results of the above studies also show that this teaching mode can significantly improve the practical training performance of this type of student group. Therefore, teachers can adopt exploratory topics or challenging knowledge points to guide students with introverted (I) preferences to think differently to improve the traditional linear thinking mode.

5. Conclusion

In this study, introverted (I) and extroverted (E) students were chosen as the research subjects, explored their performance in internal medicine, and found that different personality types existed in different students had a certain influence on the teaching effect and the influence also appeared that there was a differentiated learning mode of the individual students' demands. The emergence of this "demand" also warns teachers how to realize the change of education strategies in the process of teaching to meet the student's learning demands and improve the effectiveness of teaching. Although the MBTI is an effective intermediary tool for teachers to understand students and realize the differentiated learning needs of different students, the MBTI test assessment has a certain time limit and a particular stage. For the subsequent long-term teaching process, how to design education strategies to

meet the individual teaching needs of nursing students to stimulate the learning interest of each nursing student to promote the cultivation of high-quality nursing talents in colleges is an area that needs to be continuously explored and intensely cultivated.

Disclosure statement

The author declares no conflict of interest.

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