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# Practical research on the cultivation of inter-disciplinary undergraduate nursing talents in the context of "big health"

Meichun Tan[1], Huan Liu[1], Yingqing Xiang[1*], Lin Xiong[1], Liqin Zou[2] and Liang Fang[3]

## Abstract

**Objective** Exploring the construction and effectiveness of a inter-disciplinary undergraduate nursing talent cultivation model in the context of"great health".

**Methods** Adopting cluster sampling method, undergraduate nursing students enrolled in 2019 and 2020 were selected as the research subjects. The students who entered the school in 2019 were selected as the control group, who was cultivated according to"applied talent"cultivation model, Correspondingly, the students who entered the school in 2020 were selected as the experimental group, who was cultivated according to"inter-disciplinary talent"cultivation model. The practical effects of the two cultivation models were evaluated by stages: investigating students' innovation ability and scientific and technological readiness before clinical intership; investigating the satisfaction of the employer, service recipients, and clinical teacher with the students at the end of the clinical internship; Counting the total credits and average grades of compulsory courses for students at graduation.

**Results** The innovation ability score and scientific and technology readiness score of the experimental group students were higher than those of the control group students before the internship; At the end of the clinical internship, the satisfaction scores of the employer, service recipients, and clinical teacher of the experimental group students were higher than those of the control group students; At graduation, the total credits and average scores of compulsory courses of the experimental group students were higher than those of the control group students, and the differences were statistically significant ($P < 0.05$).

**Conclusion** The "inter-disciplinary talent" cultivation model is conducive to improving students' innovation ability、scientific and technological readiness、social satisfaction, and academic performance.

**Keywords** Inter-disciplinary, Nursing talents, Cultivation model

*Correspondence:
Yingqing Xiang
569056086@qq.com
[1]Jiangxi University of Technology Medical College, Nanchang, Jiangxi Province, China
[2]School of Public Health, Zhaoqing Medical College, Zhaoqing, Guangdong Province, China
[3]The Second Affiliated Hospital of Nanchang University, Nanchang, Jiangxi Province, China

## Introduction

In 2016, General Secretary Jinping Xi formally put forward the new concept of "big health" at the National Health and Wellness Conference [1]. This concept expanded and extended the connotation of health, clearly stating that promoting people's health should be the center, serving the people, and disease prevention should be the main focus, providing comprehensive and full life cycle health services for the people. In the context of" big health", the Ministry of Education proposed the construction of"new medical science" in 2018 [2]."The new"medical science should embody "three new":firstly, a new concept: from treatmentoriented to a full life cycle health service that includes prevention, treatment, and rehabilitation; Secondly, a new context: a new round of technological revolution and industrial change represented by artificial intelligence and big data; Finally, There is a new major that aims to achieve cross disciplinary integration between medicine and humanities, science, engineering, and other disciplines. Under the requirements of the"new medical science"construction, previous nursing concepts, nursing connotations, and nursing knowledge structures should undergo changes. The traditional nursing centered on disease care and serving patients should be expanded to health promotion as the core, based on the whole life cycle and the whole population, and further extended from disease care to the prevention of disease, health promotion [3].

The new round of scientific and technological revolution represented by the new generation of Internet and artificial intelligence is changing the traditional nursing practice. New technologies such as the Internet, the internet of things, artificial intelligence, big data, and genomics will further expand the senses of nursing staff, extend the tentacles of nursing staff, enabling nursing staff to remotely and dynamically monitor the patient's health status, lifestyle, disease progression, and treatment adherence etc., and provide personalized and accurate health management for patients. Nursing robots will be able to effectively solve the contradiction between the decreasing labor force and the increasing elderly population, enabling the elderly to receive timely, efficient, and warm care [4]. Therefore, in the context of "great health", the theories and methods of a single nursing discipline are no longer able to adapt to the complexity of human life activities, the multi-causal nature of health problems, and the diverse needs of health services [5]. Deepening the cross-fertilization of nursing with disciplines such as demography, sociology, psychology, preventive medicine, information technology, rehabilitation medicine, etc., and cultivating inter-disciplinary and innovative nursing talents who are able to solve key problems by applying cross-disciplinary knowledge, have a richer knowledge structure, and a broader vision are the new requirements of the society for nursing education.

In Cambridge Dictionary, one of the explanations about 'talent' is people who are employed who have skill and ability and are good at their jobs. In education, talent is a holistic concept blending innate potential with developmental opportunities. It recognizes diverse abilities, prioritizes growth, and seeks to democratize access to resources that allow all students to thrive in their unique strengths. Inter-disciplinary talents are those who have both specialized skills in a particular field and extensive knowledge and skills in other related fields. Inter-disciplinary talents have the following characteristics: diversified knowledge structure, outstanding adaptability, and comprehensive problem-solving ability [6]. Innovative nursing talents refer to those who have rich imagination and creativity, can creatively solve doubts and difficulties in nursing work, and promote the development of nursing discipline [7].

In summary, reforming the current talent cultivation model and cultivating innovative and inter-disciplinary nursing talents with both nursing and other multidisciplinary backgrounds are the requirements of nursing education put forward by the construction of "new medical science" in the context of "big health", and also the needs for the development of nursing education itself in the new era. Domestic scholars such as Xue Yang and Yan Xiong [8–9] have shown that the cultivation of inter-disciplinary nursing talents needs to innovate the cultivation model and build the modularized curriculum of professional groups. Research conducted by Yulu Li, Ruixue Kong [10] has found that many universities cultivate inter-disciplinary nursing talents by adjusting the allocation of educational systems. For example, the Nursing College of Gannan Medical University implements a "2 years on campus + 2 years clinical education" cultivation model, while Shandong Medical College adopts a "2 + 0.5 + 0.5" cultivation model. Hubei University of Traditional Chinese Medicine implements the "1.5 + 1.5"cultivation model. Foreign scholars such as Amal Jasim Al-Qallaf and Yingfei Sun [11–12] have found that carrying out inter-disciplinary curriculum teaching and practice activities can improve students' attitudes toward inter-disciplinary learning. There are no reports on the cultivation of inter-disciplinary undergraduate nursing talents, and this study aims to explore the construction and effectiveness of a inter-disciplinary talent cultivation model of "one core, two bodies, and three integrations". With the following specific methods:

## Objects and methods

### Research subjects

This study adopted cluster sampling method and selected the undergraduate nursing students enrolled in our

university in 2019 and 2020 as the research subjects. The students enrolled in 2019 were selected as the control group, and the students enrolled in 2020 were selected as the experimental group. Inclusion criteria: students were aware of the purpose of the study, volunteered to participate in this study, and successfully graduated after completing all courses. Exclusion criteria: dropping out or taking a break from school; refusing to participate in this study. This study was a prospective study in which the target population was selected, the research methodology and evaluation indicators were designed, and the final evaluation of the effects was made within the planned time frame. The study was approved by the Ethics Committee of school (review approval number: A099-20230830-007).

## Study methods

### *Control group*

Students in the control group were trained according to the previous cultivation model of "applied talent"which involves 3 years campus study, mainly in theory learning, and 1 year clinical internship, mainly in clinical nursing practice. During their school years, students are required to study public basic courses, medical basic courses, nursing professional courses, and nursing humanities and social science courses in accordance with the National Standards for Nursing Teaching Quality (2018 edition). During their school years, students will also learn nursing skills through participating in practical courses and clinical practice; Exercise comprehensive abilities through participating in volunteer service activities and summer practical activities. During their internship in the hospital, students were required to learn basic nursing techniques and specialized nursing techniques in various clinical departments in accordance with the National Standards for Nursing Teaching Quality (2018 edition) and the internship outline.

### *Experimental group*

Students in the experimental group were trained according to the cultivation model of "inter-disciplinary talent", and the differences between the two talent cultivation models are shown in the Table 1.

Specific measures for the cultivation of inter-disciplinary talents are as follows:

The college always adhere to the core of cultivating "innovative and inter-disciplinary nursing talents". In the process of talent cultivation, the college always revolves around the core of "innovative and inter-disciplinary nursing talents", and integrates nursing professional knowledge with other professional knowledge such as elderly services, management, humanities, information science, etc., so that students' knowledge and ability structure can be optimized and combined, and they can

**Table 1** Comparison of the 2 cultivation models

| cultivation models | | applied talent | inter-disciplinary talent |
|---|---|---|---|
| Talent cultivation orientation | | applied nursing talent | Innovative and inter-disciplinary nursing talent |
| Talent cultivation objectives | | Requirements for the 2 dimensions of nursing dimension, and social dimension | Requirements for the 3 dimensions of nursing dimension, social dimension, and technological dimension |
| Talent Service Scope | | Clinical nursing, community nursing, and other nursing service areas. | Clinical care, health management, wellness services, and other health service areas. |
| Talent cultivation method | 3 years of on-campus study | Theoretical studies: Courses are offered in accordance with the requirements of the National Standards for the Quality of Nursing Teaching and are taught in accordance with the program of classes offered.<br>Practical activities: Various nursing service practical activities such as blood pressure and blood glucose measurement activities in nursing homes. | Theoretical studies: Integration and optimization of the curriculum based on meeting the requirements of the courses offered<br>Practice Activities: Conduct various interdisciplinary health service practices. For example, visit schools to advocate healthy lifestyles and behavioral habits. |
| | 1 year of clinical practice | Learing nursing knowledge and skills in accordance with the internship program at the internship hospital | Learning multidisciplinary knowledge and skills in nursing, management, and recreation at various internship sites such as internship hospitals, communities, and nursing homes in accordance with the internship program. |

become talents with knowledge and abilities in multiple fields.

**Constructing the two major teaching systems of theory and practice** Theory Teaching: Under the guidance of the new talent cultivation objectives, the theory teaching has been reformed as follows:

1. Integrating interdisciplinary courses: The college integrates some courses in the talent training program to cultivate students' interdisciplinary knowledge and abilities. For example, nursing management and health education have been integrated into health education and management, traditional Chinese medicine nursing and rehabilitation nursing have been integrated into traditional Chinese medicine health preservation and rehabilitation, and nursing ethics and health regulations have been integrated into nursing ethics and regulations. The talent training program has also added elective courses such as nursing informatics, nutrition and health, and exercise and health, aiming to cultivate students' multidisciplinary knowledge and abilities.
2. Establishing interprofessional faculty teams: The nursing faculty of the college and the management, psychology, rehabilitation medicine and other professional faculty of the practice base have formed a number of interdisciplinary faculty teams, aiming to provide a guarantee for the development of interdisciplinary teaching and practicing activities.
3. Exploring interprofessional teaching reform and practice: The college encourages nursing teachers to engage in cross disciplinary teaching and research activities such as teaching experience exchange, academic exploration, research projects, and participation in teaching innovation competitions with teachers from other majors such as management, big data management and application, artificial intelligence, and education; The college encourages teachers to carry out comprehensive case design and simulation teaching, to use teaching methods such as team learning, role-playing, and scenario exercises, with the aim of transforming students' learning thinking from simple repetition to independent thinking, from simple simulation to comprehensive analysis, and cultivating students' knowledge and abilities in multiple fields.

**Practical teaching: including on-campus practice and off-campus practice**

1. Reforming on-campus practice teaching model: the College has built four experimental teaching platforms: basic medical experimental platform, pharmacy experimental platform, midwifery training platform, and a basic nursing experiment platform. Under the guidance of the new talent training objectives, the college breaks the previous model of independent management and operation of various platforms, implements an "integrated" practical teaching management model, and carries out the design and teaching of comprehensive experiments, aiming to break through the barriers of a single nursing discipline, effectively integrate nursing with basic medicine, pharmacy, midwifery and other disciplines, and cultivate students' interdisciplinary knowledge and abilities.
2. Broadening the off-campus practice teaching platform: Colleges and hospitals, recreational homes, dental specialty clinics, medical examination centers, and other units to build a number of practice teaching bases, which provide a broad platform for students to carry out geriatric services, community care, volunteer activities, summer social practice, and other practical activities.
3. Extending the content of on- and off-campus practice teaching.
   Under the guidance of the goal of cultivating innovative and inter-disciplinary talents, college cultivate students' multidisciplinary knowledge and ability, as well as innovation ability by broadening practical forms, improving practical methods, and enriching practical contents. For example, teachers lead students to go into primary and secondary schools to popularize basic first aid knowledge and skills, and develop healthy lifestyles and behaviors; teachers and students go to the community together to teach community residents the "seven steps to wash the hands", moxibustion, cupping and other traditional Chinese medicine techniques; teachers organize students to go to the university to carry out HIV prevention education, early screening for HIV; teachers and students go to senior recreation centers to carry out "love, respect and help the elderly" volunteer services.
4. Organizing inter-professional practical activities.

Under the guidance of the interdisciplinary faculty team, the college organized teachers and students to go to various practical teaching bases and carry out inter-disciplinary practical teaching activities through case discussions, scenario simulations, and group teaching such as Table 2:

**Implementing the education model of "integration of full time and part-time teachers, integration of industry and education, and integration of schools and enterprises** The college has a certain number of full-time

**Table 2** Interprofessional health services

| case | academic group | task |
|---|---|---|
| Grandpa Liu, male, 75 years old, retired worker, lives with his wifer in Room 301, Block 8, Ziyun District. His wife passed away 1 month ago, so he is very sad and doesn't like to talk to people. He has had high blood pressure for 10 years, and he likes to eat fatty meat and pickled food, and he takes coronary heart disease medication irregularly. Recently he often wants to smoke, feels shortness of breath after activities, and is mainly bedridden. | nursing | Respiratory management such as back tapping for sputum evacuation, education on smoking cessation, and guidance on healthy lifestyles |
| | Nutrition | Nutritional assessment and dietary program development |
| | psychology | Assessment of mental health status and psychological intervention |
| | rehabilitation | Assessment of activity capacity, development of activity programs |

teachers and selectes a group of skilled talents with high professional titles, rich experience, and strong abilities from the practical teaching bases as part-time teachers who will undertake some teaching, lecture, training, and other tasks, which achieving the integration of full-time and part-time teachers; The college encourages professional teachers to work in industries or enterprises such as hospitals, nursing homes, and dental clinics for on-the-job training during their spare time, to timely understand the development trends of the industry, collect case studies needed for classroom teaching. At the same time, the college hires experts from industries or enterprises such as hospitals and nursing homes as enterprise mentors to give special lectures or training to students, guiding them in practical learning. In addition, the college encourages teachers to bring the teaching into industries or enterprises for on-site teaching, and achieve the integration of industry and education through various methods mentioned above; The college has signed cooperative relationships with health centers, dental clinics, pharmaceutical companies and other enterprises to jointly organize and carry out various practical activities, jointly write textbooks, jointly design courses, and jointly undertake teaching tasks, thus achieving school enterprise integration.

## Observation indicators

### *Social dimension: survey on the satisfaction of employer, service recipients, and clinical teaching teachers with students*

Questionnaire of employers' satisfaction with students: The research team refer to the questionnaire of Rong Yan, Liu Yan Yan, et al. [13–14], and then design their own questionnaire of employer satisfaction(QES)for students, which contains two parts: basic information and satisfaction survey. Through 2 rounds of correspondence from experts, The satisfaction survey scale contains 6 first-level indicators, such as civic and political literacy, and 15 s-level indicators. The reliability and validity of the questionnaire are 0.92 and 0.78.

Questionnaire of service recipients' satisfaction with students: The research team refer to the questionnaire of Chang Na et al. [15],, and then make their own questionnaire of client satisfaction (QCS)for students, which contains two parts: basic information and satisfaction survey. Through 2 rounds of correspondence from experts, The satisfaction survey scale contains 5 primary indicators, such as service attitude, and 14 secondary indicators. The reliability and validity of the questionnaire are 0.85 and 0.90.

Questionnair of clinical teachers' satisfaction with students: The research team refer to the questionnaire of Xiaotong Ding, Yue Ma, et al. [16–17]and then make their own questionnaire of clinical teachers' satisfaction with interns (QCLTS), which contains two parts: basic

information and satisfaction survey. Through 2 rounds of expert correspondence, The satisfaction survey scale contains 7 primary indicators and 22 secondary indicators, such as professional ethics and professionalism. The reliability and validity of the questionnaire are 0.90 and 0.89.

The above three satisfaction questionnaires scales all use the Likert five point scoring method, the scores from high to low are 5, 4, 3, 2, and 1, representing respectively"very satisfied, satisfied, fair, dissatisfied, and very dissatisfied". The higher the score, the higher the satisfaction.

#### *Nursing dimension: GPA and total credits*

According to the requirements of the talent cultivation program, students should complete all compulsory courses and some elective courses according to their preferences, obtain no less than 181 credits in order to graduate smoothly. At graduation, their average scores for all compulsory courses and total credits will be calculated. All scores are calculated on a percentage basis. The five level scoring system is calculated based on 90 points for excellent, 80 points for good, 70 points for average, and 60 points for passing.

#### *Technology dimension*

**Self-assessment scale of college students' innovation ability** This scale was developed by Qiki Wang in 2023 to understand the innovation ability of college students [18]. This scale includes 30 items in three dimensions: innovative thinking ability (9 items), innovative learning ability (11 items), and innovative practical ability (10 items). The scale adopts Likert's five-level scoring method, the scores from high to low are 5, 4, 3, 2, and 1, representing respectively"fully compliant, compliant, uncertain, not compliant, not at all compliant". The total score of this scale ranges from 30 to 150, and the higher the total score is, the better the innovation ability is. The Cronbach's alpha coefficient of the scale is 0.922 (innovative thinking ability 0.867, innovative learning ability 0.796, innovative practice ability 0.837).

**Science and technology readiness scale for college students** This scale was proposed by Parasuraman (2000), which refers to the tendency of people to accept and use new technologies in their life or work, and was used to investigate students' attitudes toward new technologies such as artificial intelligence in clinical nursing. The scale contains 36 items in four dimensions, i.e. optimism (10 entries), innovativeness (7 entries), inadaptability (10 entries), and insecurity (9 entries). The scale adopts Likert's five-level scoring method, the scores from low to high are 1, 2, 3, 4, and 5, representing respectively "Strongly disagree, Don't quite disagree, unsure, Quite agree, and Strongly agree". Higher scores indicate a higher propensity to use the new technology in the future. The Cronbach's alpha coefficient of the scale is 0.922 (innovative thinking ability 0.867, innovative learning ability 0.796, innovative practical ability 0.837).

### Data collection

Researchers create a questionnaire on the Wenjuanxing platform, which generates an online questionnaire access link and QR code. Before the formal survey, for the student questionnaire, two members of the research team go to each class to communicate with students. They explain in detail the purpose of the questionnaire, the content of the survey, and provide the access link or QR code. The research team members explain on site the item, which is difficult to understand for students during the process of filling out the questionnaire. A total of 363 questionnaires were received from students, excluding 17 invalid questionnaires such as regular questionnaires, consistent questionnaires, and short answer time.346 valid questionnaires were recovered, with an effective recovery rate of 95%. For the questionnaires on the satisfaction of employer, service recipients and clinical teachers, Firstly, the other two members of the research team will communicate with the hospital's internship supervisor, and explain in detail the purpose of the questionnaire, the content of the survey. Then, the supervisor will be responsible for communicating with questionnaire recipients and providing the access link or QR code to the questionnaire. A total of 178 satisfaction questionnaires were received. After excluding 37 invalid questionnaires, a total of 141 valid questionnaires were recovered, with an effective recovery rate of 79%.

### Data analysis

SPSS version 21.0 is used to analyze the date. General information use descriptive analysis. Quantitative datas that follow normal distribution are described by "mean ± standard deviation", and the comparison between groups is made by two independent samples T-test. Quantitative datas that do not follow a normal distribution are described by median and quartile, and the comparison between the 2 groups is made by the nonparametric test U-test. The count data was statistically analyzed using the chi-square test. A $p$ value of $< 0.05$ is considered statistically significant.

## Results

### Demographics

Participant characteristics are presented in Table 3. There are a total of 363 research subjects.

The control group consists of 188 students, including 33 male and 155 female, with a mean age of (20.78 ± 3.95) years old. The experimental group consists of 175 students, including 44 male and 131 female, with a mean age of (20.13 ± 2.74) years old. There is no statistical difference between the two groups in Demographic

**Table 3** Participant demographic data($N=363$)

| Group | Gender | | Age | Average score of completed courses |
|---|---|---|---|---|
| | Male | Female | | |
| Experimental group($n=175$) | 44 | 131 | 20.13 ± 2.74 | 76.63 ± 10.31 |
| Control group($n=188$) | 33 | 155 | 20.78 ± 3.95 | 74.48 ± 9.63 |
| T/$\chi^2$ | 0.59[1)] | | 0.73[2)] | 0.86[2)] |
| *p* | > 0.05 | | > 0.05 | > 0.05 |

1): $\chi^2$ 2):T

**Table 4** Comparison of satisfaction scores in 2 groups (score, $\bar{x}$±S)

| Group | Employer satisfaction score (15~75 scores) | Service recipient satisfaction score (14 ~ 70 scores) | Clinical teacher satisfaction score(22 ~ 110 scores) |
|---|---|---|---|
| Experimental group($n=175$) | 62.80 ± 10.41 | 55.28 ± 12.54 | 93.98 ± 12.56 |
| Control group($n=188$) | 48.84 ± 11.93 | 49.26 ± 12.16 | 75.36 ± 20.15 |
| t | 7.89 | 3.078 | 7.01 |
| *p* | < 0.001 | 0.002 | < 0.001 |

**Table 5** Comparison of total credits and compulsory course averages of students in 2 groups(points, M ($P_{25}$,$P_{75}$))

| Group | total credits [score, M($P_{25}$,$P_{75}$)] | course averages [score, M($P_{25}$,$P_{75}$)] |
|---|---|---|
| Experimental group($n=175$) | 174(171, 178) | 80.20(75.68, 82.13) |
| Control group($n=188$) | 172(164, 178) | 78.50(73.53, 81.68) |
| Z | 1.97 | 2.173 |
| *P* | 0.049 | 0.03 |

**Table 6** Comparison of students' innovativeness scores in the 2 groups(score, $\bar{x}$±S)

| Group | Creative thinking skills(9–45) | Innovative learning capacity(11–55) | Innovative Practical Skills (10–50) | totals(30–150) |
|---|---|---|---|---|
| Experimental group($n=175$) | 37.70 ± 5.17 | 48.71 ± 5.39 | 45.26 ± 7.56 | 131.68 ± 14.80 |
| Control group($n=188$) | 32.25 ± 4.60 | 41.04 ± 7.27 | 38.40 ± 5.94 | 111.69 ± 14.37 |
| t | 7.04 | 7.68 | 6.86 | 8.66 |
| *p* | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

information such as gender and age, as well as average score of completed courses ($P>0.05$).

### Satisfaction survey results

At the end of the internship, a questionnaire survey on the satisfaction of the employer, service recipient, and clinical teachers with the students will be published online through Wenjuanxing platform. The scores of the satisfaction questionnaire are presented in Table 4:

### Students' total credits and compulsory course averages at graduation

At graduation, the total credits and average score of compulsory course forstudents are counted, and the specific scores are shown in Table 5:

### Innovative ability of college students

Before internship, a questionnaire survey on the Self-assessment scale of college students' innovation ability will be published online through Wenjuanxing platform. The specific scores are shown in Table 6:

### Technology readiness of college students

Before internship, a questionnaire survey on Science and Technology Readiness Scale for College Students will be published online through Wenjuanxing platform. The specific scores are shown in Table 7:

## Discussion

### The new cultivation model that can effectively improve social satisfaction with students

Under the guidance of the concept of"great health", the nursing concept has shifted from disease care as the center to promoting people's health as the center, and the connotation of nursing is to provide health services for the whole life cycle of the people. The complexity of human life activities, the multi-cause nature of health problems, and the diversity of health service needs make it difficult for nursing staff with only a single discipline's theory and methods to meet the health service needs of the people [19]. The National Standard for Teaching Quality of Undergraduate Professional Categories in General Colleges and Universities clearly states that

**Table 7** Comparison of students' technology readiness scores in the 2 groups(score, $\bar{x}$±S)

| Group | optimism(10–50) | innovativeness(7–35) | Inadaptability(10–50) | insecurity(9–45) | total(36–180) |
|---|---|---|---|---|---|
| Experimental group($n=175$) | 41.26 ± 5.48 | 28.39 ± 4.64 | 40.82 ± 6.28 | 39.74 ± 7.26 | 153.68 ± 14.80 |
| Control group($n=188$) | 37.40 ± 6.83 | 24.86 ± 5.93 | 35.92 ± 5.41 | 34.74 ± 6.49 | 133.68 ± 14.37 |
| t | 3.38 | 4.19 | 5.49 | 5.72 | 8.67 |
| *p* | < 0.05 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

professional undergraduate education should cultivate talents with team spirit and interdisciplinary cooperation awareness [20]. Jinling Lu et al. [21] investigations found that many nursing colleges in China lack interdisciplinary faculty and courses, resulting in students lacking knowledge and skills in other majors, as well as a lack of overall perception of the roles of various majors in the medical system. Jihye Yu et al. [22] propose that effective communication and collaboration between nursing staff and other health service providers are key to providing safe and high-quality health care services for patients.

The reformed talent cultivation model always adheres to the core of cultivating inter-disciplinary talents and focuses on cultivating students' inter-disciplinary knowledge and skills. Firstly, courses with different disciplinary natures but certain correlations are integrated, and courses from other disciplines besides nursing are added; Secondly, the college has established multiple interdisciplinary faculty teams, and encourages them to carry out interdisciplinary teaching and research activities; In addition, the college collaborates closely with enterprises such as hospitals, community health service centers, and elderly care homes, et al. The college has further clarified the requirements of the industry and positions for nursing talents, clarified the positioning of nursing talent cultivation, and improved the conditions for talent cultivation through exchanges and cooperation with enterprises, aim to cultivate talents that meet the needs of society. This study shows that the scores of students in the experimental group in the satisfaction questionnaire survey are significantly higher than those of the control group ($p<0.05$), as shown in Table 4, which indicates that the new cultivation model is conducive to improving the students' multidisciplinary knowledge and ability and thus better meet the needs of society.

### The new cultivation model helps to improve students' academic performance

Satoru Haresaku et al. [23] found that interdisciplinary courses or programs can help nursing students learn about other health care professions, and help promote cooperation and communication between different professions. Rongmei Wang et al. [24] found that The integrated course with interprofessional education and simulation provided a positive impact on undergraduate nursing students' attitudes toward interprofessional learning and knowledge about operating room nursing. Tzu-Sang Chen et al. [25] found that adopting some interdisciplinary learning methods and setting up interdisciplinary courses can significantly improve academic performance. This study shows that the total credits and average scores of the experimental group are significantly higher than those of the control group ($p<0.05$), as shown in Table 5. It shows that The reformed talent cultivation model can help improve students' academic performance. Under the guidance of the new cultivating model, the college has established in-depth cooperation with enterprises such as hospitals, community health service centers, and elderly care homes. The college not only introduces corporate mentors to undertake teaching work, but also collaborates with corporate mentors to develop teaching program, revise teaching content, and develop textbooks. The most important thing is that the college and the enterprise jointly form an interdisciplinary teaching team, encourage the team to carry out interdisciplinary teaching and research activities, and encourage team to lead students to practical teaching bases to carry out various forms and themes of interdisciplinary practical activities. Therefore, students' academic performance has significantly improved.

### The new cultivation model that helps improve students' innovation ability and scientific and technological readiness

In 2018, the Ministry of Education put forward the "four new" construction, namely, the construction of "new engineering, new medical science, new agricultural science, and new liberal arts" [26]. In the context of "new medical science", higher medical schools need to cultivate innovative nursing talents [27]. Yingjie Yao et al. [28] proposed that nursing research and innovation ability is the core ability and necessary condition for undergraduate nursing students when engaging in nursing work after graduation. Lei Chen [29] pointed out that the cultivation of innovative talents should attach importance to the integration of disciplines and majors, as well as the construction of teaching resources, such as "Nursing + X" cross-curriculum. Na Sun et al. [30] found that the practice platform is the incubation base for nursing innovative talents, and is an important place to cultivate interdisciplinary nursing talents. Qing Zhang and Ying Zhou [31–32] found that students' scientific research ability can be improved by building a learning community, and through the exchange of courses and practice together.

Guided by the goal of cultivating inter-disciplinary talents, The college has built several practice platforms with hospitals, elderly care homes, dental specialty clinics, communities, and other enterprises. The practical platform provides a broad space for students to carry out nursing care, community nursing, health science popularization, volunteer service, as well as innovative practical activities. Meanwhile, the college is a science education base in Jiangxi Province, and has been fulfilling its social responsibility of carrying out health science popularization activities for the people for many years. Teachers and students have carried out a series of diverse, rich, and thematic science activities in schools, communities, and families, such as cardiopulmonary resuscitation, Heimlich maneuver, traditional Chinese medical moxibustion, traditional Chinese medical massage, AIDS prevention, etc. Through participating in various practical activities, students not only develop their communication and collaboration skills, but also enhance their innovation abilities. This study shows that the innovation ability scores of students in the experimental group are significantly higher than those of the control group ($p < 0.05$), as shown in Table 6. It shows that the new cultivation mode, helps to improve the innovation ability of students.

### The new cultivation model that helps improve students' technology readiness

With the rapid development of robotics and artificial intelligence, a variety of artificial intelligence devices and systems such as robotic nursing, intelligent drug management systems, and intelligent bedside nursing systems, etc. have been widely used in clinical practice [33–34]. To adapt to the development of nursing disciplines, nursing students need to have a preliminary understanding of the use of new technologies and equipment, as well as possess certain abilities in nursing practice informatization [35]. Under the new talent cultivation model, the college has added elective courses such as nursing informatics for students; Professional teachers have also incorporated relevant knowledge of artificial intelligence into their teaching; Meanwhile, teachers will lead students to practice bases such as hospital to learn about the application of artificial intelligence in clinical nursing such as medical history collection, disease observation, remote nursing, and continuity of care. This study shows that the technological readiness score of students in the experimental group is significantly higher than that of the control group ($p < 0.05$), as shown in Table 7. This indicates that the new cultivation model helps to improve students' technological readiness, helps students better accept and use new technological devices or systems in their future work, and adapts to the development of the nursing discipline in the future.

In conclusion, Compared with the application oriented cultivation model, the nursing talents cultivated by the inter-disciplinary model have better performance in the three dimensions of society, nursing, and technology.

## Summary

Under the guidance of "Healthy China 2030" and the background of "big health", cultivating innovative and inter-disciplinary nursing talents with both nursing and other multidisciplinary backgrounds is not only the requirements of society, but also the needs for the development of nursing education itself [25, 36]. This study has constructed and implemented a inter-disciplinary talent cultivation model of "one core, two bodies, and three integrations", which has achieved certain results. However, this study also have some shortcomings. It did not establish clear evaluation indicators for inter-disciplinary nursing talents, did not track and understand the performance of students in the workplace 3–5 years after graduation, and evaluation for graduates by employers and service recipients. Therefore, in the future research, we will further refine the relevant work and improve the evaluation of the quality of graduates.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12909-025-07075-0.

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

#### Author contributions

Conceptualization、methodology、writing、review and editing：Meichun Tan, Huan LiuQuestionnaire preparation, distribution: Liang Fangdata collection and collation: Liqin Zouwriting—original draft preparation: Yingqing Xiang, Lin XiongAll authors reviewed the manuscript.

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#### Data availability

No datasets were generated or analysed during the current study.

## Declarations

#### Ethical approval and consent to participate

The ethics committee of Jiangxi University of Technology (review approval number: A099-20230830-007). Informed consent was obtained from all participants of the study.

#### Consent for publication

Not applicable.

**Competing interests**
The authors declare no competing interests.

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