Original Article

Study of an evaluation index system of nursing undergraduate employability developed using the Delphi method

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Abstract

Purpose: To establish an evaluation index system of nursing undergraduate employability.
Methods: Two-round expert consultation using the Delphi method and involving 26 nursing experts nationwide.
Results: The usable response rates of the 2-round consultation were 89.7% and 100% in the first and second round, respectively. The specialist authority coefficient was 0.869 and the coordination coefficients were 0.205 and 0.212 for the first and second round, respectively, both were statistically different. The evaluation index system comprised four first-level indexes, 13 second-level indexes, and 82 third-level items.
Conclusion: High positivity representative of the consulted experts enabled the construction of a reliable index system that can be used as a reference for cultivating nursing undergraduate employability.

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1. Introduction

The concept of undergraduate employability was first proposed by domestic scholar Zheng Xiaoming in 2002, representing the overall abilities undergraduates obtain from learning and the holistic development of qualities for realizing their ideal form of employment and forming their sense of self-worth in society [1]. While it is widely accepted, many scholars have elaborated on the structure and content of employability from varying perspectives. As an evaluation parameter, employability directly reflects school-running benefits, undergraduate competitiveness, and social value of education [2]. Under the National Ministry of Education...
ideology “to reinforce undergraduate teaching and improve teaching quality”, this study, which involves “overall-quality management orientation” [3], aimed to construct an evaluation index system of nursing undergraduate employability for examining the quality of nursing education by evaluating the employability of nursing undergraduates, and then providing suggestions for educational reform and development.

2. Methods

2.1. Task team establishment

We established a task team consisting of a graduate student, a tutor, and three instructors. To ensure that the study ran smoothly, team members established a research framework, designed the questionnaires, and coordinated the study throughout in addition to collecting and analyzing data.

2.2. Questionnaire compilation for expert consultation

We retrieved relevant literature from both home and abroad, and used semi-structured interviews to establish the item pool. An expert in psychology audited this item pool, and we compiled a questionnaire for expert consultation based on the item pool. The questionnaire contained the following: (1) Instructions on the research content, background, time returned, contact information, and acknowledgment. (2) A portion consisting of related concepts such as employability, three forms corresponding to every class index, and additional notes on revisions from the experts. Based on the importance of the evaluation indexes, a score of 1–5 was assigned to denote the least to most important item in sequence. (3) A form for gathering general information, determining familiarity with consultation, and self-assessment.

2.3. Selection of experts

We used the following inclusion criteria for experts to ensure the authority, representativeness, and reliability of our results: employed at a baccalaureate nursing college or upper first-class general hospital for >15 years with a senior title, bachelor’s degree or higher, and volunteered for the study. This study involved 18 baccalaureate nursing colleges and 11 upper first-class general hospitals.

2.4. Two-round consultation

In the first round, we distributed the questionnaire to the experts by e-mail or in person. The experts evaluated the appropriateness and importance of the items in the questionnaire. In the second round, we improved the questionnaire through group discussion based on the information obtained from the first round. Using 2-round consultation, we were able to formulate opinions.

2.5. Establishment of filtering criteria

We removed items with a score of <4 or coefficient >20%. By consulting the literature, opinions of the experts, and through group discussion, we modified, removed, or added items.

2.6. Statistical analysis

We used EpiData 3.1 and SPSS 13.0 to record and analyze data, respectively. Rate, mean, and standard deviation were used in descriptive analysis, which yielded initiative, authority, variable, and coordination coefficients. We performed significance testing for coordination coefficients that were statistically different (p < 0.05).

3. Results

3.1. General characteristics of the experts

Of the 29 experts approached, 26 returned the questionnaire. The experts were from 17 baccalaureate nursing colleges and nine upper first-class general hospitals in 21 municipalities of 15 provinces and aged 42–58 years (range: 51.4 ± 4.4 years). Two (7.7%) had worked for >15 years, 6 (23.1%) had worked for >20 years, and 18 (69.2%) had worked for >30 years. Fifteen (57.7%) had master’s and doctorate degrees; the rest had bachelor’s degrees. Among the 26 experts, three held senior vice titles and 23 held senior titles; 17 were presidents and nine were nursing directors, including 10 with “double qualifications” (38.5%) and 23 post-graduate tutors (88%).

3.2. Initiative coefficients

We collected 89.7% and 100% of the questionnaires in the first and second round, respectively. Thirteen experts (50%) provided constructive suggestions in the first round, while five did the same in the second round.

3.3. Authority coefficients

An authority coefficient (Cr) depends on the familiarity with the field (Cs) and criterion (Ca), i.e., Cr = (Cs + Ca)/2 [3]. Five degrees of familiarity were valued from 0.2 to 1.0, indicating lowest to highest familiarity in arithmetic sequence. We divided the criterion into more, medium, and less in sequence, including theoretical analysis (0.3, 0.2, 0.1), practical experience (0.45, 0.35, 0.2), literature at home and abroad (0.2, 0.15, 0.1), and subjective judgment (0.05, 0.05, 0.05). The authority coefficient was 0.869, with 0.838 familiarity and 0.900 criterion.

3.4. Coordination

Coordination depends on variable and coordination coefficients. The variable coefficients fluctuated between 7.9% and 28.6%, and 7.6% and 21.0% in the first and second round, respectively. The coordination coefficients in the first and second round were 0.205 and 0.212, respectively. Both
coefficients were significantly different (p < 0.01). Table 1 lists the data obtained.

3.5. Consultation

Nine experts opined that several items were not well-described. For example, they suggested that “personality traits”, a first-level index, be defined and refined further; some items involved requirements deemed higher than what fresh nursing graduates could meet. We removed, redefined, revised, and integrated items based on the expert opinions. For example, we merged “nurse–patient communication skill”, “interpersonal skill”, and “self-presentation skill” into a second-level index. We modified the third-level items “one can complete fundamental nursing techniques independently, skillfully, and regularly” to “one can complete fundamental nursing techniques accurately and regularly”, and “one can find and solve nursing problems through the evidence-based nursing method” to “one should have a sense of evidence-based nursing practice”, which reflected lower but more realistic requirements than before. With continued feedback, modification, and improvement, we constructed an evaluation index system of nursing undergraduate employability that comprised four first-level indexes, 13 second-level indexes, and 82 third-level items. Table 2 details the results of this process.

3.6. Content validity of the index system

Content validity indicates how well actual content measured by a scale matches the content intended for measurement. As one of the most widely used indexes in quantitative evaluation, there are two types of content validity index (CVI): item-level (I-CVI) and scale-level (S-CVI) [5]. In the first round, I-CVI ranged 0.885–1.000, S-CVI universal agreement (S-CVI/UA) was 0.888, and S-CVI average (S-CVI/Ave) was 0.993. In the second round, I-CVI, S-CVI/UA, and S-CVI/Ave were 0.923–1.000, 0.931, and 0.997, respectively.

4. Discussion

4.1. The scientific rationale for establishing an evaluation index system of nursing undergraduate employability

The Delphi method, devised by the RAND Corporation and the Douglas Company in the second half of the 20th century, is widely used in the field of social science and is currently being used by an increasing number of nursing researchers. It is an advantageous extension of a systematic approach to the field of value judgment, which plays a major role in brainstorming without being influenced by authoritative opinions [6]. Based on the general and professional characteristics of nursing undergraduates, the system was initially developed by semi-structured interview, reference model of employability [7]—proposed by Yorke and Knight and widely used in the employment field—and literature review of training goals, professional norms, educational standards, and employability at home and abroad. Two-round expert consultation led to the eventual establishment of the system. Guided by scientific theory throughout, we developed a clear, systematic, and integrated system. The system has four dimensions: (1) Understanding of knowledge, which indicates how well one grasps the subject knowledge, including understanding of the relationships among diverse disciplines and the ability to combine and integrate theoretical knowledge and practical technology. (2) Professional skills, which are essential for nursing but less useful for other positions due to their specialized nature. (3) General skills, which are necessary and transferable beyond a specific career or profession. (4) Personality traits, which are the sum of psychological traits such as capacity, personality, attitude, emotion, value, and behavior shown in nursing, which consists mainly of professional attitude, emotion, faith, values, and self-efficacy.

4.2. Representation of consulted experts

As the key to the success of the Delphi method, the selection of the consulted experts is important to guarantee the authority and reliability of the results. It is necessary for experts to obtain extensive knowledge, rich experience, and full insight into a research topic to carry out proper evaluation and make valuable judgments. Aiming at the features of employability, the consulted experts came from a talent base in terms

<table>
<thead>
<tr>
<th>First-level index</th>
<th>Second-level index</th>
<th>x ± s</th>
<th>CV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of knowledge</td>
<td>Knowledge storage ability</td>
<td>4.77 ± 0.43</td>
<td>9.01</td>
</tr>
<tr>
<td></td>
<td>Critical thinking ability</td>
<td>4.73 ± 0.45</td>
<td>9.56</td>
</tr>
<tr>
<td>Professional skills</td>
<td>Ability to apply nursing process</td>
<td>4.62 ± 0.57</td>
<td>12.36</td>
</tr>
<tr>
<td></td>
<td>Operational ability</td>
<td>4.69 ± 0.47</td>
<td>10.04</td>
</tr>
<tr>
<td></td>
<td>Professional development ability</td>
<td>4.73 ± 0.45</td>
<td>9.56</td>
</tr>
<tr>
<td>General skills</td>
<td>Interpersonal competence</td>
<td>4.62 ± 0.57</td>
<td>12.36</td>
</tr>
<tr>
<td></td>
<td>Social adaptation ability</td>
<td>4.73 ± 0.45</td>
<td>9.56</td>
</tr>
<tr>
<td></td>
<td>Independent learning ability</td>
<td>4.69 ± 0.47</td>
<td>10.04</td>
</tr>
<tr>
<td></td>
<td>Ability to cooperate</td>
<td>4.81 ± 0.40</td>
<td>8.36</td>
</tr>
<tr>
<td></td>
<td>Ability to manage information</td>
<td>4.23 ± 0.51</td>
<td>12.15</td>
</tr>
<tr>
<td></td>
<td>Ability to plan and organize</td>
<td>4.00 ± 0.49</td>
<td>12.25</td>
</tr>
<tr>
<td>Personality traits</td>
<td>Professional ethics</td>
<td>4.77 ± 0.43</td>
<td>9.01</td>
</tr>
<tr>
<td></td>
<td>Self-efficacy</td>
<td>4.85 ± 0.37</td>
<td>7.59</td>
</tr>
</tbody>
</table>

x, mean; s, standard deviation; CV, variable coefficients.
of both cultivation and experience. To avoid regional differences, the experts were selected from East, South, North, Southwest, Northeast, and Northwest China, originating from 15 provinces altogether. They are influential domestic presidents or nursing directors, some of whom have participated in policy formulation regarding the cultivation of nursing undergraduates and are equipped with an overall grasp of the current requirements for employability. The common characteristics were level of education, title and age structure, higher education, academic standing, rich experience, and high achievements in their field. In addition, their work units encompassed both military and local colleges and traditional Chinese and Western medical colleges. Thus, we conclude that the consultation results are extensive, authoritative, and representative.

4.3. Reliability of results

We analyzed the reliability of the results mainly from initiative, authority, and coordination coefficients, and content validity. To some extent, the questionnaire recovery rate reflected the degree to which an expert was concerned and positive about the research contents. We collected 89.7% and 100% of the issued questionnaires in the first and second rounds, respectively, both considerably higher than the standard return rate of around 50%. That indicates that the consulted experts were motivated, interested in the research content, and were willing to commit to the study. It is generally believed that an authority coefficient >0.8 indicates greater assurance in selection, with 0.7 being the minimum acceptable standard [8]; the larger the number, the higher the authority and prediction accuracy. In our study, the authority coefficient was 0.869, with 0.838 familiarity and 0.900 criterion. We conclude that the consulted experts have high authority and that the results are reliable.

The degree of coordination is composed of variable and coordination coefficients. A smaller variable coefficient and higher coordination coefficient indicate expert opinions that are more consistent. We narrowed down all but one variable coefficient to <20% after the 2-round consultation. To avoid subjective bias, we performed significance testing for the coordination coefficient, which was 0.205 and 0.212, in the first and second round, respectively. Both values were statistically significant (P < 0.01), proof that the expert opinions were concordant and that the results are desirable. Generally, S-CVI/UA must not be <0.8 to indicate good content validity, while S-CVI/Ave should be 0.9 [4]. We tested content validity to show that the actual content measured using a scale matched what we intended to measure very well, where S-CVI/UA was 0.888 and 0.931, and S-CVI/Ave was 0.993 and 0.997 in the first and second round, respectively.

4.4. The significance of establishing an evaluation index system of nursing undergraduate employability

Along with the popularization of higher education, improving the quality of undergraduate talent has become a serious challenge. One indication is the obvious employability gap when university students graduate [9]. Therefore, to ensure steady advancement of teaching reforms for improving undergraduate employability and overall quality, the employment of university graduates has been repeatedly emphasized at national and provincial work conferences. High employment rates merely indicate that there are more posts for nursing undergraduates; they do not represent greater employability. However, it has been shown that less comprehensive cognition of employment, low professional identity, weaknesses in communication, coordination, nursing research, nursing management, willpower, cohesion, and execution are certain to influence post-graduation competence [10–12]. Thus, it is essential to construct an objective, canonical, and scientific index system to evaluate nursing undergraduate employability, which has not been reported thus far. We hope that our study provides helpful reference for nursing undergraduates to identify their employability gap so that they strengthen the cultivation of integrated qualities and talents for sustainable development. We also hope that our findings will aid universities in clarifying the differences and weakness in talent cultivation at home and abroad so that the relevant improvements can be made to educational reform efforts and that employers use the talent available and guarantee the stability of a nursing team.

5. Conclusion

Based on literature review and semi-structured interviews, we established an evaluation index system of nursing undergraduate employability using the Delphi method. The selected experts were highly representative, authoritative, positive, and their opinions were centralized, indicating that the index system is reliable. However, the deficiency of low coordination coefficients persisted despite the statistically significant differences. The number of items may be why the experts had difficulty achieving consensus. The next step is to test the reliability and validity of the system through factor analysis by clinical empirical study and simplify it so that it is user-friendly.

Funding

This study was supported by Educational Reforms of Fujian Medical University (J10006) and UK-China Collaborative Partnerships in Employability and Entrepreneurship (PMI2) (2010–2012).

Conflicts of interest

None

References


