

# Development and Validation of a Tool for Measuring the Professional Identity of Nursing Students: the Q-IPEI / Le développement et la validation d'un instrument de mesure de l'identité professionnelle chez les étudiantes infirmières : le Q-IPEI

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## Recommended Citation

Tchouaket, Eric; Houle, Dominique; Therrien, Dominique; Larouche, Catherine; Denoncourt, Annie; and Reny, Pascale (2019) "Development and Validation of a Tool for Measuring the Professional Identity of Nursing Students: the Q-IPEI / Le développement et la validation d'un instrument de mesure de l'identité professionnelle chez les étudiantes infirmières : le Q-IPEI," *Quality Advancement in Nursing Education - Avancées en formation infirmière*: Vol. 5: Iss. 2, Article 5.

DOI: <https://doi.org/10.17483/2368-6669.1163>

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## **Development and Validation of a Tool for Measuring the Professional Identity of Nursing Students: the Q-IPEI / Le développement et la validation d'un instrument de mesure de l'identité professionnelle chez les étudiantes infirmières : le Q-IPEI**

### **Cover Page Footnote**

We wish to thank the Ministère de l'Éducation, du Loisir et du Sport (MELS) in Quebec, Canada, which financed Professor Houle's interlevel collaboration program. This research was made possible by this grant. We also wish to thank Roxana Staiculescu and Johanne Barrette, as well as the students who participated in this research.

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## Introduction

In recent decades, Western countries have undergone major societal changes. These have been described in terms of transitions: demographic (population aging and migration issues), nutritional (dietary and lifestyle changes), epidemiological (disease chronicity), and technological (new technologies and medical advances) (Clavet, Duclos, Fortin, Marchand, & Michaud, 2013). Nurses are called to work in a constantly changing environment with populations presenting increasingly complex health problems (Ordre des infirmières et infirmiers du Québec, 2010).

Given the global shortage of nurses recognized by the World Health Organization (WHO), nurses are confronted with greater responsibilities in an environment of complex care (Senior, 2010). Moreover, they are faced with public health, mental health, and psychological health issues, which lead to their absenteeism, presenteeism and, above all, abandonment of the profession (Ordre des infirmières et infirmiers du Québec, 2010, 2011). These issues have underscored the connection between rapid changes in care environments and confusion around defining nurses' roles and level of professional identity (PI) (Fry et al., 2013; Stenner, Carey, & Courtenay, 2010). Sainsaulieu (2014) defined PI as "the way in which different groups in the workplace identify with peers, leaders, [and] other groups." In contrast to Sainsaulieu, who saw PI as being generated through the experience of power relations, Champy (2012) and Dubar, Tripier, and Boussard (2015) considered PI to depend strongly on the recognition or non-recognition of the person's knowledge, skills, and self-concepts by institutions, co-workers, the institutional hierarchy, union representatives, the academic world, the family context, and so on. As such, nurses' PI must be formed during their education as nursing students.

The analysis of the PI development of nursing students identifies the most important dimensions on which teachers can intervene to promote retention in school and in employment. Without knowing these critical dimensions, investing in strengthening the PI of nurses in education would remain impractical (Champy, 2012; Dubar et al., 2015). Moreover, several challenges, tensions, questions, and imbalances hinder the retention of nurses in the education continuum. When these challenges are approached from the perspective of PI development, social and emotional components are then integrated, which contrasts with more discipline-centred conceptions (Houle, 2011). According to Pépin, Ducharme, and Kérouac (2010), the guiding principle of any nursing education should be inspired by the discipline, and the PI of nursing students needs to be strengthened and maintained throughout their academic career. However, regardless of the advancement of students in education, their socio-emotional experiences with individuals, families, and groups can be considered. The creation and validation of a questionnaire on the development of PI from this angle will be more complete because it will take into account the disciplinary foundations of the profession and the lived experience.

To strengthen the nursing profession, and above all to reinforce the image of the practising nurse, it would be important to discern future nurses' level of PI during their academic education, hence the relevance of measuring PI development in future nurses.

The literature highlights the complex and multifaceted nature of PI. This concept relates to personal and social factors associated with the need for self-awareness to advance one's personal and professional development (Bennett, 2010; Adams, Hean, Sturgis, & Macleod Clark, 2006; Dobrow & Higgins, 2005). For other authors, PI in the health sector refers to the health professional's personal and subjective conception of the role that must be adopted to carry out

one's responsibilities and especially to ensure quality and safe care (Fry et al., 2013; Stenner et al., 2010). For Horton, Tschudin, and Forget (2007), PI refers to the nurse's level of responsibility within a care team. These authors specify that a nurse's PI is founded on respect for the values of the profession (code of ethics). This idea is supported by Birks, Chapman, and Francis (2010), who consider that nurses' PI indicates the degree to which they have internalized and integrated their professional role. Rognstad, Nortvedt, and Aasland (2004) and Weis and Schank (2009) also found that nurses' PI is based on their integration of values and beliefs underlying their thoughts and actions in their practice. For several other authors (Deppoliti, 2008; Johnson, Cowin, Wilson, & Young, 2012), PI is constructed and deconstructed as a result of repeated reflection on the gap between theory and practice.

Given this multiplicity of interpretations, as Goulet and Dallaire (2002) suggest and supported by Houle et al. (2017), there is ambiguity and lack of consensus around the definition of nurses' PI. Nevertheless, nurses' PI is characterized by personal, relational, and professional skills or representations that enable them to practise more effectively.

Measuring the level of PI development in nursing students involves simultaneously describing the levels of their personal, relational, and professional practice representations for a better future practice throughout their academic program. The scientific literature abounds in tools for measuring PI (Cowin, Johnson, Wilson, & Borgese, 2013). However, none focuses simultaneously on the three representations, nor on the measurement of PI among nursing students during their academic program.

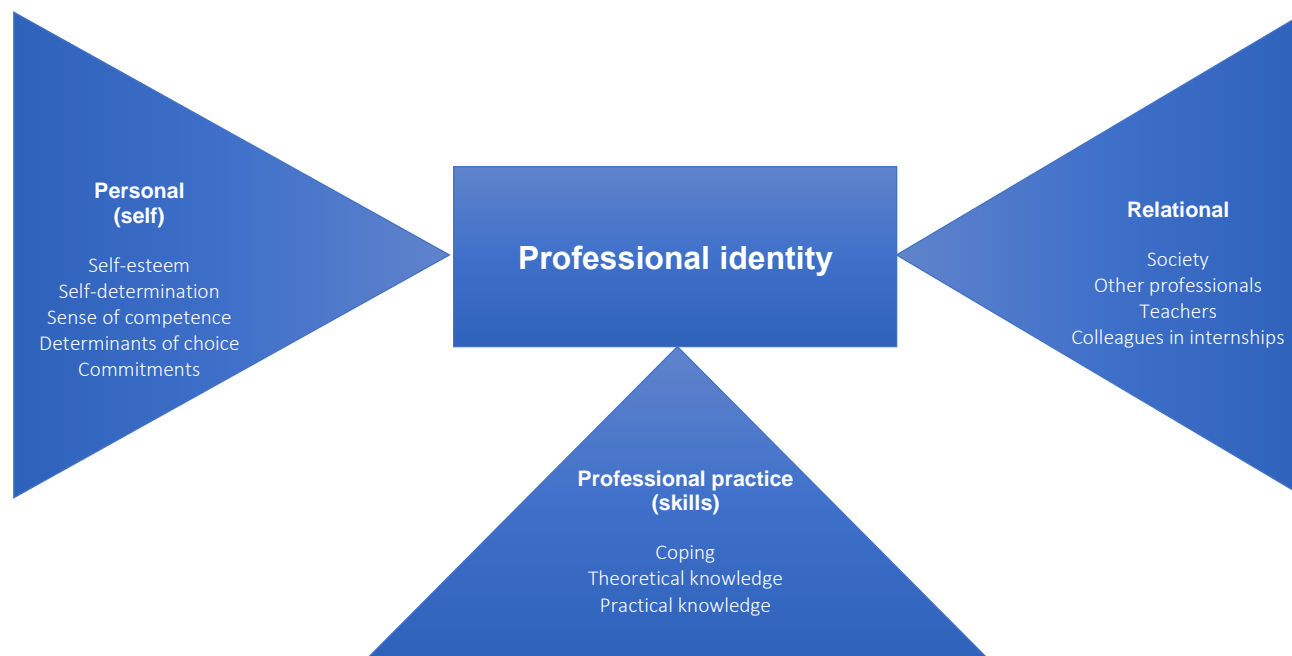
As such, we believe it would be useful to build and validate a measurement tool that would clearly describe the personal, relational, and professional practice components of nursing students' PI. This measurement tool could be used to identify the personal, relational, and professional dimensions that influence nurses' PI in terms of looking to the future, envisioning their career path, and implementing a learning and education rationale within a context of complex care.

### **Theoretical Framework**

The theoretical framework underlying this study is an adapted version of the model of Gohier, Anadon, Bouchard, Charbonneau, and Chevrier (2001), which defines PI multidimensionally, dynamically, and interactively while taking into account psychological and sociological dimensions. Based on this model, built in the field of education, the PI of nurses-in-education is divided into three interconnected components: (1) *personal identity*, in terms of self-esteem, self-determination, sense of competence, determinants of choice, and commitment to that choice; (2) *relational identity*, referring to the various relationships nursing students have with society, health professionals, teachers, and other students in both classroom and internship; and (3) *professional practice*, relating to mastery of their professional role in terms of proficiency (theoretical knowledge, practical knowledge, coping, etc.). Figure 1 presents the theoretical framework for measuring PI based on the model of Gohier et al. (2001).

Figure 1

*Professional identity theoretical framework inspired by the model of Gohier et al. (2001)*



## Methods

### Research Design

This study was conducted using a methodological development research approach (Fortin & Gagnon, 2016), which focused on the construction and validation of a questionnaire (Q-IPEI) to measure the PI of nursing students.

### Study Location

The study was conducted in Quebec, a province in Canada, where future nurses are educated either in a three-year college program (DEC) or in two- or three-year university programs (BAC). The college program leads to a registered nurse diploma, and the university program leads to a baccalaureate nursing degree. A registered nurse can acquire a baccalaureate degree after two years of university study. This is referred to as a DEC-BAC five-year program. The study was conducted at two colleges and one university. In this region of Quebec, Canada, the selected university is the one in which most of college-educated registered nurses pursue their university education to obtain a baccalaureate degree in nursing.

### Questionnaire Construction

The development of a tool to measure nursing students' PI, abbreviated as Q-IPEI, was based on both a review of the scientific literature and a "representation survey" conducted among nursing students and their teachers, and in accordance with the three dimensions of the reference framework (Figure 1).

The literature review involved searching the MEDLINE, CINAHL, and PubMed electronic databases for PI measurement questionnaires produced since 2000. A search strategy based on ((*professional identity*) AND (*tool\**) AND (*nurs\**) AND (*student\**)) OR ((*professional development*) AND (*tool\**) AND (*nurs\**) AND (*student\**)), adapted to each database, was used to identify scientific articles published in French and English. Approximately 400 articles were retrieved. After analyzing duplicates, titles, abstracts, and study locations (to select studies from countries comparable to Canada), 18 articles were retained. Analysis of those 18 articles yielded seven tools directly related to nursing students' PI. Table 1 summarizes the dimensions, number of items, strengths, and shortcomings of each tool in terms of the three components (personal identity, relational identity, and professional practice) of the conceptual framework.

Table 1

*Summary of tools for measuring professional identity surveyed in the literature (alphabetically by authors)*

| Measurement tool    | Dimensions   | Number of items and scales     | Field of study of students in education | Strengths  | Deficiencies in relation to the conceptual framework  |
|---------------------|--|--------------------------------|---|--|---|
| Adams et al. (2006) | 1- Professional identity (Macleod Clark MCPIS-9)   | 9 items; 5-point Likert scale  | Social sciences and health              | - Social interactions: knowledge, beliefs, and values shared with others<br>- Developmental aspect of PI over time | - Personal conception<br>- Primarily measures belonging to a profession   |
| Bennett (2010)      | 1- Marketing professional identity<br>2- Organizational-focused identity<br>3- Education and personal development<br>4- Mentoring<br>5- Appraisal<br>6- Reward<br>7- Nature of activities undertaken<br>8- Networking<br>9- Opportunities for advancement<br>10- Task culture<br>11- Commitment to the marketing profession<br>12- Commitment to the | 66 items; 7-point Likert scale | Marketing and health                    | - Two facets of PI: orientation towards marketing practice; orientation towards collective and social interactions | - Does not take into account the developmental aspect of PI during education<br>- Measures 15 to 18 months after the end of education |

|                                       |  |                                   |  |  |  |
|---------------------------------------|--|-----------------------------------|--|--|--|
|                                       | organization<br>13- Job satisfaction<br>14- Satisfaction with the organization<br>15- Self-assessed performance<br>16- Intention to remain |                                   |  |  |  |
| Crossley & Vivekananda-Schmidt (2009) | 1- Interpersonal tasks<br>2- Generic attributes<br>3- Profession-specific elements   | 9 items                           | Medicine                                 | -Professional practice   | - Absence of personal and individual aspects, and social interactions            |
| Dobrow & Higgins (2005)               | 1-Professional identity  | 4 items;<br>7-point Likert scale  | Administration, business school, nursing | - Developmental aspect of PI<br>- Development over time<br>- Importance of the individual's environment                      | - No definition of PI<br>- No guidance on the notion of developing one's PI      |
| Marcia & Archer (1993)                |  | 64 items;<br>6-point Likert scale | Education, health sciences               | - Personal aspects and values<br>- Perception of oneself<br>- Reactions to difficult situations                              | - Does not take into account social interactions                                 |
| Rognstad et al. (2004)                | 1- Altruism<br>2- Acknowledgment   | 8 items;<br>5-point Likert scale  | Nursing                                  | - Motivation and personal determination  | - Focused entirely on personal identity  |
| Weis & Schank (2009)                  | 1- Caring<br>2- Activism<br>3- Trust<br>4- Professionalism<br>5- Justice   | 26 items;<br>5-point Likert scale | Nursing                                  | - Development and internalization of professional practices and values<br>- Focuses on the practice and social aspects of PI | - Does not take into account the personal aspects and values of nursing students |

The main findings from the literature review are that (1) none of the seven tools simultaneously considers all three dimensions of the conceptual framework (personal identity, relational identity, professional practice); (2) none takes into account the evolving nature of PI during education (only one of the seven does so, and only at the end of the education); and (3) none was developed in the context of nursing education in Canada, and Quebec in particular. By combining the seven measurement tools, the dimensions and items (of the dimensions) of the

present tool for measuring nursing students' PI were constructed. All dimensions and their items were classified into each of the three components of the conceptual framework.

To adapt the dimensions and items to the Quebec context, eight nursing students (four college and four university) and three nursing teachers (two college and one university) were consulted. The 11 respondents analyzed each constructed dimension and item, and they produced individually a report with a maximum of 10 sentences. These reports contained some suggestions and corrections that could be made to adapt the dimensions and items in Quebec's nursing care context.

The two main authors analyzed the transcripts (approximately 110 sentences), first individually and second together. The previously constructed dimensions and items were adapted to Quebec's nursing care context and the first version of the questionnaire on nursing students' PI (Q-IPEI) was developed. This initial version contained 12 dimensions and 73 items distributed as follows: *personal identity* component, five dimensions (self-esteem, self-determination, sense of competence, determinants of choice, commitment) and 25 items; *relational identity* component, four dimensions (relationships with society, with other health professionals, with teachers during their education, and with colleagues in internships) and 19 items; and *professional practice* component, three dimensions (coping, mastery of theoretical knowledge, mastery of practical knowledge) and 29 items. For this first version of the Q-IPEI, a 4-point Likert scale (*1–totally agree; 2–somewhat agree; 3–somewhat disagree; 4–totally disagree*) was also used.

### Validation of Content and Form

The first version of the Q-IPEI was submitted for validation of content and form to six experts on the subject of students' PI and to 136 nursing students: 94 in college programs (25 in first year, 33 in second year, and 36 in third year) and 42 attending university after three years of college (14 in first year and 28 at the end of university education).

Of the six experts, two were from the theoretical field of education sciences (without teaching nursing), two taught nursing in college, and two taught nursing in university. These experts were chosen for their experience or specialization in educational theory and education in general, and in the practical field of nursing education at both the college and the university levels in Quebec. With the conceptual framework (Figure 1) in hand, each was asked to assess the content and form of the first draft of the Q-IPEI. They were asked to select one of the following four statements for each of the 12 dimensions and 73 items: *1–non-relevant, to be removed; 2–relevant with major corrections; 3–relevant with minor corrections; 4–relevant without corrections*. When responding 1, 2, or 3, the experts were asked to make comments or suggestions. All items deemed irrelevant by at least four of the six experts were simply removed.

Furthermore, data were also collected from 136 nursing students to assess the variability of the results, and especially the relevance of maintaining a just 4-point scale (*1–totally agree; 2–somewhat agree; 3–somewhat disagree; 4–totally disagree*). As descriptive analyses showed that students' responses were highly concentrated around *2–somewhat agree* and *3–somewhat disagree*, the decision was taken to switch to a 6-point scale to allow potential variability in students' responses: *1–totally agree; 2–somewhat agree; 3–slightly agree; 4–slightly disagree; 5–somewhat disagree; 6–totally disagree*.

The second version of Q-IPEI with 12 dimensions, 77 items, and a 6-point scale as shown in table 2 (column Number of items before empirical validation) was built.

### Psychometric Validation

Psychometric validation of the second version of Q-IPEI, which consisted of analyzing its construct validity and fidelity, was performed using data collected from 488 nursing students over two weeks in February 2013 and from 504 students in February 2014. All these nursing students were present in their class during the data collection. They chose to participate on a voluntary basis and signed a free and informed consent form. In 2013, the breakdown of students was as follows: 373 in college, with 127 in first year (level 1), 114 in second year (level 2) and 132 in third year (level 3); and 115 in university, with 65 in first year (level 4) and 50 in second year (level 5). In 2014, the distribution was 359 in college, with 96 at level 1, 124 at level 2, 139 at level 3; and 145 in university, with 82 at level 4 and 63 at level 5. In 2014, the goal was to have at least as many students as in 2013. We tried to obtain at least the same numbers per academic level, but this was difficult given the voluntary and unrestricted nature of participation in the study.

**Construct validity of the Q-IPEI.** *Construct validity* of the Q-IPEI was analyzed in three steps: known groups analysis; exploratory factor analysis; and confirmatory factor analysis (Tabachnick & Fidell, 2019). SPSS software and its AMOS model (Bryne, 2016) were used for the analyses with a 5% significance threshold.

*Known groups analyses* were conducted to assess PI variability among academic levels. They allowed us to know if the PI could vary from one academic level to another as mentioned by (Champy, 2012; Dubar et al., 2015). Because the data followed a normal distribution, this variation was assessed using analyses of variance (ANOVA) at the five academic levels for the data collected in 2013 and 2014.

*Exploratory factor analyses* were performed with the 2013 data to verify the multidimensional nature of the Q-IPEI's individual components and especially to analyze the relevance of subdividing each component into the dimensions proposed in the questionnaire. The purpose of the factor analysis was to ensure the constructed Q-IPEI was empirically compliant with the conceptual framework. Factors were extracted by means of principal component analysis (PCA) based on Varimax rotation. All items with communities greater than 0.30 were selected. Thus, 5, 4, and 3 factors were extracted for the personal, relational, and professional practice components, respectively. To verify PCA quality, Bartlett's sphericity test and Kaiser-Meyer-Olkin (KMO) sampling accuracy were assessed.

*Confirmatory factor analyses* were then conducted with the data collected in 2014 to confirm the factor structure of each of the three components of the PI of nursing students. Models assuming a subdivision of the components into dimensions were analyzed. Missing data were estimated using Bayesian estimates. The quality of the model was evaluated with chi-square tests and two goodness-of-fit indices: CFI (comparative fit index) and RMSEA (root-mean-square error of approximation). In general, the adjusted models were assessed to determine whether they were very well adjusted (CFI > 0.9, RMSEA < 0.05), well adjusted (CFI > 0.7 and 0.05 < RMSEA < 0.08), or poorly adjusted (CFI < 0.7 and RMSEA > 0.10). An RMSEA between 0.08 and 0.10 was also acceptable (Dagnall, Denovan, Parker, Drinkwater, & Walsh, 2018).

**Q-IPEI fidelity.** The fidelity of each of the three components of the Q-IPEI was assessed using analyses of internal consistency and homogeneity of the items in each of the 12 dimensions. To this end, Cronbach's alpha coefficients for each of the 12 dimensions and three components were estimated for the two data collection years (2013 and 2014). A Cronbach's alpha greater than 0.7 was considered acceptable, as suggested by Taber (2016). This threshold is arbitrary, as some authors consider 0.75 or 0.80 to be the minimum acceptability threshold, whereas others are satisfied with 0.60 (Griethuijsen et al., 2014).

### Ethical Considerations

This research project was approved by the ethics committees of the colleges and university in which the study was conducted. Throughout the study, the principles of confidentiality, free and informed consent, and benefit-risk formulation were respected.

## Results

### The Nursing Students' Professional Identity Questionnaire: Q-IPEI

Table 2 presents details on the numbers of dimensions and items in the Q-IPEI. It also provides an overview of the changes made when constructing the second version of the Q-IPEI. That version includes 12 dimensions and 77 items distributed as follows: five dimensions and 26 items for the *personal identity* component; four dimensions and 22 items for the *relational identity* component; and three dimensions and 29 items for the *professional practice* component. Table 3 presents in detail all questions in the Q-IPEI.

Table 2

*Quantitative overview of the changes made to the dimensions and items of the first version of the questionnaire on the professional identity of nursing students*

| Components  | Dimensions                                       | Number of initial items* | Number of items changed | Number of items deleted | Number of items added | Number of items before empirical validation | Number of items after empirical validation | From a 4-point to a 6-point scale   |
|---|--|--------------------------|-------------------------|-------------------------|-----------------------|---|--|---|
| <b>Personal identity in relation to self (Items Q15 to 40)</b>                          | Self-esteem                                      | 4                        | 1                       | 1                       | 0                     | 3   | 0  | 1–totally agree; 2–somewhat agree; 3–slightly agree; 4–slightly disagree; 5–somewhat disagree; 6–totally disagree |
|   | Self-determination                               | 6                        | 0                       | 0                       | 0                     | 6   | 5  |   |
|   | Sense of competence                              | 6                        | 3                       | 0                       | 2                     | 8   | 6  |   |
|   | Determinants (intrinsic and extrinsic) of choice | 6                        | 0                       | 0                       | 0                     | 6   | 6  |   |
|   | Commitment                                       | 3                        | 0                       | 0                       | 0                     | 3   | 3  |   |
|   | <b>Total</b>                                     |                          | <b>25</b>               | <b>4</b>                | <b>1</b>              | <b>2</b>                                    | <b>26</b>                                  |   |
| <b>Relational identity in terms of relationships and interactions (Items Q41 to 62)</b> | Relationship with society                        | 3                        | 0                       | 0                       | 0                     | 3   | 3  |   |
|   | Relationship with other health professionals     | 4                        | 4                       | 0                       | 2                     | 6   |  |   |
|   | Relationship with teachers during education      | 6                        | 0                       | 0                       | 0                     | 6   | 6  |   |
|   | Relationship with colleagues during internships  | 6                        | 3                       | 0                       | 1                     | 7   | 7  |   |
|   | <b>Total</b>                                     |                          | <b>19</b>               | <b>7</b>                | <b>0</b>              | <b>3</b>                                    | <b>22</b>                                  | <b>22</b>   |

|  |                                  |           |          |          |          |           |           |
|--|----------------------------------|-----------|----------|----------|----------|-----------|-----------|
| <b>Professional practice in relation to theoretical and practical knowledge (competencies) (Items Q63 to 91)</b> | Coping                           | 10        | 2        | 0        | 0        | <b>10</b> | <b>7</b>  |
|  | Mastery of theoretical knowledge | 12        | 1        | 0        | 0        | <b>12</b> | <b>12</b> |
|  | Mastery of practical knowledge   | 7         | 4        | 0        | 0        | <b>7</b>  | <b>7</b>  |
|  | <b>Total</b>                     | <b>29</b> | <b>7</b> | <b>0</b> | <b>0</b> | <b>29</b> | <b>26</b> |

\*Full details of the initial items may be obtained on request addressed to the researcher authors of this article.

Table 3

*Detailed descriptions of Q-IPEI dimensions and items*

|   |   |
|---|---|
| <b>Personal component of PI</b>   | <b>Relational component of PI</b>   |
| <b>Dimension: Self-esteem</b>   | <b>Dimension: Relationship with society</b>   |
| 1.1 I have a positive image of myself   | 6.1 Having a valued social status   |
| 1.2 I feel that I am faithful to my values regardless of the context            | 6.2 Being a social model  |
| 1.3 I take care of myself (life habits)   | 6.3 Being seen by people as credible  |
| <b>Dimension: Self-determination</b>  | <b>Dimension: Relationship with other health professionals</b>  |
| 2.1 Whether my plans are achieved depends a lot on me                           | 7.1 I feel comfortable questioning the physician's decisions  |
| 2.2 I am self-critical of my strengths and limitations                          | 7.2 I feel comfortable questioning the decisions of other professionals (respiratory therapist, occupational therapist, physiotherapist, pharmacists, etc.) |
| 2.3 I make choices about my future  | 7.3 I feel comfortable suggesting care options to the physician   |
| 2.4 I am able to defend my own interests through the actions I take             | 7.4 I feel comfortable suggesting care options to other professionals (respiratory therapist, occupational therapist, physiotherapist, pharmacists, etc.)   |
| 2.5 I am able to influence the events that happen to me                         | 7.5 I am satisfied with my relationship with the physician  |
| 2.6 I get what I want when I put in the required effort                         | 7.6 I am satisfied with my relationships with other professionals   |
| <b>Dimension: Sense of competence</b>   | <b>Dimension: Relationship with teachers during education</b>   |
| <b>3. My perception of my personal competence as a student</b>                  | 8.1 They show interest in my learning   |
| 3.1 I am confident in my ability to complete my internship                      | 8.2 They welcome me warmly  |
| 3.2 I am confident in my ability to complete my theoretical studies             | 8.3 They help me to be motivated  |
| 3.3 I enjoy taking on challenges  | 8.4 They support me when I need it  |
| 3.4 I know myself well  | 8.5 They help me to feel confident  |
| 3.5 I feel that I am a competent student  | 8.6 They are positive role models for me  |
| 3.6 I invest myself fully in my internships                                     | <b>Dimension: Relationship with colleagues during the internship</b>  |
| 3.7 I invest myself fully in my theoretical studies                             | 9.1 They help me to feel confident  |
| 3.8 I feel that I am competent when learning new things in my nursing education | 9.2 They welcome me warmly  |

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|--|
| <b>Dimension: Determinants of choice</b>                                 |
| 4.1 Working conditions (salary, opportunities, benefits, security, etc.) |
| 4.2 This corresponds to my self-image                                    |
| 4.3 My family, my social network, or my friends                          |
| 4.4 My personal areas of interest (preferences, aptitudes, dreams, etc.) |
| 4.5 My desire to fulfill myself through new knowledge                    |
| 4.6 The prestige of the profession                                       |
| <b>Dimension: Certainty of choice</b>                                    |
| 5.1 I am considering abandoning this program at the end of term          |
| 5.2 I am questioning my decision to remain in this program               |
| 5.3 This program suits me perfectly                                      |

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| 9.3 They show interest in my learning    |
| 9.4 They are positive role models for me |
| 9.5 They help me to be motivated         |
| 9.6 They support me when I need it       |
| 9.7 They consider my ideas               |

|   |
|---|
| <b>Professional practice component of PI</b>  |
| <b>Dimension: Coping</b>  |
| 10.1 I try to change the situation by taking action                                     |
| 10.2 I explore possible alternatives  |
| 10.3 I take time to reflect   |
| 10.4 I try to change my perception of the situation                                     |
| 10.5 I evaluate myself  |
| 10.6 I find that such periods have a negative impact on my intention to become a nurse  |
| 10.7 I commit myself to resolving the situation   |
| 10.8 I withdraw from the situation  |
| 10.9 I find ways to manage my stress better   |
| 10.10 I find that such periods have a positive impact on my intention to become a nurse |
| <b>Dimension: Mastery of theoretical knowledge</b>                                      |
| 11.1 Applying my clinical judgment  |
| 11.2 Innovating in my practice  |
| 11.3 Carrying out a variety of tasks  |
| 11.4 Working in a team  |
| 11.5 Working independently  |
| 11.6 Working meticulously (with precision)  |
| 11.7 Carrying out a series of care techniques   |
| 11.8 Using ethical norms to guide my actions  |

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|---|
| <b>Professional practice component of PI (continued)</b>                            |
| <b>Dimension: Mastery of practical knowledge</b>                                    |
| 12.1 Accompany and support the patient's recovery                                   |
| 12.2 Defend the patient's rights (negotiate in the patient's best interest)         |
| 12.3 Caring for patients by relieving their physical suffering                      |
| 12.4 Caring for patients by relieving their emotional suffering                     |
| 12.5 Being a pivotal person who harmonizes patient care                             |
| 12.6 Expressing humanity (compassion, openness, empathy, respect, and authenticity) |
| 12.7 Establishing supportive communication with every patient                       |

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| 11.9 Using scientific evidence as a basis for solving problems |
| 11.10 Working in critical or unexpected situations             |
| 11.11 Working with tight deadlines (under pressure)            |
| 11.12 Managing or supervising other professionals              |

**The personal identity component of PI** is described in five dimensions and 26 items: self-esteem (3 items); self-determination (6 items); sense of competence (8 items); determinants of choice (6 items); and commitment (3 items). *Self-esteem* is the dimension of nursing students' PI that provides information on how their personal identity is strengthened through their perception of their (positive) image and their sense of intrinsic well-being during their education. *Self-determination* measures each nursing student's level of determination and personal effort to become an excellent nurse. *Sense of competence* measures the level of perceived ability to carry out theoretical and internship activities suitably as a student. It represents the student's level of investment in both theoretical and practical internship courses. *Determinants of choice* refer to the intrinsic (personal) and extrinsic (external) reasons for choosing a future career as a nurse. *Commitment* refers to the nursing student's intention to continue or abandon the education program.

**The relational identity component of PI** is described in four dimensions and 22 items: relationship or interaction with society (3 items); relationship with other health professionals (6 items); relationship with teachers during their education (6 items); and relationship with colleagues during internships (7 items). *Relationship with society* refers to nursing students' perception of themselves as a social model, education for a profession valued by the population. *Relationship with other health professionals* provides information on students' apprehensions about physicians, respiratory therapists, occupational therapists, physiotherapists, pharmacists, and all other professionals with whom they will collaborate. *Relationship with teachers* focuses on teachers' position in terms of the quality of students' learning. The same applies to *relationship with colleagues during internships*, which provides information on students' perception of support from both teachers and other colleagues during practical activities to prepare and educate competent nurses.

**The professional practice component of PI** is described in three dimensions and 29 items: coping (10 items); mastery of theoretical knowledge (12 items); and mastery of practical knowledge (7 items). *Coping* provides information on the intrinsic or extrinsic strategies that nursing students themselves are continually developing to respond to patients' needs or deal with complex situations in the future as nurses. *Mastery of theoretical knowledge* provides information on the level of knowledge nurses should have to practise their profession ethically. *Mastery of practical knowledge* measures nursing students' proficiency in a specific clinical situation.

### Psychometric Qualities of the Questionnaire

**Characteristics of student nurses and their level of professional identity.** Table 4 presents the characteristics of the 488 nursing students interviewed in 2013 and 504 in 2014 on whom the psychometric analyses were conducted. It shows that 83.4% and 89.7% of the nursing students interviewed in 2013 and 2014, respectively, were female. Students under 25 years of age made up 70.5% and 68.4% of the samples in 2013 and 2014, respectively.

Table 4

*Characteristics of nursing students and their levels of professional identity in 2013 and 2014*

| Variables                           | 2013 (n = 488)     |                     | 2014 (n = 504)      |            |
|-------------------------------------|--------------------|---------------------|---------------------|------------|
|                                     | f <sub>i</sub> (%) | mean (Std)          | f <sub>i</sub> (%)  | mean (Std) |
| <b>Sex</b>                          |                    |                     |                     |            |
| Female                              | 407 (83.4)         |                     | 452 (89.7)          |            |
| Male                                | 81 (16.6)          |                     | 52 (10.3)           |            |
| <b>Age</b>                          |                    |                     |                     |            |
| 18–21                               | 217 (44.5)         |                     | 232 (46.0)          |            |
| 22–25                               | 127 (26.0)         |                     | 113 (22.4)          |            |
| 26–30                               | 62 (12.7)          |                     | 57 (11.3)           |            |
| 31–35                               | 39 (8.0)           |                     | 40 (7.9)            |            |
| 36–40                               | 24 (4.9)           |                     | 35 (6.9)            |            |
| 41 and over                         | 19 (3.9)           |                     | 27 (5.4)            |            |
| <b>Academic level</b>               |                    |                     |                     |            |
| 1                                   | 127 (26.0)         |                     | 96 (19.0)           |            |
| 2                                   | 114 (23.4)         |                     | 124 (24.6)          |            |
| 3                                   | 132 (27.0)         |                     | 139 (27.6)          |            |
| 4                                   | 65 (13.3)          |                     | 82 (16.3)           |            |
| 5                                   | 50 (10.2)          |                     | 63 (12.5)           |            |
| <b>Setting</b>                      |                    |                     |                     |            |
| College 1 (levels 1, 2, and 3)      | 125 (25.6)         |                     | 121 (24.0)          |            |
| College 2 (levels 1, 2, and 3)      | 230 (47.1)         |                     | 233 (46.2)          |            |
| University (levels 4 and 5)         | 133 (27.3)         |                     | 150 (29.8)          |            |
| <b>PI components and dimensions</b> |                    |                     |                     |            |
| <b>Personal</b>                     |                    | <b>1.91 (0.019)</b> | <b>1.93 (0.019)</b> |            |
| Self-esteem                         |                    | 1.94 (0.027)        | 1.97 (0.027)        |            |
| Self-determination                  |                    | 1.82 (0.023)        | 1.79 (0.024)        |            |
| Sense of competence                 |                    | 1.82 (0.024)        | 1.83 (0.023)        |            |
| Commitment                          |                    | 1.76 (0.045)        | 1.74 (0.04)         |            |
| Determinants of choice              |                    | 2.15 (0.029)        | 2.19 (0.03)         |            |
| <b>Relational</b>                   |                    | <b>2.35 (0.027)</b> | <b>2.37 (0.027)</b> |            |
| In internships                      |                    | 2.81 (0.051)        | 2.79 (0.052)        |            |
| With teachers                       |                    | 2.14 (0.036)        | 2.09 (0.034)        |            |
| With other professionals            |                    | 2.35 (0.035)        | 2.43 (0.038)        |            |
| With society                        |                    | 2.12 (0.035)        | 2.16 (0.036)        |            |
| <b>Professional practices</b>       |                    | <b>1.98 (0.024)</b> | <b>2.00 (0.024)</b> |            |
| Coping                              |                    | 1.96 (0.028)        | 1.98 (0.026)        |            |
| Theoretical knowledge               |                    | 2.11 (0.031)        | 2.14 (0.032)        |            |
| Practical knowledge                 |                    | 1.75 (0.030)        | 1.79 (0.031)        |            |

With regard to PI, the nursing students indicated definitively that they agreed (*1–totally agree*, and *2–somewhat agree*) with the PI statements (all scores were consistently below 3). All dimensions were relevant to measure each PI component.

In addition, as shown in Table 5, known groups analyses showed a statistically significant variation ( $p < .05$ ) in the PI levels of nursing students by academic level in each of the three components in 2013 and 2014. Tukey's post hoc analyses generally indicated that the PI levels of nursing students at academic level 2 (second year of college) and academic level 4 (first year of university) were statistically different from those of others in both 2013 and 2014.

Table 5

*Known groups analyses: variations in professional identity scores according to academic level*

| Academic level                 | 2013 (n = 488) |             |             |             |             |                 | 2014 (n = 504) |             |             |             |             |                 |
|--------------------------------|----------------|-------------|-------------|-------------|-------------|-----------------|----------------|-------------|-------------|-------------|-------------|-----------------|
|                                | 1              | 2           | 3           | 4           | 5           | <i>p</i> -value | 1              | 2           | 3           | 4           | 5           | <i>p</i> -value |
| <b>Personal*</b>               | <b>1.84</b>    | <b>1.93</b> | <b>1.9</b>  | <b>2.08</b> | <b>1.83</b> | <b>0.003</b>    | <b>1.89</b>    | <b>1.94</b> | <b>1.85</b> | <b>2.03</b> | <b>1.99</b> | <b>0.026</b>    |
|                                | (0.462)        | (0.431)     | (0.399)     | (0.425)     | (0.35)      | *               | (0.42)         | (0.488)     | (0.378)     | (0.373)     | (0.459)     | *               |
| Self-esteem                    | 1.88           | 1.9         | 1.96        | 2.13        | 1.9         | 0.071           | 1.93           | 2.07        | 1.87        | 1.96        | 2.04        | 0.097           |
|                                | (0.638)        | (0.572)     | (0.604)     | (0.605)     | (0.466)     |                 | (0.619)        | (0.693)     | (0.586)     | (0.547)     | (0.566)     |                 |
| Self-determination             | 1.72           | 1.88        | 1.85        | 1.95        | 1.64        | 0.002           | 1.78           | 1.78        | 1.78        | 1.79        | 1.84        | 0.953           |
|                                | (0.470)        | (0.568)     | (0.495)     | (0.542)     | (0.402)     | *               | (0.553)        | (0.575)     | (0.52)      | (0.46)      | (0.611)     |                 |
| Sense of competence            | 1.79           | 1.87        | 1.79        | 1.95        | 1.66        | 0.038           | 1.78           | 1.88        | 1.8         | 1.89        | 1.82        | 0.484           |
|                                | (0.602)        | (0.542)     | (0.457)     | (0.501)     | (0.406)     | *               | (0.473)        | (0.621)     | (0.503)     | (0.481)     | (0.516)     |                 |
| Commitment                     | 1.68           | 1.86        | 1.73        | 1.77        | 1.81        | 0.657           | 1.78           | 1.8         | 1.56        | 1.93        | 1.74        | 0.040           |
|                                | (1.071)        | (0.965)     | (0.993)     | (0.809)     | (0.947)     |                 | (0.96)         | (0.885)     | (0.77)      | (0.999)     | (0.906)     | *               |
| Determinants of choice         | 2.03           | 2.1         | 2.11        | 2.47        | 2.22        | <0.00           | 2.1            | 2.1         | 2.11        | 2.42        | 2.38        | <0.00           |
|                                | (0.588)        | (0.61)      | (0.577)     | (0.751)     | (0.654)     | 1*              | (0.737)        | (0.649)     | (0.589)     | (0.61)      | (0.845)     | 1*              |
| <b>Relational*</b>             | <b>2.19</b>    | <b>2.49</b> | <b>2.38</b> | <b>2.56</b> | <b>2.14</b> | <b>&lt;0.00</b> | <b>2.15</b>    | <b>2.54</b> | <b>2.35</b> | <b>2.47</b> | <b>2.27</b> | <b>&lt;0.00</b> |
|                                | (0.623)        | (0.602)     | (0.54)      | (0.519)     | (0.453)     | 1*              | (0.578)        | (0.606)     | (0.625)     | (0.561)     | (0.558)     | 1*              |
| In internships                 | 2.82           | 3.01        | 2.84        | 2.76        | 2.25        | <0.00           | 2.31           | 3.04        | 2.81        | 2.89        | 2.32        | <0.00           |
|                                | (0.966)        | (1.066)     | (0.857)     | (0.952)     | (0.905)     | 1*              | (1.245)        | (1.062)     | (1.05)      | (0.805)     | (0.683)     | 1*              |
| With teachers                  | 1.93           | 2.13        | 2.17        | 2.54        | 2.07        | <0.00           | 1.82           | 2.26        | 1.97        | 2.19        | 2.21        | <0.00           |
|                                | (0.745)        | (0.729)     | (0.894)     | (0.624)     | (0.658)     | 1*              | (0.636)        | (0.925)     | (0.694)     | (0.596)     | (0.654)     | 1*              |
| With other professionals       | 2.37           | 2.43        | 2.26        | 2.62        | 2.05        | 0.001           | 2.53           | 2.47        | 2.3         | 2.57        | 2.32        | 0.088           |
|                                | (0.856)        | (0.722)     | (0.682)     | (0.84)      | (0.597)     | *               | (0.836)        | (0.892)     | (0.758)     | (0.849)     | (0.824)     |                 |
| With society                   | 2.03           | 2.11        | 2.06        | 2.37        | 2.22        | 0.043           | 2.02           | 2.1         | 2.13        | 2.4         | 2.24        | 0.022           |
|                                | (0.762)        | (0.766)     | (0.728)     | (0.881)     | (0.725)     | *               | (0.78)         | (0.83)      | (0.763)     | (0.866)     | (0.837)     | *               |
| <b>Professional practices*</b> | <b>1.99</b>    | <b>2.01</b> | <b>1.9</b>  | <b>2.13</b> | <b>1.85</b> | <b>0.024</b>    | <b>2.04</b>    | <b>2.04</b> | <b>1.93</b> | <b>2.02</b> | <b>1.95</b> | <b>&lt;0.00</b> |
|                                | (0.596)        | (0.528)     | (0.506)     | (0.531)     | (0.439)     | *               | (0.681)        | (0.546)     | (0.481)     | (0.486)     | (0.49)      | 1*              |
| Coping                         | 1.90           | 1.99        | 1.83        | 2.26        | 2           | <0.00           | 1.89           | 2.02        | 1.92        | 2.06        | 2.07        | 0.133           |
|                                | (0.607)        | (0.622)     | (0.544)     | (0.571)     | (0.733)     | 1*              | (0.601)        | (0.565)     | (0.58)      | (0.589)     | (0.608)     |                 |
| Theoretical knowledge          | 2.11           | 2.17        | 2.09        | 2.25        | 1.86        | 0.039           | 2.27           | 2.18        | 2.06        | 2.17        | 1.99        | 0.087           |
|                                | (0.718)        | (0.657)     | (0.717)     | (0.698)     | (0.514)     | *               | (1.001)        | (0.711)     | (0.565)     | (0.618)     | (0.567)     |                 |
| Practical knowledge            | 1.79           | 1.76        | 1.7         | 1.8         | 1.67        | 0.659           | 2.07           | 1.79        | 1.7         | 1.72        | 1.77        | 0.368           |
|                                | (0.780)        | (0.623)     | (0.584)     | (0.575)     | (0.539)     |                 | (1.075)        | (0.661)     | (0.529)     | (0.523)     | (0.489)     |                 |

\* $p < .05$

In 2013, for the *personal identity* component of PI, Tukey's post hoc analyses indicated that the PI scores of academic level 4 nursing students for the dimensions of *self-determination*, *sense of competence*, and *determinants of choice* were statistically different from scores obtained for those at other academic levels (1, 2, 3, and 5). For the *relational identity* component of PI, the dimension *relationship with colleagues during internships* was the one in which the score of nursing students at academic level 2 was statistically different from the others. In the other three dimensions, the PI score for nursing students at academic level 4 was statistically different from those at other academic levels. For the *professional practice* component of PI, the scores of the level 4 nursing students differed from those of students at other academic levels for the *coping* and *mastery of theoretical knowledge* dimensions. No statistically significant variation was observed for the *mastery of practical knowledge* dimension.

In 2014, for the *personal identity* component of PI, Tukey's post hoc analyses indicated that the PI scores of level 4 nursing students for the *commitment* and *determinants of choice* dimensions were statistically different from those obtained for students at other academic levels (1, 2, 3, and 5). For the *relational identity* component of PI, level 2 nursing students stood out statistically from the others on two dimensions: *relationships with teachers during their education*, and *relationships with colleagues during internships*. The level 4 nursing students differed statistically from the others in terms of the dimension *relationship with society*. Finally, no statistical differences were observed in each of the dimensions, taken one by one, of the *professional practice* component of PI.

**Exploratory factor analyses.** First, using the 2013 data, PCAs revealed the multidimensional nature of each of the three components of PI operationalized by the 12 theoretical dimensions presented in the conceptual framework. Table 6 shows the PCA results for the three components of PI.

For the *personal identity* component of PI, six items (the three items of the *self-esteem* dimension, two items of the *sense of competence* dimension, and one of the *self-determination* dimension) were removed because they had communalities below 0.3, for a final total of 20 items. Then, the PCA with a four-dimensional Varimax rotation extraction explained 69.96% of the variance of the component for the 20 items. With a Kaiser-Meyer-Olkin (KMO) of 0.809 and a statistically significant Bartlett sphericity test ( $p < .001$ ), the PCA performed for this component of PI was of good quality.

For the *relational identity* component of PI, the four factors representing the dimensions of the conceptual framework, extracted with the Varimax rotation, explained 87.02% of the variance of the component with the 22 items. With a KMO of 0.879 and a statistically significant Bartlett sphericity test ( $p < .001$ ), the PCA performed for this component of PI was of good quality.

For the *professional practice* component of PI, three items (all in the *coping* dimension) were removed because they had communalities of less than 0.3, for a final total of 26 items. The three factors extracted with the Varimax rotation explained 93.0% of the variance of the component with the 26 items. With a KMO of 0.920 and a statistically significant Bartlett sphericity test ( $p < .001$ ), the PCA performed for this component of PI was of good quality.

Table 6

*Results of extracting dimensions based on exploratory principal component factor analyses*

| Item<br>s | Personal*                  |                            |                           |                | Ite<br>ms | Relational          |                                    |                      |                       | Ite<br>ms | Professional practice |                                  |                                |
|-----------|----------------------------|----------------------------|---------------------------|----------------|-----------|---------------------|------------------------------------|----------------------|-----------------------|-----------|-----------------------|----------------------------------|--------------------------------|
|           | Self-<br>determinati<br>on | Sense of<br>competen<br>ce | Determinants<br>of choice | Commitm<br>ent |           | With<br>societ<br>y | With<br>other<br>profession<br>als | With<br>teache<br>rs | In<br>internshi<br>ps |           | Copi<br>ng            | Theoreti<br>cal<br>knowled<br>ge | Practica<br>l<br>knowled<br>ge |
| Q18       | <b>0.572</b>               | 0.08                       | 0.125                     | 0.119          | Q41       | <b>0.87</b>         | 0.041                              | 0.129                | 0.06                  | Q63       | <b>0.676</b>          | 0.132                            | 0.134                          |
| Q21       | <b>0.593</b>               | 0.138                      | 0.191                     | 0.171          | Q42       | <b>0.825</b>        | 0.227                              | 0.098                | 0.025                 | Q64       | <b>0.742</b>          | 0.133                            | 0.138                          |
| Q22       | <b>0.742</b>               | 0.138                      | 0.001                     | -0.056         | Q43       | <b>0.799</b>        | 0.072                              | 0.095                | 0.112                 | Q65       | <b>0.75</b>           | 0.107                            | 0.033                          |
| Q23       | <b>0.689</b>               | 0.277                      | -0.082                    | 0.077          | Q44       | 0.101               | <b>0.768</b>                       | 0.051                | 0.037                 | Q66       | <b>0.692</b>          | 0.085                            | 0.202                          |
| Q24       | 0.207                      | <b>0.646</b>               | -0.024                    | 0.04           | Q45       | 0.012               | <b>0.794</b>                       | 0.069                | 0.045                 | Q67       | <b>0.583</b>          | 0.121                            | 0.257                          |
| Q25       | 0.074                      | <b>0.737</b>               | -0.148                    | -0.009         | Q46       | 0.016               | <b>0.848</b>                       | 0.038                | 0.001                 | Q69       | <b>0.694</b>          | 0.181                            | 0.13                           |
| Q26       | 0.196                      | <b>0.539</b>               | -0.026                    | 0.207          | Q47       | 0.027               | <b>0.765</b>                       | -0.019               | 0.011                 | Q71       | <b>0.671</b>          | 0.258                            | -0.002                         |

|   |        |              |              |              |     |       |              |              |              |     |       |              |              |
|---|--------|--------------|--------------|--------------|-----|-------|--------------|--------------|--------------|-----|-------|--------------|--------------|
| Q28   | 0.239  | <b>0.72</b>  | 0.083        | 0.037        | Q48 | 0.348 | <b>0.55</b>  | 0.13         | 0.27         | Q73 | 0.282 | <b>0.617</b> | 0.188        |
| Q29   | 0.134  | <b>0.586</b> | 0.163        | 0.14         | Q49 | 0.263 | <b>0.492</b> | 0.086        | 0.298        | Q74 | 0.311 | <b>0.522</b> | 0.279        |
| Q30   | 0.127  | <b>0.608</b> | 0.033        | 0.016        | Q50 | 0.122 | 0.043        | <b>0.754</b> | 0.091        | Q75 | 0.259 | <b>0.672</b> | 0.2          |
| Q31   | 0.107  | <b>0.546</b> | 0.25         | 0.171        | Q51 | 0.053 | 0.096        | <b>0.775</b> | 0.087        | Q76 | 0.135 | <b>0.475</b> | 0.294        |
| Q32   | 0.102  | 0.016        | <b>0.691</b> | -0.041       | Q52 | 0.121 | 0.058        | <b>0.851</b> | 0.064        | Q77 | 0.022 | <b>0.661</b> | 0.093        |
| Q33   | -0.033 | 0.422        | <b>0.428</b> | 0.262        | Q53 | 0.039 | 0.07         | <b>0.838</b> | 0.114        | Q78 | 0.155 | <b>0.679</b> | 0.152        |
| Q34   | 0.18   | -0.004       | <b>0.626</b> | 0.084        | Q54 | 0.053 | 0.049        | <b>0.855</b> | 0.153        | Q79 | 0.066 | <b>0.732</b> | 0.25         |
| Q35   | -0.026 | 0.438        | <b>0.273</b> | 0.282        | Q55 | 0.058 | -0.025       | <b>0.791</b> | 0.196        | Q80 | 0.131 | <b>0.597</b> | 0.29         |
| Q36   | -0.222 | 0.495        | <b>0.352</b> | 0.254        | Q56 | 0.076 | 0.093        | 0.148        | <b>0.779</b> | Q81 | 0.284 | <b>0.538</b> | 0.288        |
| Q37   | -0.037 | 0.105        | <b>0.783</b> | -0.028       | Q57 | 0.042 | 0.109        | 0.113        | <b>0.862</b> | Q82 | 0.093 | <b>0.785</b> | 0.156        |
| Q38   | 0.12   | 0.013        | -0.058       | <b>0.836</b> | Q58 | 0.018 | -0.01        | 0.206        | <b>0.867</b> | Q83 | 0.095 | <b>0.617</b> | 0.032        |
| Q39   | 0.158  | 0.188        | 0.025        | <b>0.828</b> | Q59 | 0.088 | 0.062        | 0.063        | <b>0.831</b> | Q84 | 0.133 | <b>0.617</b> | 0.175        |
| Q40   | 0.054  | 0.445        | 0.226        | <b>0.589</b> | Q60 | 0.097 | 0.027        | 0.111        | <b>0.89</b>  | Q85 | 0.104 | 0.425        | <b>0.631</b> |
| *69.96% of variance explained, KMO: 0.809, Bartlett test <i>p</i> -value < .001 |        |              |              |              | Q61 | -0.01 | 0.063        | 0.029        | <b>0.821</b> | Q86 | 0.108 | 0.417        | <b>0.631</b> |
|   |        |              |              |              | Q62 | 0.078 | 0.11         | 0.146        | <b>0.825</b> | Q87 | 0.028 | 0.291        | <b>0.731</b> |
|   |        |              |              |              |     |       |              |              |              | Q88 | 0.183 | 0.115        | <b>0.798</b> |
|   |        |              |              |              |     |       |              |              |              | Q89 | 0.165 | 0.299        | <b>0.725</b> |
|   |        |              |              |              |     |       |              |              |              | Q90 | 0.141 | 0.158        | <b>0.695</b> |
|   |        |              |              |              |     |       |              |              |              | Q91 | 0.262 | 0.089        | <b>0.702</b> |

**Confirmatory factor analyses.** The factor structure of each of the three components was confirmed by confirmatory factor analyses using the 2014 data. RMSEA and CFI goodness-of-fit indices were considered acceptable, being, respectively, 0.074 and 0.807 for the *personal identity* component; 0.077 and 0.899 for the *relational identity* component; and 0.067 and 0.875 for the *professional practice* component. Table 7 details the values of the estimated weights in the different confirmatory factor analysis models for each component of PI measured by the Q-IPEI.

Table 7

*Estimated regression weights of confirmatory factor analyses for the three components of professional identity*

| Dimensions of PI                             | Weights | S.E.  | C.R.  | P   |
|--|---------|-------|-------|-----|
| <b>Personal (RMSEA: 0.073; CFI: 0.809)</b>   |         |       |       |     |
| Self-determination                           | 1       |       |       |     |
| Sense of competence                          | 2.31    | 0.277 | 8.324 | *** |
| Determinants of choice                       | 1.61    | 0.24  | 6.717 | *** |
| Commitment                                   | 1.66    | 0.22  | 7.531 | *** |
| <b>Relational (RMSEA: 0.077; CFI: 0.899)</b> |         |       |       |     |
| Society                                      | 1       |       |       |     |
| Other professionals                          | 0.87    | 0.127 | 6.826 | *** |
| Teachers                                     | 0.86    | 0.118 | 7.276 | *** |
| Internships                                  | 1.1     | 0.153 | 7.216 | *** |

| <b>Professional practice (RMSEA: 0.067; CFI: 0.875)</b> |      |                                 |        |     |
|---|------|---------------------------------|--------|-----|
| Coping  | 1    |                                 |        |     |
| Theoretical knowledge                                   | 1.94 | 0.189                           | 10.215 | *** |
| Practical knowledge                                     | 1.8  | 0.155                           | 11.651 | *** |
| <b>Combined</b>   |      | <b>RMSEA: 0.072; CFI: 0.861</b> |        |     |

**Questionnaire fidelity.** The questionnaire's fidelity was measured using the Cronbach's alpha coefficient values of the three components and 11 dimensions, after excluding the *self-esteem* dimension. Table 8 presents the Cronbach's alphas of each PI component and associated dimensions. Overall, the Cronbach's alpha coefficients in 2013 and 2014 were 0.823 and 0.832, respectively. More specifically, except for the *self-determination* and *determinants of choice* dimensions, which had Cronbach's alpha fidelity thresholds below 0.7, all other dimensions had acceptable Cronbach's alphas above 0.7. Cronbach's alpha coefficients for the *personal identity* component were 0.860 in 2013 and 0.826 in 2014; those for the *relational identity* component were 0.885 in 2013 and 0.904 in 2014. Last, Cronbach's alpha coefficients for the *professional practice* component were 0.904 in 2013 and 0.923 in 2014.

Table 8

*Cronbach's alphas for the three components and 11 dimensions of professional identity in 2013 and 2014*

| <b>Components /Dimensions of PI</b> | <b>Cronbach's alphas</b> |              |
|-------------------------------------|--------------------------|--------------|
|                                     | <b>2013</b>              | <b>2014</b>  |
| <b>Personal</b>                     | <b>0.860</b>             | <b>0.826</b> |
| Self-determination                  | 0.668                    | 0.675        |
| Sense of competence                 | 0.798                    | 0.790        |
| Determinants of choice              | 0.633                    | 0.651        |
| Commitment                          | 0.778                    | 0.725        |
| <b>Relational</b>                   | <b>0.885</b>             | <b>0.904</b> |
| With society                        | 0.798                    | 0.841        |
| With other professionals            | 0.838                    | 0.850        |
| With teachers                       | 0.906                    | 0.906        |
| In internships                      | 0.937                    | 0.948        |
| <b>Professional practice</b>        | <b>0.904</b>             | <b>0.923</b> |
| Coping                              | 0.745                    | 0.841        |
| Theoretical knowledge               | 0.891                    | 0.886        |
| Practical knowledge                 | 0.876                    | 0.895        |
| <b>Combined</b>                     | <b>0.823</b>             | <b>0.833</b> |

## Discussion

The aim of this research was to construct and validate a questionnaire on the professional identity of nursing students (Q-IPEI) in the context of the province of Quebec in Canada. This study fills a gap in the nursing literature, mainly in the measurement of nurses' perceived professional identity, as suggested by Johnson et al. (2012).

## The Questionnaire on Nursing Students' Professional Identity: The Q-IPEI

To our knowledge, the Q-IPEI is the first instrument that measures nursing students' professional identity in Quebec. It was developed based on a literature review and consultation with education and nursing experts, and tested with college and university nursing students and teachers.

After PCA-type exploratory factor analyses coupled with confirmatory analyses, the multidimensional structure of the PI was demonstrated. The Q-IPEI questionnaire thus constructed and validated contains three components, 11 dimensions, and 68 items. While the *self-esteem* dimension of the *personal identity* component had been included in the questionnaire after the theoretical construction and expert consultation, empirical analyses did not demonstrate the relevance of its three items. This dimension was therefore deleted from the final version of the Q-IPEI. This deletion appeared to have no detrimental effect. According to Bennett (2010) and Rognstad et al. (2004), the items of the *self-esteem* dimension were strongly correlated with those of the *self-determination* and *sense of competence* dimensions of the *personal identity* component of PI.

The analyses showed the fidelity of the Q-IPEI, with acceptable internal consistency for the Q-IPEI as a whole and for each of its PI components (*personal*, *relational*, and *professional practice*) and their 11 dimensions, with Cronbach's alphas above 0.7. Homogeneity was also seen in the 68 items of the 11 dimensions, as well as in the 11 dimensions of the three components of the Q-IPEI questionnaire.

The results also indicated that nursing students at academic level 2 and especially those at academic level 4 had the lowest levels of PI. This could suggest that the academic level 2 and 4 nursing students were in a period of questioning their future identity as nurses. As such, they would be undergoing stress and emotional upheaval, and perceiving the resources in their education program as not adequate to equip them to meet the challenges of their profession (Houle, 2011; Houle et al., 2017). They would be uncertain (questioning) about how they saw themselves in the future and about their expectations for an interesting career path in an increasingly complex care context (Houle et al., 2017).

### Comparison with the Literature

The Q-IPEI differs from several other tools in the literature for measuring nursing students' professional identity:

- (i) It goes beyond the *personal identity* component in the consolidation of working identity and projection into the future, as suggested by Rognstad et al. (2004) and Bennett (2010).
- (ii) It goes beyond the *relational identity* component, which focuses on relationships with fellow nursing students, with teachers, and with internship and classroom mentors (Adams et al., 2006). This component also incorporates elements of the environment and work climate (Dobrow & Higgins, 2005).
- (iii) It incorporates the ideas of Weis and Schank (2009), and Crossley and Vivekananda-Schmidt (2009), who state that PI develops through theoretical and practical skills, as well as through respect for the profession's ethics. In a similar vein, Deppoliti (2008) indicates that strengthening nurses' interest in their profession in the long term gives them the ability to bridge the gap between theory and practice during the internships.

They must therefore have a solid professional practice and be able to cope with the complexity of care.

Thus, the Q-IPEI's originality lies in the fact that it integrates ideas and combines PI components that are generally measured individually. Finally, with reference to Cowin et al. (2013), who analyzed the quality of the five tools used to measure nurses' PI, the Q-IPEI has much stronger psychometric qualities not only at the overall level but also in its three components and 11 dimensions. These properties were evaluated and confirmed by exploratory and confirmatory factor analyses and by analyses of item fidelity and internal consistency.

With respect to limitations, one of the main weaknesses of the Q-IPEI is that it cannot measure nursing students' self-esteem. Even though the analyses showed strong correlations between the *self-esteem* dimension (whose items were removed from the final version of the questionnaire) and the *self-determination* and *sense of competence* dimensions, the *self-esteem* dimension is essential in absolute terms for a better understanding of PI. Moreover, as Johnson et al. (2012) suggested, PI should be measured through a longitudinal study conducted over time. However, the present study did not use this research design. Even though 153 nursing students participated in both data collections (2013 and 2014), no analysis was done of this subgroup. It would have been interesting to validate the constructed Q-IPEI through a longitudinal study. This is the next avenue to be explored. Finally, intra-rater reliability through test-retest analyses, as suggested by Fortin and Gagnon (2016), should have been performed to ensure the intra-rater stability of the questionnaire. However, it was not useful to perform such analyses, as the questionnaires had undergone content validation by experts. Those experts provided feedback twice on the initial theoretical version of the Q-IPEI. Finally, the current Q-IPEI contains 11 dimensions and 68 items, and it would be interesting to consider a future study that would produce a shorter version of the Q-IPEI with good psychometric qualities and fewer dimensions.

### **Implications and Recommendations**

Despite these limitations, the Q-IPEI is useful on several levels. First, it generates a profile of nursing students' PI in terms of self-determination; sense of competence; determinants of personal choice; commitment; interactions with society; relationships with colleagues, teachers, and internship supervisors; coping; and mastery of theoretical and practical knowledge.

Second, the Q-IPEI would allow key decision-makers in the health system to consolidate and develop proactive strategies for nursing students during their education. These would raise the students' level of confidence in themselves as future nurses and would especially help them cope with the challenges currently facing the nursing profession.

Third, all the strategies to be developed would surely be helpful in reviewing, adapting, or developing more appropriate pedagogical tools for use in theoretical courses and internships. Emphasis would be placed on consolidating individual and relational skills in professional practice.

## References

- Adams, K., Hean, S., Sturgis, P., & Macleod Clark, J. (2006). Investigating the factors influencing professional identity of first-year health and social care students. *Learning in Health and Social Care*, 5: 55–68. <https://doi.org/10.1111/j.1473-6861.2006.00119.x>
- Bennett, R. (2010). What makes a marketer? Development of ‘marketing professional identity’ among marketing graduates during early career experiences. *Journal of Marketing Management*, 27(1-2), 8–27. <https://doi.org/10.1080/02672571003647792>
- Birks, M., Chapman, Y., & Francis, K. (2010). Becoming professional by degrees - a grounded theory study of nurses in Malaysian Borneo. *Singapore Nursing Journal*, 37(3), 31–42.
- Bryne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). New York, NY: Routledge, Taylor & Francis Group.
- Champy, F. (2012). L’unité des professions et la diversité des valeurs, pratiques, carrières et intérêts de leurs membres. In F. Champy (ed.), *La sociologie des professions* (pp. 95–142). Paris, France: Presses Universitaires de France.
- Clavet, N- J., Duclos, J.-Y., Fortin, B., Marchand, S., & Michaud, P.-C. (2013). *Les dépenses en santé du gouvernement du Québec, 2013–2030: projections et déterminants*. Montreal: CIRANO-Centre interuniversitaire de recherche en analyse des organisations.
- Cowin, L. S., Johnson, M., Wilson, I., & Borgese, K. (2013). The psychometric properties of five Professional Identity measures in a sample of nursing students. *Nurse Education Today*, 33(6), 608–613. <https://doi.org/10.1016/j.nedt.2012.07.008>
- Crossley, J., & Vivekananda-Schmidt, P. (2009). The development and evaluation of a professional self-identity questionnaire to measure evolving professional self-identity in health and social care students. *Medical Teacher*, 31(12), e603–e607. <https://doi.org/10.3109/01421590903193547>
- Dagnall, N., Denovan, A., Parker, A., Drinkwater, K., & Walsh, R. S. (2018). Confirmatory factor analysis of the Inventory of Personality Organization-Reality Testing Subscale. *Frontiers in Psychology*, 9, 1116. <https://doi.org/10.3389/fpsyg.2018.01116>
- Deppoliti, D. (2008). Exploring how new registered nurses construct professional identity in hospital settings. *Journal of Continuing Education in Nursing*, 39(6), 255–262. <https://doi.org/10.3928/00220124-20080601-03>
- Dobrow, S. R., & Higgins, M. C. (2005). Developmental networks and professional identity: A longitudinal study. *Career Development International*, 10(6/7), 567–583. <https://doi.org/10.1108/13620430510620629>
- Dubar, C., Tripier, P., & Boussard, V. (2015). *Sociologie des professions*. Paris, France: Armand Colin. <https://doi.org/10.3917/arco.dubar.2015.01>
- Fortin, M.-F., & Gagnon, J. (2016). *Fondements et étapes du processus de recherche : méthodes quantitatives et qualitatives* (3rd ed.). Québec, QC: Chenelière Éducation.
- Fry, M., Duffield, C., Baldwin, R., Roche, M., Stasa, H., & Solman, A. (2013). Development of a tool to describe the role of the clinical nurse consultant in Australia. *Journal of Clinical Nursing*, 22(11-12), 1531–1538. <https://doi.org/10.1111/j.1365-2702.2012.04264.x>

- Griethuijsen, R. A. L. F., van Eijck, M. W., Haste, H., Brok, P. J., Skinner, N. C., Mansour, N., ... BouJaoude, S. (2014). Global patterns in students' views of science and interest in science. *Research in Science Education*, 45(4), 581–603. <https://doi.org/10.1007/s11165-014-9438-6>
- Gohier, C., Anadon, M., Bouchard, Y., Charbonneau, B., & Chevrier, J. (2001). La construction identitaire de l'enseignant sur le plan professionnel : Un processus dynamique et interactif. *Revue des sciences de l'éducation*, 27, 3–32. <https://doi.org/10.7202/000304ar>
- Goulet, O., & Dallaire, C. (Eds.). (2002). *Soins infirmiers et société*. Boucherville, QC: Gaëtan Morin.
- Horton, K., Tschudin, V., & Forget, A. (2007). The value of nursing: A literature review. *Nursing Ethics*, 14(6), 716–740. <https://doi.org/10.1177/0969733007082112>
- Houle, D. (2011). *L'expérience de transition et d'adaptation des étudiantes infirmières en contexte de formation intégrée (continuum de formation DEC/Baccalauréat)*. Doctoral thesis. Montreal, QC: Université du Québec à Montréal.
- Houle, D., Therrien, D., Savoie-Zajc, L., Tchouaket, E. N., Denoncourt, A., & Reny, P. (2017). La pertinence des stages de formation pratique pour le développement de l'identité professionnelle d'étudiantes infirmières au Québec. *Canadian Journal of Education*, 40(4), 393–418.
- Johnson, M., Cowin, L. S., Wilson, I., & Young, H. (2012). Professional identity and nursing: Contemporary theoretical developments and future research challenges. *International Nursing Review*, 59(4), 562–569. <https://doi.org/10.1111/j.1466-7657.2012.01013.x>
- Marcia, J. E., & Archer, S. L. (1993). Identity status in late adolescents: Scoring criteria. In J. E. Marcia, A. S. Waterman, D. R. Matteson, S. L. Archer, & J. L. Orlofsky (Eds.), *Ego identity: A handbook for psychological research* (pp. 205–240). New York, NY: Springer-Verlag.
- Ordre des infirmières et infirmiers du Québec. (2010). *Évolution des effectifs infirmiers*. Montreal, QC: OIIQ, Direction des affaires externes et des statistiques sur l'effectif.
- Ordre des infirmières et infirmiers du Québec. (2011). *Portrait de la relève infirmière*. Montreal, QC: OIIQ.
- Pépin, J., Ducharme, F., & Kérouac, S. (2017). *La pensée infirmière* (4th ed.). Montreal, QC: Chenelière Éducation.
- Rognstad, M. K., Nortvedt, P., & Aasland, O. (2004). Helping motives in late modern society: Values and attitudes among nursing students. *Nursing Ethics*, 11(3), 227–239. <https://doi.org/10.1191/0969733004ne691oa>
- Sainsaulieu, R. (2014). *L'identité au travail. Les effets culturels de l'organisation* (4e éd. augmentée d'une préface de Norbert Alter). Paris, France: Les Presses de Sciences.
- Senior, K. (2010). Wanted: 2.4 million nurses, and that's just in India. *Bulletin of the World Health Organization*, 88(5), 327–428. <https://doi.org/10.2471/blt.10.020510>

- Stenner, K., Carey, N., & Courtenay, M. (2010). How nurse prescribing influences the role of nursing. *Nurse Prescribing*, 8(1), 29–34. <https://doi.org/10.12968/npre.2010.8.1.46022>
- Tabachnick, B. G., & Fidell, L. (2019). *Using multivariate statistics* (7th ed.). London, England: Pearson Education Company.
- Taber, K. S. (2016). The use of Cronbach’s alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48, 1273. <https://doi.org/10.1007/s11165-016-9602-2>
- Weis, D., & Schank, M. J. (2009). Development and psychometric evaluation of the Nurses Professional Values Scale—Revised. *Journal of Nursing Measurement*, 17(3), 221–231. <https://doi.org/10.1891/1061-3749.17.3.221>