Dutch translation and validation of the readiness for interprofessional learning scale (RIPLS) in a primary healthcare context

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ABSTRACT
Background: Interprofessional education and collaborative practice are gradually gaining importance in the context of growing healthcare complexity. The readiness for interprofessional learning scale (RIPLS) is a well-known scale that can identify attitudinal barriers and variance across professions, which may affect educational interventions.

Objectives: This study aims to translate the English RIPLS into Dutch and to test its reliability and validity.

Methods: The scale was translated and back-translated by two pairs of people independently and tested for feasibility and comprehensibility. The translated scale was used with 219 general practitioners, 238 community nurses, and 53 palliative home-care nurses. Exploratory factor analysis was used to assess construct validity. Confirmatory factor analysis was done to generate a fit model. Cronbach’s alpha was computed to evaluate internal consistency. Regression analysis was used to evaluate the effect of the RIPLS score on the level of learning through collaboration and to gauge the influence of the participants’ gender, age, previous palliative care education, type of practice and years in practice.

Results: Confirmatory and exploratory factor analysis confirms the factor structure of the original version. The Dutch version shows good reliability (overall Cronbach’s alpha: 0.88; intraclass correlation coefficient after test-retest: 0.718 (95%CI: 0.499–0.852). The RIPLS score correlates with the amount of workplace learning during collaboration (discriminant validity: \( P < 0.001 \)).

Conclusion: The Dutch translation of the RIPLS is now ready for comparative studies.

Introduction
Worldwide, demographic and epidemiologic changes are leading to more complex healthcare situations. These complex situations require interprofessional education (IPE) and interprofessional collaboration (IPC) for health professionals to provide high-quality care.\[1\] The introduction of IPE and IPC provides an answer to the silo-nature of most health professionals’ education and socialization.\[2\] Interprofessional education occurs ‘when two or more professions learn with, from and about each other to improve collaboration and the quality of care’.\[3\] This can be realized during classroom-based learning or during workplace learning (WPL) where healthcare professionals learn during daily practice activities.\[4–6\] This WPL during interprofessional collaboration is part of the lifelong learning continuum. Currently, the overall effects of IPE on the physicians’ attitudes and behaviour and the quality of healthcare are believed to be beneficial, even though further research is needed to examine these effects in more detail.\[7,8\]

The readiness for interprofessional learning scale (RIPLS) is one of the most frequently applied instruments in the evaluation of interprofessional education.
and attitudes of healthcare professionals towards IPE. 
[9,10] The RIPLS, constructed by Parsell and colleagues and adapted by McFadyen, was originally devised for use with undergraduate students and comprised three subscales: teamwork and collaboration, professional identity, and roles and responsibilities.[11,12] As such, this instrument allowed the evaluation of undergraduate IPE during the preparation of the future healthcare workforce. Reid adapted and validated the scale for use in the postgraduate context in primary care.[13] Although the scale became useful to evaluate the effects of lifelong learning on healthcare professionals’ attitudes towards interprofessional learning, it has never been tested for applicability during interprofessional WPL in practice. The Reid version of the RIPLS is a 23-item scale with three factors: (1) teamwork and collaboration; (2) patient centeredness; (3) sense of professional identity. Each item has to be scored on a five-point Likert scale. A higher total score is associated with higher readiness for interprofessional learning (scores can range between 23 and 135). The English version of the scale can be found in the Supplementary Material available online. Currently there is no Dutch version of the RIPLS available. The availability of the same tool in different countries may provide opportunities for international research to corroborate further the knowledge base for IPE. Testing the RIPLS in the context of WPL might offer opportunities for further optimizing WPL as a fully-fledged component on the lifelong learning continuum of healthcare professionals. Therefore, the aim of this study was to:

- translate the Reid version of the RIPLS into Dutch;
- test the Dutch version for its reliability and validity in primary healthcare;
- evaluate the Dutch version for its use with respect to workplace learning.

**Methods**

**Study design and setting**

A cross-sectional study design was used. This study is part of a larger study in primary palliative care that has been described elsewhere.[6] Some aspects of this larger study are outlined below under ‘selection of study subjects’ and ‘data collection’. The setting has been chosen to validate the RIPLS because it involves interprofessional learning with different disciplines: general practitioners (GPs), community nurses (CNs) and palliative home care team (PHCT) nurses. The learning in this study occurs as workplace learning (WPL) whereby professionals learn with, from and about each other during interprofessional collaboration: joint care for the same patient.[6] GPs and CNs carry out palliative care while the PHCT nurses have an advisory task.

**Ethics**

Ethical approval was gained from the Ghent University Hospital (B670201213298).

**Selection of study subjects**

The Dutch speaking part of Belgium is covered by 15 PHCTs. All 15 were invited to participate. All patients (taken care of by the teams) who died within a three-month period were included in the study as index patients (prospective cohort study). The attending GPs, CNs and PHCT nurses of these index patients, were invited to participate in the study. Written informed consent was obtained from all participants.

**Translating the RIPLS—content validity**

The English version of the scale has been translated and back-translated by two pairs of translators independently (two bilingual researchers and two linguists Dutch–English). The final, back-translated version was presented to the author of the original English scale (Reid version) for approval.

Also, the Dutch version was pre-tested among a group of healthcare professionals from the three different disciplines of our study population: general practitioners, community nurses and palliative care nurses. Cognitive interviewing was used to evaluate feasibility and comprehensibility of the scale.[14]

**Data collection**

The attending GPs, CNs and PHCT nurses of the index patients were asked to fill in the RIPLS in the first week after the patient’s death. For this purpose, participants received a link to the online questionnaire. Additionally, GPs and PHCT nurses were presented with a list of topics relevant to palliative care and were asked to indicate the areas where they had learned something during the collaborative care of the index patient. As the questionnaires were handed out after the collaboration (between GPs and PHCT nurses during patient care), and participants were not aware of the focus of the questionnaires during the collaboration, there was no interference with daily collaborative practice. That is why the data reflect the actual learning effect of collaboration.
As the PHCT nurses proved the most accessible and involved in every patient case, they were chosen to test the stability of the RIPLS. To have scores of test-retest, they filled out the RIPLS immediately after the patients passing and two to four weeks later for the second time.

**Statistical analysis**

Only complete forms were used for the statistical analysis. Exploratory factor analysis was done to evaluate construct validity. Analogous to the development of the English scale, principal components analysis of the responses was conducted. A scree plot was used to determine the number of factors that explained a large proportion of the correlations between the responses. Principal-factor analysis with varimax rotation was performed. Factors meeting Kaiser’s eigenvalue criterion of >1 were included. Consistent with the development of the original scale, only factor loadings of 0.4 or more were accepted.

Confirmatory factor analysis was done to generate a fit model. The following indices were calculated: normed fit index (NFI), goodness of fit index (GFI), comparative fit index (CFI) and incremental fit index (IFI).

Cronbach’s alpha coefficient was computed for each factor separately and for the entire scale to evaluate internal consistency as a measure of reliability.

Multiple linear regression analysis was used to gauge the influence of participants’ gender and age (basic psychometric properties), previous palliative care training (we sought to evaluate the exchange of palliative care knowledge during collaboration), type of practice (GPs in teams or working solo) and years in practice (as a substitute for palliative care experience) on the RIPLS score.

The intraclass correlation coefficient (ICC) was calculated after test-retest analysis with a subgroup of the participants to test the stability over time.

**Discriminant validity**

Simple linear regression was used to evaluate the correlation between the RIPLS score and the number of items learned during interprofessional collaboration to show discriminant validity regarding workplace learning.

**Results**

**Study population**

Twelve out of 15 PHCTs agreed to participate. During the three-month registration period, 219 GPs, 53 PHCT nurses and 238 CNs completed the Dutch version of the RIPLS (Table 1). This sample (510 participants) has been used for the factor analysis.

**Translation of the scale**

The translation and back-translation required two rounds to reach agreement on all scale items. Approval of the back-translated English version was received from the author of the original scale.

**Pre-test of the translated version**

Cognitive interviews were conducted with six nurses, two PHCT nurses and eight GPs. Minor changes were

| Table 1. Participant characteristics. | General practitioners (n = 243) | Palliative home care team nurses (n = 72) | Community nurses (n = 263) |
|-------------------------------------|-------------------------------|------------------------------------------|---------------------------|
| Gender                              |                               |                                          |                           |
| Male                                | 168 (69.2%)                   | 13 (18%)                                 | 58 (22%)                  |
| Female                              | 71 (29.2%)                    | 57 (79.2%)                               | 204 (77.6%)               |
| Missing                             | 4 (1.6%)                      | 2 (2.8%)                                 | 1 (0.4%)                  |
| Age category                        |                               |                                          |                           |
| <31                                 | 16 (6.6%)                     | 0 (0%)                                   | 22 (8.5%)                 |
| 31–40                               | 29 (12%)                      | 10 (14%)                                 | 67 (25.5%)                |
| 41–50                               | 62 (25.5%)                    | 28 (39%)                                 | 112 (42.5%)               |
| 51–60                               | 81 (33.5%)                    | 30 (41.5%)                               | 47 (18%)                  |
| >60                                 | 55 (22.4%)                    | 4 (5.5%)                                 | 15 (5.5%)                 |
| Type of practice                    |                               |                                          |                           |
| Solo                                | 113 (47.1%)                   | Not applicable                           | 56 (21.2%)                |
| Duo                                 | 57 (23.8%)                    |                                          |                           |
| Group                               | 67 (27.9%)                    |                                          | 119 (45.3%)               |
| Community service                   | 3 (0.5%)                      |                                          | 83 (31.6%)                |
| Missing                             | 3 (0.5%)                      |                                          | 5 (1.9%)                  |
| Previous palliative care education  |                               |                                          |                           |
| Yes                                 | 59 (22.1%)                    | Not applicable                           | Not applicable            |
| No                                  | 203 (76.0%)                   |                                          |                           |
| Missing                             | 5 (1.9%)                      |                                          |                           |
made to the wording of the scale items. See Supplementary Material available online for the Dutch version of the RIPLS.

**Exploratory factor analysis**

Based on the principal components, three components proved to meet Kaiser’s eigenvalue criterion of > 1. These three components explain 58.9% of the variance (see Table 2). Factor 1 explained 38.7% of variance, factor 2 and 3 explained 10.4% and 9.8% of variance, respectively.

**Confirmatory factor analysis**

Factor analysis confirmed the factor structure of the scale consisting of three factors: teamwork and collaboration, patient centeredness and sense of professional identity (Figure 1). These are identical to the original Reid’s version of the scale.

Model fit indices range from 0 to 1, with higher values indicating better fit: NFI = 0.87; IFI = 0.90; CFI = 0.90; GFI = 0.86.

The calculated Cronbach’s alphas were 0.94 (teamwork and collaboration), 0.88 (patient centeredness), 0.71 (sense of professional identity) and 0.788 (overall alpha) (Table 3).

**Regression analysis**

Gender, age, years of practice and nurse practice organization had no significant impact on the RIPLS score. There was a significant effect of GP practice organization on the sub-score teamwork and collaboration (lower for solo practice: \( P = 0.027 \)) and on the sub-score professional identity (higher for solo practice: \( P = 0.008 \)) (Table 4). The profession also affected significantly on the total RIPLS score (Table 5).

**Test-retest**

The ICC absolute agreement revealed good reliability for total score and all sub-scores, except for the identity sub-score. Total score: 0.718 (95%CI: 0.499–0.852); RIPLS teamwork and collaboration: 0.720 (95%CI: 0.508–0.855); RIPLS identity score: 0.166 (95%CI: −0.199–0.486); RIPLS patient centeredness score: 0.641 (95%CI: 0.339–0.792).

**Workplace learning**

The total RIPLS score significantly correlated with the number of items learned through collaboration after correction for age, gender and profession (\( P < 0.001 \)). A higher score on the RIPLS indicated more items learned.

**Discussion**

**Main findings**

In this study, the RIPLS was translated to Dutch and tested in primary healthcare in Belgium. The Dutch version proved to be a fit model (by EFA and CFA), correlating well with the English version. The translated scale showed good overall reliability and validity.

**Strengths and limitations**

This is the first translation of the RIPLS in Dutch, rendering it ready for use in research and evaluation of educational interventions. The publications on the RIPLS we found were all made to study participants after classroom learning (e.g. interprofessional workshop). This paper is the first time it was used in a workplace-learning context. Since the translated scale was tested in a specific context, namely primary palliative care, further testing in other contexts is required.

**Interpretation of the results in relation to existing literature**

The exploratory and confirmatory factor analysis showed results that were similar to the original English version of the scale; the items contributed to the same
factors as was reported by Reid.[13] (Table 2) Therefore, it can be concluded that the translated version is valid for use and that the theoretical constructs that are valid in classroom based IPL apply equally to the context of interprofessional workplace learning. This supports the thinking about WPL from an educational viewpoint. What is more, it provides us with a benchmark for evaluating the extent to which healthcare professionals are ready to apply interprofessional WPL in their professional practice.

High reliability was shown through calculation of Cronbach’s alphas for all subscales and for the entire scale. The results were equal to, or higher than, the Cronbach’s alphas obtained in the paper on the original scale (Table 3).

The test-retest analysis showed good reliability except for the ‘sense of professional identity’ subscore. This also correlates with the PHCT nurses’ lowest scores of all participant groups in terms of the sub-score of professional identity. This analysis only involved the subgroup of PHCT nurses. These specialized palliative care nurses have a merely advisory task toward GPs and CNs and are, therefore, dependent on the interprofessional relationships to provide high-quality patient care. Professional identity formation is a complex phenomenon depending on interpersonal and institutional or social variables.[15] The qualitative exploration of the specific work situation of Belgian PHCT nurses showed that these variables lead to fluctuating role performance and professional behaviour. [16] The situated and interactional dimension of role performance and its relation to self-perceived identity may account for the low reliability score in the test-retest analysis on professional identity.[17]

Similar to Reid’s findings, GPs in our study show lower scores in terms of teamwork and collaboration and higher scores for professional identity than nurses. [13] This finding is in line with initial RIPLS studies in classroom-based learning.

Our study shows a statistically significant correlation between the RIPLS score and interprofessional workplace learning, measured by the number of items.

Table 3. Cronbach’s alpha for the original English scale and the translated Dutch scale.

| Original English scale [13] | Translated Dutch scale |
|---------------------------|------------------------|
| Factor 1 (teamwork and collaboration) | 0.88 | 0.94 |
| Factor 2 (patient centredness) | 0.86 | 0.88 |
| Factor 3 (sense of professional identity) | 0.69 | 0.71 |
| Overall alpha | 0.76 | 0.88 |

Figure 1. Visual presentation of the confirmatory factor analysis model presented with the estimated standardized regression weights.
learned during collaboration (see Methods). This is the first time the RIPLS has been tested in situations other than classroom-based learning. In our study, we collected data about the learning that spontaneously took place as an unintended, implicit outcome of interprofessional collaboration. Literature shows that exposure to classroom-based IPE experiences leads to a higher score on the RIPLS.[18–23] Our study suggests that these higher scores may be correlated with a higher learning effect of interprofessional collaboration, indicating that the translated scale can be used to inform us on attitudes towards interprofessional workplace learning. As interprofessional workplace learning is becoming an important aspect of the lifelong learning continuum, the call for undergraduate IPE as an amplifier of this dynamic becomes more pressing.

Age, gender, previous palliative care training and years in practice do not have a significant impact on the RIPLS score in our study. This suggests that the attitude towards interprofessional learning is a rather constant characteristic, independent of practice experience. As this is the first time these properties have been tested in established healthcare professionals (most studies have been performed with undergraduate students), it is impossible to draw comparisons with literature.

**Implications for clinical practice and research**

Our study shows that the RIPLS can also be used for healthcare professionals (and not only for students) and that it applies to interprofessional workplace learning just as much as it does to classroom based learning. Further research is needed to evaluate the longitudinal effect of interprofessional education throughout a professional’s career.

Further research is needed to explore the reliability of the identity subscale of the RIPLS. In the light of defining consequential validity, differences among professional groups could be taken into account when preparing healthcare professionals for practice or when coaching interprofessional healthcare teams in their function. This has to be evaluated in future research.

**Conclusion**

The Dutch version of the RIPLS shows good validity and reliability for use in primary care. Its applicability in workplace learning offers new scope for continuing professional development.

**Acknowledgements**

The authors thank Ross Reid for evaluating and approving the translated Dutch scale as a correct translation of the original English scale, and Kristien Temperville for proofreading the manuscript.

**Declaration of interest**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

| Table 4. Effect of gender, age category and profession on RIPLS score and subscores. |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Gender                       | Age category                  | Profession                    | Adj R squared |
| Teamwork and collaboration    | P = 0.533                     | P = 0.456                     | P = <0.001*     |
| Patient-centredness           | P = 0.114                     | P = 0.432                     | P = 0.425b      |
| Sense of professional identity| P = 0.114                     | P = 0.432                     | P = 0.011*     |
| Total RIPLS score             | P = 0.531                     | P = 0.475                     | P = 0.003*     |

*Significant result.

Table 5. Effect of profession on RIPLS score and sub scores: pairwise comparisons.

| Profession     | Between GP and PHCT nurse | Between GP and community nurse | Between PHCT nurse and community nurse |
|----------------|----------------------------|--------------------------------|----------------------------------------|
| Teamwork and collaboration | 6.1 (95% CI: 3.8–8.5) lower for GP than for PHCT nurse (P < 0.001)* | 3.1 (95%CI: 1.5–4.6) lower for GP than for community nurse (P < 0.001)* | 3.1 (95%CI: 0.9–5.3) higher for PHCT nurse than for community nurse (P = 0.006)* |
| Patient-centredness | NS                         | NS                             | NS                                     |
| Sense of professional identity | 1.5 (95% CI: 0.5–2.5) higher for GP than for PHCT nurse (P = 0.003)* | NS                             | 1.2 (95% CI: 0.3–2.2) higher for community nurse than for the PHCT nurse (P = 0.006)* |
| Total RIPLS score | 4.8 (95% CI: 1.6–7.9) lower for GP than for PHCT nurse (P = 0.002)* | 2.7 (95% CI: 0.7–4.7) lower for GP than for community nurse (P = 0.009)* | NS                                     |

*Significant result.

NS, not significant result.
References

[1] World Health Organization. Framework for action on inter-professional education and collaborative practice. Geneva: World Health Organization; 2010.

[2] Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. Lancet. 2010;376:1923–1958.

[3] CAIPE: Centre for the advancement of interprofessional education [Internet]. The definition and principles of interprofessional education; [cited 2016 June 12]; [about 4 screens]. Available from: http://caipe.org.uk/about-us/the-definition-and-principles-of-interprofessional-education/

[4] Eraut M. Non-formal learning and tacit knowledge in professional work. Br J Educ Psychol. 2000;70:113–136.

[5] Billett S. Workplace pedagogic practices: Co-participation and learning. Br J Educ Stud. 2002;50:457–481

[6] Pype P, Peersman W, Wens J, et al. What, how and from whom do health care professionals learn during collaboration in palliative home care: A cross-sectional study in primary palliative care. BMC Health Serv Res. 2014;14:501.

[7] Reeves S, Perrier L, Goldman J, et al. Interprofessional education: Effects on professional practice and healthcare outcomes (update). Cochrane Database Syst Rev. 2013;3:CD002213.

[8] Lapkin S, Levett-Jones T, Gilligan C. A systematic review of the effectiveness of interprofessional education in health professional programs. Nurse Educ Today. 2013;33:90–102.

[9] Thannhauser J, Russell-Mayhew S, Scott C. Measures of inter-professional education and collaboration. J Interprof Care. 2010;24:336–349.

[10] CIHC: Canadian interprofessional health collaborative [Internet]. Overview [cited 2016 June 12]; [1 screen]. Available from: http://www.cihc.ca/http://www.cihc.ca/about/overview

[11] Parsell G, Bligh J. The development of a questionnaire to assess the readiness of health care students for inter-professional learning (RIPLS). Med Educ. 1999;33:95–100.

[12] McFadyen AK, Webster V, Strachan K, et al. The readiness for inter-professional learning scale: A possible more stable sub-scale model for the original version of RIPLS. J Interprof Care. 2005;19:595–603.

[13] Reid R, Bruce D, Allstaff K, et al. Validating the readiness for inter-professional learning scale (RIPLS) in the postgraduate context: Are health care professionals ready for IPL? Med Educ. 2006;40:415–422.

[14] Beatty P, Gordon B. The practice of cognitive interviewing. Public Opin Q. 2007;71:287–311.

[15] Cruess RL, Cruess SR, Boudreau JD, et al. A schematic representation of the professional identity formation and socialization of medical students and residents: A guide for medical educators. Acad Med. 2015;90:718–725.

[16] Pype P, Mertens F, Deveugele M, et al. ‘I beg your pardon?’ Nurses’ experiences in facilitating doctors’ learning process—an interview study. Patient Educ Couns. 2014;96:389–394.

[17] Sarangi, S. Reconfiguring self/identity/status/role: The case of professional role performance in healthcare encounters. JALPP. 2010;7:79–100.

[18] Sytsma TT, Haller EP, Youdas JW, et al. Long-term effect of a short interprofessional education interaction between medical and physical therapy students. Anat Sci Educ. 2015;8:317–323.

[19] Shoemaker MJ, de Voest M, Booth A, et al. A virtual patient educational activity to improve interprofessional competencies: A randomized trial. J Interprof Care. 2015;29:395–397.

[20] Murphy JI, Nimmagadda J. Partnering to provide simulated learning to address interprofessional education collaborative core competencies. J Interprof Care. 2015;29:258–259.

[21] Wang R, Shi N, Bai J, et al. Implementation and evaluation of an interprofessional simulation-based education program for undergraduate nursing students in operating room nursing education: A randomized controlled trial. BMC Med Educ. 2015;15:115.

[22] Hood K, Cant R, Baulch J, et al. Prior experience of interprofessional learning enhances undergraduate nursing and healthcare students’ professional identity and attitudes to teamwork. Nurse Educ Pract. 2014;14:117–122.

[23] Darlow B, Coleman K, McKinlay E, et al. The positive impact of interprofessional education: A controlled trial to evaluate a programme for health professional students. BMC Med Educ. 2015;15:98.