Towards Validating a Toolkit of Bilingual Interprofessional Healthcare Education Assessment Tools: Data

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Abstract— **There is a need to create validated evaluation strategies for interprofessional education (IPE) in order to continue to improve IPE education, gather evidence of learning and transfer knowledge to the point of care. In this paper we present the findings from our data collection(to date) over an 18 month period in a variety of IPE courses and program (university and college credit courses in nursing, medicine, various healthcare courses, and continuing education courses for healthcare professionals in four countries). The two quantitative tools used in both English and French were validated and are reported in this paper.**

Keywords- interprofessional education; assessment; evaluation instruments

I. INTRODUCTION

The purpose of this project (funded by a Health Force Ontario Research Grant) was to design, develop, pilot, refine and validate a toolkit of qualitative and quantitative assessment tools to assess interprofessional education (IPE). The four qualitative and quantitative evaluation tools used in both English and French included an evaluation survey based on the W(e)Learn framework, a survey to access changes in attitudes and behaviour and a team and learner exemplar and companion contract [1]. The process of developing our tools has been published elsewhere [2]. Descriptions of the instruments can be found in Table 1.

TABLE I.   TOOLKIT OF EVALUATION INSTRUMENT

Assessment Tool	Purpose
ICCAS – Interprofessional Collaborative Competencies Attainment Survey	This quantitative survey has been designed to document learner's perceptions of changes in their attitudes and behaviors with regard to IPC competencies as a result of IPE. Learners reflect back after completing the IPE experience and identify (in hindsight) where they perceive they were before and after the learning experience [2]
W(e)Learn Assessment	This quantitative instrument is designed to align with the W(e)Learn framework http://www.ennovativesolution.com/WeLearn/ Learners rate their experiences in an IPE program using the dimensions of IPE identified by the W(e)Learn framework (content, media, service, structure and outcomes) [2].

Learner Contract	This qualitative tool has been created to help individual learners develop the core competencies needed to collaborate effectively with other healthcare professionals. Specifically, the contract will: (a) document how learners plan to develop their knowledge, skills and activities associated with IPC; (b) assist learners in identifying and documenting learning outcomes associated with the learning activities. This tool will facilitate learner's planning, monitoring, and assessment of their IPE experience [2].
Learner Contract Exemplar	The Learner Contract exemplar provides ideas, appropriate language and suggestions for how to plan and implement strategies to facilitate and assess IPE activities. Facilitators may choose to share this tool with learners to guide them in their IPC planning or to use some or all of it to support their teaching [2].
Team Contract	This qualitative tool has been created to help teams work together effectively. Specifically, the contract will: (a) document how teams plan to develop knowledge, skills and activities associated with (IPC);(b) assist teams in identifying and documenting learning outcomes associated with the learning activities. This tool will facilitate team's in planning, monitoring, and assessing their IPE experience [2].
Team Contract Exemplar	The Team Contract exemplar provides ideas, appropriate language and suggestions for how to plan and implement strategies to facilitate and assess IPE activities. Facilitators may choose to share this tool with teams to guide them in their IPC planning or to use some or all of it to support their teaching [2].

This study is unique because (a) all instruments are aligned with a Canadian, nationally validated set of IPE core competencies and an IPE framework (W(e)Learn), (b) the post/post design of our quantitative ICCAS tool, we believe, will be sensitive to changes in IPE attitude and behaviour, and (c) the learner contract is a teaching/learning tool to help teams or individual learners plan their learning and becomes a qualitative self-reflection assessment tool after learning.

In this paper, we present the findings (to date) from our 18 month validating process in a variety of IPE courses and programs (university and college credit courses in nursing, medicine, various healthcare courses, and continuing

education courses for healthcare professionals in Canada, and New Zealand. Data collection and analysis will continue over the next six months. The two quantitative tools used in both English and French were validated and are reported in this paper. Data collection is still in process for the learner and team contracts.

II. METHODOLOGY

A letter of invitation was emailed to potential participants met at various IPE and healthcare conferences who expressed an interest in participating in the validation process. Letters were sent to various IPE educators in Canada, the United States, England and New Zealand between November 2009 and June 2010. A copy of the letter can be found in the Appendix. Through word of mouth and additional conference presentations, growing interest to participate in the study emerged. Response to the invitation to participate in the study was enthusiastic as many programs revealed that they need and want assessment instruments for their IPE projects.

The four instruments in both French and English were emailed to programs in October 2009 with a list of criteria that needed to be met in order to be involved in the study. The criteria included completion of a brief (approximately 10 minute) survey providing a course description and feedback on the instruments. Programs were requested to provide an MS Excel template for each assessment instrument completed by learners within the programs to assist with validation. Ethics approval was obtained and confidentiality of the participants was ensured.

For their participation in the project, programs were promised an electronic version of the four final instruments (in either French or English or both), with a synopsis of the psychometric properties. Programs also received a small stipend ($300.00 Canadian) to be used as needed (e.g., to pay a research assistant to input data).

Data started to emerge in February 2010. The project manager was in contact with the participating program coordinators via telephone and email. On several occasion the participating cites were visited by the project manager to discuss the instruments with instructors. Table 2 shows the participating programs to date.

Results of the validation process of the two quantitative instruments are reported in the next section of this paper. The validation process included calculating the internal consistency of the resulting scales on the planning and assessment tools with Cronbach's alphas [3]. Any scales with poor internal consistency (alphas < .7) were then subjected to item analysis. Item-total correlations were computed between individual item responses and respective total scale scores. Items with low item-total correlations were discarded from their respective scale. This process was then repeated in an iterative fashion until all scales displayed adequate internal consistency.

Construct validity of the tools was assessed with confirmatory factor analyses. Criterion related validity was assessed by comparing scores on the various subscales of the survey with other related measures. Divergent validity evidence was sought by computing correlations between

scores on the quantitative tools and non-related demographic variables, such as education level.

TABLE 1: PARTICIPATING PROGRAMS TO DATE

IPE Program	N	Country
Jeux Interprofessionnels Francophones 2010, à la Cité Collégiale	29	Canada
IPE Program, Northern Ontario School of Medicine	15	Canada
IPE showcase, à la Cité Collégiale	58	Canada
Hybrid IPE course, Algonquin College	60	Canada
IPE project with Nursing and Library students, Algonquin College	74	Canada
Transdisciplinary Community Health Program – University of Ottawa	22	Canada
Rural Interprofessional Clinical Education Project – University of Ottawa	6	Canada
IPE program, Faculty of Health and Environmental Sciences, Auckland University of Technology	945	New Zealand
IPE project – Elisabeth Bruyere Research Institute and the University of Ottawa	25	Canada
Clinique universitaire interprofessionnelle de réadaptation Université d'Ottawa	7	Canada
en formation interprofessionalisme Hôpital Montfort	5	Canada

III. DATA ANALYSES

A. Internal Consistency

The internal consistency of resulting scales on the planning and assessment tools assessed with Cronbach's alphas. The reliability analysis showed that all items on the W(e)Learn instrument are very highly correlated. The reliability analysis also showed that all items on the ICCAS instrument are very highly correlated.

Items of the W(e)Learn were grouped under the constructs of structure, content, service, and outcomes. All items had Cronbach's alphas over .90 with the exception of the five items under the service construct which were approaching .90 (r=.88). Items of the ICCAS were grouped under the constructs of the competencies for IPC: communication; collaboration; roles and responsibilities; collaborative patient/family centred approach; conflict management/resolution; and team functioning. Cronbach's alphas for all items were above .90, ranging from r=.90 to r=.93

Item-total correlations were computed between individual item responses and respective total scale scores. Items with low item-total correlations were to be discarded from their respective scale. This process would be repeated in an iterative fashion until all scales display adequate internal consistency. However, it was determined that if any item were deleted on the W(e)Learn , the Cronbach's alphas of the remaining items would not increase. Likewise, if any

item were deleted on the ICCAS, the Cronbach's alphas of the remaining items would not increase. Thus, no items on the W(e)Learn and ICCAS were deleted.

B. Construct Validity

Construct validity of the tools was assessed with confirmatory factor analyses. It was expected that items would load strongly onto the factors in accordance with the model variables. Further, it was expected that items from the same subscale will load onto the same factors.

Confirmatory factor analyses were conducted for both the W(e)Learn and ICCAS assessment instruments. In fact, two factor analyses were conducted for the ICCAS; for the "before" items and then the "after" items. Items of the W(e)Learn instrument loaded onto three factors. As expected, the factor analyses for the ICCAS showed items for each sub-scale loading onto six factors with some overlap.

For the W(e)Learn, factors did not correspond perfectly with the 4 subscales. This was not entirely surprising, as the theoretical model upon which the W(e)Learn is based proposes that both Content and Structure are dependent upon various aspects of Structure. Results suggest a possible regrouping of some Structure items with Content (those related to collaborative pedagogical strategies), some Structure items with Service (those related to facilitation strategies). Items for the Outcomes subscale, as well as items for the Structure, Content, and Service subscales that relate to practical/authentic IPE content and resources loaded onto factor 1 (factor loadings > .50). Items for the Structure and Content subscales that relate to collaboration and teamwork loaded onto factor 2 (factor loadings > .50), whereas items for the Structure and Service subscales that relate to facilitation loaded onto factor 3 (factor loadings > .50).

Regarding the ICCAS, results suggest that, before IP training, individuals tend to focus more solely on their interactions with the patient/family in planning care, whereas following training, individuals better understand the interactions with other IP professions in effective team functioning.

For the "before" results of the ICCAS, items related to team functioning and collaborative patient/family-centred approaches loaded on factor 1 (factor loadings > .70); communication items loaded onto factor 2 (factor loadings > .56); conflict resolution/management items loaded onto factor 3 (factor loadings > .73); collaboration items loaded onto factor 4 (factor loadings > .73); and, roles and responsibilities items seemed to load onto factors 5 and 6(factor loadings > .65).

For the "after" results of the ICCAS, items related to collaborative patient/family-centred approaches loaded on factor 1 (factor loadings > .70); communication items loaded onto factor 2 (factor loadings > .53); conflict resolution/management items loaded onto factor 3 (factor loadings > .63) with team functioning items also showing relatively high factor loadings (.56 -.59); collaboration items loaded onto factor 4 (factor loadings > .60); roles and responsibilities items seemed to load onto factor 5 (factor loadings > .40); and some roles and responsibilities and

communication items loading onto factor 6 (factor loadings > .40).

Correlations were computed between subscales of the ICCAS and a related instrument, the IEPS, using responses from after training.

C. Criterion Related Validity

Criterion related validity was assessed by comparing scores on the various subscales of the survey with other related measures. Factors 2 and 4 of the IEPS, measure understanding the need for interdisciplinary cooperation and understanding the value of other professions.

It may be hypothesized that individuals who score higher on the Communication, Collaboration, Roles and Responsibilities, Conflict Management, and Team Functioning subscales of the ICCAS would be more likely to see the value in and need for cooperation with team members from other professions. This hypothesis was partially supported, as Factor 2 of the IEPS was significantly positively correlated with all scales of the ICCAS. However, factor 4 of the IEPS did not correlate significantly with subscales of the ICCAS.

D. Divergent Validity

Divergent validity evidence was sought by computing correlations between scores on the quantitative tools and non-related demographic variables, such as education level. Correlations were computed between subscales of the ICCAS and a related instrument, the IEPS, using responses from after training.

Factors 1 and 3 of the IEPS measure perceptions of the competence and cooperation within one's profession but not one's own ability. It may therefore be hypothesized that individual's scores on the subscales of the ICCAS should not be related to the IEPS. This hypothesis was partially supported, as neither Factors 1 nor 3 of the IEPS was significantly positively correlated with any scales of the ICCAS.

IV. CONCLUSIONS AND FUTURE WORK

Validating instruments and processes will increase the likelihood that IPE experiences are planned and delivered effectively and increase justification and accountability for healthcare educational experiences and clinical practice.

In summary, assessment is an important, and often overlooked, element in designing an IPE initiative. These instruments are intended to make the assessment process easier and more effective. Although these instruments were designed with interprofessional healthcare teams in mind, we feel the validated instruments could readily be transferable to a variety of interdisciplinary tasks and settings such as social work and human services education. Next steps include collecting more data over the next year, conducting the validation analyses again, and making any refinements to the instruments if necessary.

REFERENCES

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[3] L.J. Cronbach, "Coefficient alpha and the internal structure of tests," Psychometrika, vol. 16, issue 3, 1951, pp. 297–334.

APPENDIX

Dear (type name),

Thank you for agreeing to participate in the validation study of our interprofessional education (IPE) assessment instruments. Enclosed you will find the IPE instruments, as well as a brief survey about your IPE program(s), a copy of our ethics approval letter, and an Excel file to be used for entering your data. A brief description of each enclosure is included at the end of this letter.

Your participation in the validation study involves the following steps:

1) Begin using the IPE instruments in your IPE program(s) at any time. You may choose to use the instruments in one program or in multiple programs. As well, you may choose to use all of the instruments or just a subset of them.

2) Enter the data that you collect with the IPE instruments into the enclosed Excel template. If you are using the instruments in multiple, distinct programs, please save the data from each program in a separate Excel file, and name each file using a unique label (e.g., If you are using the instruments in 2 different courses, you might name the Excel files with the associated course code: EDU5191.xls and EDU7395.xls).

3) Complete the Program Description and Instrument Feedback Survey. If you are using the instruments in multiple, distinct programs, please complete a separate survey for each, and be sure to include the program labels that you used for naming the associated Excel files.

4) Return the Excel data file(s) and the completed Program Description and Instrument Feedback Survey(s) to:

When we receive your data, we will send you a $300.00 CDN stipend for your participation. If you use at least 3 of the IPE instruments (the ICCAS, W(e)Learn, and either the Team or Learner Contract) in your program we will send an additional $300 CDN stipend. In order to receive the stipend and be included in the initial validation report, your data must be received before September 1st, 2010. After analyzing the data, we will send you our initial report on the psychometric properties of the instruments as well as revised instruments for your use.

If you have any questions about the process or about the instruments, we encourage you to contact us at. Again, we sincerely thank you for your participation.