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Developing an Assessment Tool for Enhancing Interprofessional Education of Patient Safety

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Abstract. The increasing recognition of the value of effective interprofessional collaboration has promoted interprofessional education (IPE) among healthcare professionals. The IPE pilot program initiative at UTHealth matriculated students from the disciplines of biomedical informatics, biomedical sciences, dentistry, medicine, nursing and public health. There has been a pressing need for developing an assessment tool in reflecting how IPE participants recognize and understand the other disciplines including clinical informatics in nowadays' practice. This paper reports our development process of the assessment tool, which is still under an iterative, in-depth refinement and aiming at greater collaborations.

Keywords. Interprofessional education; evaluation tool; program improvement

Introduction

To build up competencies in collaborative practice across six schools of The University of Texas Health Science Center at Houston (UTHealth), an Interprofessional education (IPE) pilot class based upon a structured clinical simulation was launched in 2014. So far, seven cohorts (spring & fall in 2014, 2015, 2016 and spring 2017) of students from all six schools of UTHealth participated in the four-session IPE workshop that is designed to enhance a student's ability to function in interprofessional health care teams. Health IT is an emerging component in promoting patient safety and healthcare quality, which is reflected by the rapid growth and adoption of electronic health record systems. There has been an obvious gap in IPE programs that health IT was not part of the content because most IPE evaluation instruments were mainly developed for nursing, medicine and pharmacy which are reflected by the scarcity of the IPE evaluation involving health IT in clinical communication and collaboration. Therefore, to evaluate and demonstrate the unique pilot program including health IT, it is imperative to develop an assessment tool suitable for the multidisciplinary participants from the six schools at UTHealth. The need to develop such an innovative and timely assessment tool for IPE echoes the imperative role of health IT in clinical communication and patient safety towards a safer system for better care.

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1. Background

IPE occurs when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes [1]. The goal of IPE is toward the highest quality of team-based care. The team members are recognized by others as well as by themselves as having a collective identity and shared responsibility for a patient.

UTHealth, the most comprehensive academic health center in the University of Texas System is comprised of schools of biomedical informatics, biomedical sciences, dentistry, medicine, nursing and public health, a total of six schools located in the world largest medical center at Houston, Texas in the USA.

The IPE program is designed to teach students the fundamental team communication skills they will need to use throughout their health professional careers. Starting in spring 2014, the initial pilot program to promote curriculum and clinical innovations in IPE and collaborative practice included 34 students selected by the Dean of each school at UTHealth and grouped into six IPE teams coached by course directors. The IRB at UThealth approved the project.

Working in an IPE team through the semester, the students are expected to demonstrate collaborative behavior by applying TeamSTEPPS® [2], i.e. strategies and tools to enhance performance and patient safety, a teamwork system designed by the Agency for Healthcare Research and Quality for healthcare professionals to improve patient safety. The IPE program is delivered in the format of structured clinical simulation.

To meet the IPE core competencies, students should be able to apply quality improvement, utilize health information technology/informatics, and employ evidence to provide patient centered care. As a participating member in the IPE program, the School of Biomedical Informatics (SBMI) plays a key role in contributing to IPE with a full spectrum of informatics components.

2. Methods

The development of the IPE assessment tool was comprised of three steps. 1) conducted a literature review to identify peer-reviewed assessment tools of interprofessional education. 2) followed the modified Kirkpatrick model [3] to develop a new assessment tool with an emphasis on clinical informatics. 3) developed a plan to validate the tool through expert review and pilot testing, an ongoing task through an iterative process.

3. Results

Our preliminary literature search identified the following peer-reviewed assessment tools, but none of them indicates a clear health IT components towards healthcare quality and safety.

1. APSQ: attitudes to patient safety questionnaire [4], a 45-item measure of attitudes towards five patient safety themes.

2. ATHT: Attitudes toward health care teams [5]: 5-point Likert scales administered to geriatric health care teams.
3. CSCD: collaboration and satisfaction about care decisions scale [6]: a longitudinal description on collaboration and satisfaction with decision – making process among nurses, residents and attending physicians at surgical ICU.
4. IEPS: interdisciplinary education perception scale [7]:4 sub-scale assessment tool administered to allied health professions.
5. ITPS: interprofessional team performance scale [8]:measuring team performance in long-term care settings.
6. RIPLS: readiness for interprofessional learning scale [9]: a rating scale using items based on the desired outcomes of shared learning to assess the 'readiness' health care undergraduates.

Q5. Attitude toward interprofessional education (IPE). Please rate the following statements on a scale from 1 to 5, 1 = "Strongly Disagree", 5 = "Strongly Agree".

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)
1. Learning with other students will help me become a more effective member of a health care team. (1)	❍	❍	❍	❍	❍
2. Patients would ultimately benefit if health care students worked together to solve problems. (2)	❍	❍	❍	❍	❍
3. Shared learning with other health care students will increase my ability to understand clinical problems. (3)	❍	❍	❍	❍	❍
4. Learning with health care students before exposure to the work setting would improve relationships after exposure to the work setting. (4)	❍	❍	❍	❍	❍
5. Communication skills should be learned with other health care students. (5)	❍	❍	❍	❍	❍
6. Shared learning will help me to think positively about other professionals. (6)	❍	❍	❍	❍	❍
7. For small group learning to work, students need to trust and respect each other. (7)	❍	❍	❍	❍	❍
8. Team-working skills are essential for all health care students to learn. (8)	❍	❍	❍	❍	❍
9. Learning team-working skills can prepare me to prevent patient safety events in the health care settings. (9)	❍	❍	❍	❍	❍
10. Shared learning will help me to understand my own limitations. (10)	❍	❍	❍	❍	❍
11. I don't want to waste my time learning with other health care students. (11)	❍	❍	❍	❍	❍
12. It is not necessary for health care students to learn together. (12)	❍	❍	❍	❍	❍
13. Problem-solving skills can only be learned with students from my own department. (13)	❍	❍	❍	❍	❍
14. Shared learning with other health care students will help me to communicate better with patients/clients and other professionals. (14)	❍	❍	❍	❍	❍
15. I would welcome the opportunity to work on small-group projects with other health care students. (15)	❍	❍	❍	❍	❍
16. Shared learning will help me to clarify the nature of problems. (16)	❍	❍	❍	❍	❍
17. Shared learning before exposure to the work setting will help me become a better team worker. (17)	❍	❍	❍	❍	❍
18. The function of nurses and therapists is mainly to provide support for doctors. (18)	❍	❍	❍	❍	❍
19. I'm not sure what my professional role will be. (19)	❍	❍	❍	❍	❍
20. I have to acquire much knowledge and skills than other health care students. (20)	❍	❍	❍	❍	❍
21. Better multi-disciplinary teamwork will reduce patient safety events. (21)	❍	❍	❍	❍	❍

Figure 1. Sample questions of attitude toward the IPE within the assessment tool, administered via pre & post questionnaires

The modified Kirkpatrick model fits nicely with the evaluation of IPE as it covers most literature of evaluation users' needs [10]. To enhance the health IT component in IPE, we followed the six items listed below to develop the new assessment tool based upon the modified Kirkpatrick's learning and training evaluation model.

1. Reaction - Learners' views on the learning experience and its interprofessional nature.

2. Modification of attitudes/perceptions - Changes in learners' reciprocal attitudes or perceptions between participant groups. Changes in perception or attitudes towards the value and/or use of team approaches to caring for a specific patient group.
3. Acquisition of knowledge/ skills - Including learners' knowledge and skills linked to interprofessional collaboration, documenting patient data and communicating, exchanging patient information with healthcare professionals through EHRs and HIE.
4. Behavioral change - Identifies learners' transfer of interprofessional learning to their practice setting and changed professional practice.
5. Change in organizational practice - Wider changes in the organization and delivery of care.
6. Benefits to patients - Improvements in health or well-being of patients.

With references to other IPE questionnaires identified, a new questionnaire was developed to assess the following four aspects:

1. mutual respect and shared values;
2. roles and responsibilities;
3. interprofessional communication facilitated by health IT, and
4. health IT supported teams and teamwork

The questionnaire has six sections and each question regarding the four aspects contains a 5-point Likert scale. Sample questions listed in the Figure 1&2 show the attitude toward IPE, communication and teamwork skills. The complete questionnaires are shareable for demonstrating a greater generalizability and broader collaboration beyond the disciplines of the six schools at UTHealth. The questions measuring the impact of the IPE program with an enhanced health IT component were administered via pre & post tests, with an emphasis on

1. acquisition of knowledge relative to IPE and IPE competencies, quality improvement and patient safety, and TeamSTEPPS[2] principles and communication strategies.
2. qualitative survey of participant satisfaction with the experiences;
3. qualitative self- and team-based assessments of performance in case scenarios and structured clinical simulation, and
4. observational analysis of participants by faculty during structured clinical simulation to evaluate team-based behaviors.

The assessment tool, comprised of a pre & a post test questionnaire and guidance of data analysis, was validated by quality improvement experts and the pilot course participants. The questionnaires were reviewed by all the course directors and domain experts in the field of quality improvement and patient safety. The domain experts were able to complement to the disciplines in the six UTHealth schools. Comments and suggestions gleaned from the review process were incorporated into a revised version circulating for a second round of review, which was limited to the course directors only.

The questionnaires were administered, at the beginning and closure of the pilot program in the semester of spring 2014 (N=34), fall 2014 (N=30), spring 2015 (N=72), and fall 2015 (N=91) at UTHealth. Data collected at the baseline and after the pilot program were compared and analyzed for significance. In addition, course director's

observation during the course enriches the qualitative data collection. The data analysis process using a statistical software (SPSS and/or R) was documented and accompanied with the questionnaire as an entire set of the assessment tool.

Q6. Communication and teamwork skills. Please rate the following statements on a scale from 1 to 5, 1 = "Strongly Disagree", 5 = "Strongly Agree".

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)
1. I feel comfortable justifying recommendations/advice face-to-face with more senior people. (1)	❍	❍	❍	❍	❍
2. I feel comfortable explaining an issue to people who are unfamiliar with the topic. (2)	❍	❍	❍	❍	❍
3. I feel comfortable reporting a patient safety event through a web-based reporting system if I happen to witness it happening. (3)	❍	❍	❍	❍	❍
4. I feel comfortable reporting any errors I had made through a web-based reporting system, no matter how serious the outcome had been. (4)	❍	❍	❍	❍	❍
5. I have difficulty in adapting my communication style (oral and written) to particular situations and audiences. (5)	❍	❍	❍	❍	❍
6. I prefer to stay quiet when other people in a group express opinions that I don't agree with. (6)	❍	❍	❍	❍	❍
7. I feel comfortable working in a group. (7)	❍	❍	❍	❍	❍
8. I feel uncomfortable putting forward my personal opinions in a group. (8)	❍	❍	❍	❍	❍
9. I feel uncomfortable taking the lead in a group. (9)	❍	❍	❍	❍	❍
10. I am able to become quickly involved in new teams and groups. (10)	❍	❍	❍	❍	❍
11. I am comfortable expressing my own opinions in a group, even when I know that other people don't agree with them. (11)	❍	❍	❍	❍	❍
12. Giving precedence to the interests of patients and populations facilitates interprofessional health care delivery./Placing the interests of patients and populations at the center facilitates interprofessional health care delivery. (12)	❍	❍	❍	❍	❍
13. Honesty and integrity in relationships with other professionals are essential for all health care students. (13)	❍	❍	❍	❍	❍

Figure 2 Sample questions of communication and teamwork skills toward the IPE within the assessment tool, administered via pre & post questionnaires

4. Discussion

The project has advanced IPE at UTHealth and will promote the culture of patient safety and health quality by providing students an early exposure to simulated clinical teamwork. Based upon the modified Kirkpatrick model and a systematic IPE literature review, an assessment tool of IPE with an enhanced component of health IT has been developed. The tool was validated by domain experts and tested in a pre-post evaluation during the pilot courses in 2014 and 2015.

The pilot IPE program primarily demonstrated a successful design and implementation in promoting the value of learning and enhancing the essential skills and understanding in health science students through interprofessional collaboration.

We identified a few deficiencies in the evaluation process for future improvement through the upcoming IPE programs. For example, few paired items in the assessment tool were not sensitive to respondents' changes before and after the IPE intervention and failed to reflect what these items intended to examine. As a pilot program, it is inevitable that the small sample sizes may limit the generalizability of the tool.

We plan to disseminate assessment tool to other UT health science centers for a wider range of validation and collaboration. This paper just reported the development process in brief due to the page limitation. The evaluation outcome over the period is under in-depth analysis over years for refining the assessment tool and sharing with national and international collaborators interested in a broader impact on IPE. Moreover, through a comparable data set, the assessment tool holds potential for a

global collaboration on IPE programs to enhance safety and quality by promoting health IT and nursing informatics.

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