

Ten key elements for implementing interprofessional learning in clinical simulations

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This paper discusses 10 key elements for the design and implementation of interprofessional education (IPE) in a skills centre. The elements are based on published literature as well as on the experience of an IPE initiative, simulating the management of a multiple-traumatised patient in the acute and rehabilitation phases, by students from 4 professions: medicine, nursing, occupational therapy and physiotherapy. The key elements are interrelated and include the partners involved (learners, facilitators and patient simulator), the content, learning resources, setting, faculty development, logistics, learning strategies and evaluation.

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Interprofessional education (IPE) refers to healthcare students learning with, from and about one another to improve collaboration and the quality of patient care.^[1] Successful transition of students to competently work-ready health professionals requires an ability to work in healthcare teams^[2] and should be addressed through IPE.

The use of IPE to facilitate effective teamwork in healthcare is not novel and has been supported for about 40 years. Despite increasing recognition of the importance of IPE^[3] and collaborative teamwork being a World Health Organization (WHO) priority of action,^[4] an international environmental scan commissioned by the WHO concluded that significant efforts are still required to ensure that IPE is designed, delivered and evaluated at a high standard. This finding was based on self-reports from 41 countries that IPE was often (i) not mandatory (88%); (ii) not based on explicit learning outcomes (34%); (iii) not assessed for what was learned (63%); (iv) not offered by trained facilitators (69%); and (v) not formally evaluated (30%).^[3] IPE is an important pedagogy but there are certainly challenges and barriers involved in this effort. A systematic planning, development, and implementation process should be outlined before initiating IPE.^[5]

An IPE simulation was presented at Medunsa for students from 4 professions: medicine, nursing, occupational therapy and physiotherapy. Owing to large groups of students, the simulation was repeated 6 times. The simulation comprised 2 phases: (i) the acute phase requiring medical and nursing students to manage a multi-traumatised patient on admission to the emergency room, followed by (ii) a rehabilitation phase during which occupational therapy (OT) and physiotherapy (PT) students joined for a consultation with the patient at a clinic. We drew upon our experience of simulation as well as published literature to plan, develop and implement these IPE experiences. Seven of the 10 elements of our planning, development and implementation concur with all the elements of a Conceptual Framework for Interprofessional Education and Practice (developed by the McGill Educational Initiative on Interprofessional Collaboration).^[6] The elements are the partners involved (learners, facilitators and patient simulator), the content, learning resources, setting and faculty development. The remaining 3 elements are the logistics, learning strategies and evaluation. These 10 key elements for the design and implementation of IPE in a skills centre are discussed under separate headings but are interrelated, as each has an influence on the process of developing and delivering an IPE event.

The 10 key elements

1. Facilitators

Interprofessional education involves staff from different professional backgrounds learning and working together. Commitment is required of faculty to engage in shared learning and dialogue which has the potential to encourage collegial learning, change thinking and support new working relationships.^[7]

The facilitation of IPE for a small group of students is a complex and demanding activity. Facilitators need to display a wide range of attributes and competencies to ensure that they function effectively, as would be demonstrated in commitment to IPE, positive role modelling and valuing of diversity.^[5] They should feel confident and secure about their knowledge base and their ability to facilitate diverse groups of interprofessional learners,^[5] work creatively with small groups^[8] and be able to plan, develop, implement, teach and evaluate IPE.^[5]

In the absence of top-down drivers for the implementation of IPE, lecturers committed to changing and improving healthcare education for improved patient management and safety, could serve as bottom-up drivers. It is advisable to include faculty who are creative and innovative – as well as interested in transformational change – when selecting professionals to take part in an event that is relevant to their curricula. One of our challenges for this initiative was similar to that reported in the literature – that the facilitators lacked training for teaching in an IPE environment.^[5] The lecturers from the 4 professions invited to join the skills centre personnel in the planning and implementation of the IPE event were skilled clinical facilitators, strongly motivated and enthusiastic.

2. Learners

It is difficult to select training that is relevant for students from different healthcare professions; most studies limited the complexity by including no more than 4 professional groups.^[6] The management of a multiple-traumatised patient, as reflected in Table 1, was selected as content for 3 reasons: (i) the management of traumatised patients forms part of undergraduate medical (5th year), nursing (4th year), OT (4th year) and PT (4th year) curricula; (ii) these senior students have already mastered the required individual clinical skills; and (iii) the skills centre is very well-suited for trauma simulations.

The simulation matched the 5th-year medical students' lectures on multiple trauma, and their attendance was mandatory. Fourth-year nursing students were invited to join, as well as OT and PT students who were allocated to relevant clinical settings that made possible their reallocation to the skills centre for short periods. As there were large numbers of student and limited time, some students observed the simulations and assessed the actions using an assessment tool (Table 2) as a guide.

3. Patient simulators

Authenticity is an important mechanism for participants to have positive experiences; the simulation of patients by high-fidelity simulators and simulated/standardised patients (SPs) plays a big part. For the present simulation, the high-fidelity simulator was programmed to display dyspnoea with decreased breath sounds on the injured side and was manipulated to appropriately change vital signs in response to treatment or deterioration in condition. Separate low-fidelity arms were used for suturing and venous cannulation, and a pneumothorax trainer to prevent numerous invasive procedures being performed on the costly simulator.

SP encounters must not be overly different from the experience with a real patient. For the SPs to be more believable, they need to 'become the patient', with real emotions, and express the needs, expectations and fears of a patient. Appropriate moulage and dress are also important. In our simulation, the SP was dressed in overalls, and a stab wound with controllable bleeding was created on the right arm, at the correct site where a penetrating wound could cause damage to the radial nerve. Bruises and haematomas were added to improve authenticity of the patient. Detail regarding the background, moulage and dress were carefully planned and documented to ensure effective SP training and accurate repetition of the event.

4. Content

Teamwork has become a major focus in healthcare, as many of the high number of preventable medical errors are a result of dysfunctional or non-existent teamwork.^[9] Team-based skills such as communication and leadership are therefore vital for success in IPE events, and training in

these non-technical skills is becoming a high priority.^[10] The choice in setting the scene and creating learning situations in planning IPE is crucial to the learning that will occur. It is difficult to select training that will be relevant for students from different healthcare professions.^[11] Scenarios for the simulations should be customised to facilitate team interaction. The multidisciplinary and time-sensitive nature of trauma care especially requires teamwork and communication for treating the acutely injured patient.^[12]

Trauma and communication skills were considered as common ground for a simulation appropriate for the 4 selected students groups, since these skills are included in their various curricula. The groups, however, have different roles and, as pointed out in the literature, they have different competencies and objectives as per the various curricula.^[5] The content should therefore be appropriate for the stages in the curricula of students from all the participating professions.

The simulation (Table 1) comprised 3 scenarios (including pre-hospital and initial in-hospital phases that were at a level commensurate with the knowledge and experience of medical and nursing students) and a rehabilitation phase for the same patient that would be more suitable for the medical, PT and OT students.

5. Learning resources

The resources in the skills centre are appropriate for various simulations. The patient simulators, equipment and facility itself have a big influence on scenario planning. The flat roof of the skills centre and surrounding concrete slab made it ideal for Scenario 1 to simulate a 'fall from a height'. The facility also provided easy access to a room fitted with video recording equipment, which was used as the 'emergency room' for Scenario 2. Students not taking part in the resuscitation observed and assessed the activities through a one-way mirror or on plasma screen from the observation room.

Pictures of the prepared venues and equipment were taken and filed together with the requirements list to facilitate easy and correct preparation for similar simulations to follow. Other resources include the instruments necessary for planning, implementation and evaluation of the simulation. They include an action guide (part of which is shown in Table 2) that can be

Table 1. Scenarios and outcomes incorporated in simulation

Scenarios	Actions required
<p>1. Pre-hospital environment (medical and nursing students) A 25-year-old technician has fallen 6 m onto a concrete floor, sustaining possible cervical spine and thoracic injuries and a deep stab wound, caused by a screwdriver he was holding, to his right upper arm.</p>	Perform a primary survey and identify possible injuries. Apply a rigid cervical collar and direct pressure to the stab wound. Obtain a SAMPLE history, perform a log-roll of the patient onto a spinal board and transfer to the emergency room.
<p>2. Emergency room environment (team work by medical and nursing students) A neck collar has been applied as well as a pressure bandage to his right upper arm. He has difficulty breathing but can still answer questions. Full admission procedures excluded.</p>	Integrate the assessment and reassessment of the patient's airway patency, breathing, oxygen saturation, blood pressure, level of consciousness and pain. Administer oxygen, stabilise the cervical spine with head blocks, obtain a history and do a full secondary assessment; start two intravenous lines; perform a needle decompression of the chest; discuss the need for a chest drain; suture the arm laceration and assess the distal pulses and motor function; pass a urinary catheter and insert a nasogastric tube. Provide information and comfort patient throughout.
<p>3. Outpatients Department (medical, OT and PT students) Patient complains of an inability to extend his right wrist and fingers. He is concerned about the clumsiness of his hands and complains of tiredness when he walks up the stairs. His employer threatens to dismiss him.</p>	Medical students: Examine the patient's hand and make a referral. OT and PT students: Examine patient's hand and explain plan for rehabilitation, including exercises and a splint.

Table 2. Part of guidance/assessment tool for scenario 2

Actions	SP/facilitator's responses	Done	
		Yes	No
Assess LOC	Responds (Glasgow = 15)		
Administer O ₂ via non-breather mask			
Stabilise the Cx spine (head blocks)			
Assess airway patency	Airway patent		
Assess breathing	Patient is short of breath and moaning 'I can't breathe, it hurts'.		
Rise and fall of chest	Asymmetrical		
Use of accessory muscles and/or diaphragm	Present		
Skin colour	Pale		
Integrity of thorax (soft tissues and bones)	Bruise (R)		
Attach to cardiac monitor	HR 120; BP 110/80; RR 28		
Attach pulse oximeter	Saturation 92%		
2 x IVs			
Take bloods			
Start warm fluid			
Discuss chest drain			
Secondary survey			
Bilateral breath sounds	Reduced air entry on left		
Trachea	Trachea central		
Re-assess			
LOC	Glasgow = 14 (mumbling)		
Vital signs	HR 120, BP 100/80, RR 30		
O ₂ saturation	Saturation 88%		
Air entry	Reduced on left side		
Trachea	Trachea deviated to the right		
Perform needle decompression	Breathing improves		

HR = heart rate; BP = blood pressure; RR = respiratory rate; LOC = level of consciousness.

used by the facilitator without the 'Done' columns, as a guide to responses required during the simulation. It can also be used without the responses column by the observing students and facilitator to guide their assessments and follow-up discussions of the performances during the reflection session.

6. Settings

Since teamwork needs to be learnt and practised in safe simulated settings to enhance resuscitation performance,^[13] the skills centre was the ideal setting for simulating the management of a multiple-traumatised patient. Every effort was made to customise the IPE so that it reflected appropriate, authentic and relevant service delivery settings, since authenticity is deemed important for a positive experience by participants.^[6]

7. Faculty development

Becoming a skilled educator in IPE is a process. Faculty members need to have a shared understanding of the purpose and goal of IPE, and to engage in collaborative discussions. Barriers to this strategy of teaching and learning at both the individual and the organisational level can be addressed by providing individuals with the knowledge and skills needed to design and facilitate IPE.^[6]

Staff development to enable competent and confident facilitation of IPE is a key influence on the effectiveness of IPE.^[6] Topics should be aimed at

integrating principles of teamwork into a healthcare system^[5] and could include instruction on interactive teaching and learning, facilitated learning, group dynamics, technology, conflict resolution, assessment strategies for IPE^[5] and experiential exercises; the latter provide opportunities for sharing facilitation tips. Faculty members from various disciplines are given an opportunity to interact early in the process of initiating IPE. Sharing experience is essential for team bonding and agreeing upon optimal strategies.^[5]

Globally, only a third of facilitators undertaking IPE have not received any training.^[3] None of the facilitators in our simulation had any formal training, but fortunately had the attributes described in the first key point. Our experiences in this IPE event could be useful in future faculty development to promote IPE.

8. Logistics

Traditional university curricula severely limit the time that students from different professions can learn together. Apart from timetabling, formal IPE can also be restrained by factors such as space and lack of management support.^[3]

Time: Implementing this simulation was negotiated in the medical curriculum since suitable skills training was required for the management of severely traumatised patients. The only available time was on 4 Friday

afternoons in 1 month. Time was then negotiated for nursing, OT and PT students to attend the IPE events.

Groups: Owing to time limitations and despite the fact that the simulations were duplicated for each event, there were about 20 students per simulation. Although hands-on experience would have been ideal, some students could only observe. The schedule for the groups was made available well in advance.

Orientation: Student preparedness should be seen as a prerequisite for clinical IPE. The facilitators produced a video of the scenario, which was used to orientate the students on the expected outcomes of the event and the skills they needed to revise. Students then had the opportunity to indicate whether they wanted hands-on experience of the simulation or whether they would rather observe the process. A schedule of the facilitators' responsibilities and roles was negotiated and made available to all. Some facilitated the resuscitation while others manipulated the simulators or assessed the activities of the students by means of a checklist.

9. Learning strategy

The IPE event was based on Kolb's Experiential Learning theory, which includes a meaningful and relevant context, experiential learning, debriefing and reflection. Students should be encouraged to actively partake and then review and reflect on their performance in order to identify their personal and professional learning requirements to achieve proficiency.^[14] A number of studies have explicitly documented the inclusion of team reflection as part of their design.^[6]

The intervention for IPE should be based on shared outcomes, relevant to all groups, provided in a realistic educational context suitable for students with differing levels of previous IPE and skills training experience.^[15] In our event, the context was trauma as explained under the **Content** heading, and the experiential learning was reserved for only small teams of students because of time constraints. Students were expected to take responsibility for the management of the patient by prioritising, making appropriate decisions, resolving their conflicts, and performing and delegating tasks. The teams as well as the facilitators and observing students who used a checklist to guide their observations, took part in the post-simulation discussion to reflect on the performance.

10. Evaluation

Feasible assessment of IPL outcomes, especially those concerning teamwork and collaborative practice skills, presents a major challenge for educators.^[11] Seventy per cent of respondents to the WHO review on the status of IPE used a range of methods to evaluate IPE. Student surveys were the most popular evaluation tool. Additional methods include *inter alia* test results and reflective journals.^[13]

Conclusions

The 10 key elements cover the range of resources and processes required to implement an IPE event aimed at providing healthcare students with an opportunity to acquire awareness of professions and to develop collaborative skills.

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