Development of undergraduate nursing entrustable professional activities to enhance clinical care and practice

Siew Tiang Lau[a], Emily Ang[a], Dujeepa D. Samarasekera[b], Shefaly Shorey[a],*

[a] Alice Lee Centre for Nursing Studies, Yong Loo Lin School of Medicine, National University of Singapore, Level 2, Clinical Research Centre, Block MD11, 10 Medical Drive, Singapore 117597, Singapore
[b] Centre for Medical Education, National University of Singapore, Level 5, Clinical Research Centre, 10 Medical Drive, Singapore 117597, Singapore

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ABSTRACT

Background: Nursing education adopts a time-based approach to assess the multifaceted competencies of student nurses. The competency-based approach is preferred historically as it is practical and ensures that individuals deliver effective healthcare practice. However, there remains a gap on how these competencies are actually applied in nursing practice. To facilitate the connection between competencies, competency-based education, and nursing practice, entrustable professional activities (EPAs) can be utilized to translate competencies into clinical practice. EPAs have shown promising results across multiple healthcare specialties and have become the current driving force to facilitate nursing care and practice. Given the limited information of EPAs in nursing education, it is an opportune time to develop EPAs specific to nursing care and practice.
Objectives: To provide a detailed breakdown on the development of EPAs in nursing education to inform clinical care and practice.
Methods: The development stages of EPAs included: i) the formation of a team, ii) the development of the conceptual framework, and iii) the pooling, reviewing, and revising of core EPAs.
Results: A total of ten core EPAs were developed, with sub-EPAs nested within these core EPAs. The EPAs include: 1) patient engagement, 2) patient care and practice, 3) care management, 4) common procedures, 5) safety, 6) urgent care, 7) transition care, 8) patient education, 9) interprofessional collaboration, and 10) palliative care.
Conclusion: The development of EPAs specific to nursing care and practice may offer nursing programs a guide to assist with curricula planning and a basis for developing entrustment assessment tools. The unfamiliarity of EPAs in nursing education may pose as implementation challenges to EPAs. Future research is warranted to evaluate and improve the developed EPAs.

1. Introduction

Nursing programs have a common goal to cultivate and develop highly competent practitioners who can deliver safe and high quality care. However, with the varying teaching strategies, inconsistencies in the qualities and contents of evidence-based practice programs across nursing education remain one of the most commonly reported barriers in optimizing and transferring evidence-based practice to the real-world setting (Glasziou et al., 2008). To overcome this barrier, competencies, i.e. observable and measurable actions or behaviors based on individuals' capabilities to assimilate knowledge, skills, values, and attitudes, act as the foundational basis of nursing education (Chesbro et al., 2018). A standardized set of competencies in nursing education for clinicians and students have been shown to improve evidence-based

teaching and learning as well as applications of quality evidence-based knowledge and skills (Hatala and Guyatt, 2002; Melnyk et al., 2014). For instance, in 2007 and 2009, the Quality and Safety Education in Nursing project focused on six areas of nursing practice—(1) quality improvement, (2) safety, (3) teamwork and collaboration, (4) patient-centered care, (5) evidence-based practice, and (6) informatics—to develop two sets of competencies dedicated to novice nurses and advanced level nurses to provide them with consistent information for standardized evidence-based practice in their respective institutions (Cronenwett et al., 2007; Cronenwett et al., 2009). Therefore, competencies provided a blueprint for the development of nursing education curricula (Wagner et al., 2018).

Currently, nursing education adopts a time-based approach to assess competencies based on the duration exposed to a task rather than a

* Corresponding author.
E-mail addresses: nurlst@nus.edu.sg (S.T. Lau), nuranke@nus.eu.sg (E. Ang), meddds@nus.edu.sg (D.D. Samarasekera), nurssh@nus.edu.sg (S. Shorey).

direct observation of clinical practice in a real-world setting (Chesbro et al., 2018; Wagner et al., 2018; Wagner and Reeves, 2015). However, as the literature proposes that competencies are multifaceted, adopting a time-based approach limits healthcare providers' abilities to capture what nursing competencies truly entail (Chen et al., 2015; Ten Cate, 2005; Van Merriënboer et al., 2002). The effectiveness of the time-based approach to assess competencies becomes questionable as the gap between the expectations and actual clinical practice of nursing students broadens (Anema and McCoy, 2009). Therefore, other approaches to assess students' competencies in performing professional activities are needed (Giddens et al., 2014).

As competencies are context-dependent and often abstract to teach or assess, competency-based education, an educational approach that addresses accountability for educational outcomes and aligns workforce needs, employers' job expectations, and most importantly, the assessment of competence in educational programs, is preferred as it is practical and ensures that students acquire adequate levels of competency to deliver effective evidence-based practices such as patient care and healthcare services (Anema and McCoy, 2009; Chesbro et al., 2018; Wagner et al., 2018). It grounds educational experiences around competencies that are versatile and learner-centered and target evidence-based practices that translate into performance outcomes (Chen et al., 2015; Hoyt et al., 2017). Furthermore, the approach has been recognized for its benefits in medical education and other medical faculties such as pharmacy and pediatrics (Boyce et al., 2011; Hsu et al., 2016; Ten Cate, 2013). Thus, competency-based nursing education is the recent need in facilitating nursing care and practice.

To bridge the gaps between competencies, competency-based education, and nursing practice, entrustable professional activities (EPAs) can be utilized to translate competencies into clinical practice (Ten Cate, 2005). EPAs are defined as units of professional practice that can be represented as tasks or activities that healthcare supervisors entrust trainees with once they achieve adequate levels of competency (Ten Cate et al., 2016). EPAs are integrated assessment frameworks that are widely adopted by medical educators as these ground competencies in daily skills (e.g. communication) (Hoyt et al., 2017; Ten Cate, 2005, 2013). The development of EPAs was purported to support the needs of unsupervised physician residents as part of their graduation (Ten Cate and Scheele, 2007). Over the past decade, the concept of EPAs has extended to include undergraduate medical education and students from various medical specialties, in which the goal is to entrust them with performing activities and tasks within their job scopes without direct supervision (Englander et al., 2016). EPAs represent the tasks and activities of a job that require the assimilation of competencies and provide structures for evaluating competencies that align with both trainees and their respective specialties (Rose et al., 2014). EPAs facilitate the development of educational programs, in which the essential tasks of the professions are delineated, and relevant knowledge, skills, values, and attitudes are identified to execute these activities to result in entrustment decisions (Rose et al., 2014). Therefore, EPAs are purported to turn competencies into practice in clinical settings (Wagner et al., 2018).

With respect to the American Association of American Medical College's Core EPAs for Entering Residency, American medical schools have tested EPAs as potential frameworks to assess competencies (Englander et al., 2016). Furthermore, other specialties that had developed EPAs and tested them as potential models for competency assessments include nephrology (Yuan et al., 2014), emergency medicine (Beeson et al., 2014), internal medicine (Caverzagie et al., 2015), and pulmonary and critical care medicine (Fessler et al., 2014). Additionally, EPAs for care continuity (Ng and Ng, 2014) and patient-centered medical homes (Chang et al., 2013) have been considered and developed. This shows that EPAs have extended out of graduate medical education, but these remain unfamiliar to the nursing specialty and are not widely adopted in nursing education (Wagner et al., 2018).

Currently, existing nursing-focused EPAs include nursing curricula

as approaches to improve student nurses' training (Giddens et al., 2014), nursing telehealth (van Houwelingen et al., 2016), and the conceptualization of interprofessional EPAs (Meade et al., 2016). To the best of our knowledge, EPAs specific to nursing care and practice are limited even though the EPA framework has the potential to enhance various aspects of nursing care and practice in both nursing education and training (Wagner et al., 2018). EPAs serve as a guideline to what nursing practitioners can and cannot do in patient care by providing an approach for assessments associated with the extent of direct supervision required (Ten Cate, 2013). Ultimately, it is the interaction between nurses' performances and adequate levels of supervision that results in effective patient-centered care and practice. Furthermore, the American Association of Colleges of Nursing (2015) encouraged the use of EPAs as EPAs are suitable for nursing educators to standardize core competencies and assessment tools when evaluating nurses. Therefore, we propose a plausible reform of nursing education and assessments by mapping the core competencies of a state registered Nursing Board, i.e. the Singapore Nursing Board (2018), to explore and develop EPAs specific to nursing care and practice to achieve the goal of producing highly competent practitioners who can deliver safe and high quality care.

2. Methods

The aim of this paper is to provide a detailed breakdown on the development of EPAs in nursing education to inform clinical care and practice for undergraduates. A qualitative study design was used whereby the development of EPAs was based on a previously defined epistemological stance (i.e. applications of EPAs in the medicine field), with further investigation in exploring an in-depth understanding of EPAs and their suitability and applicability in nurse education (Landiyanto, 2019). Furthermore, the researchers integrated the participatory method of research in interpreting the data collated from a team of content experts with influences from personal backgrounds and experiences (Landiyanto, 2019) in developing the EPAs. The three stages—i) the formation of a team, ii) the development of the conceptual framework, and iii) the pooling, reviewing, and revising of core EPAs—were used to develop the EPAs. The entire process to develop EPAs took about a year (March 2016 to March 2017), and the details for each stage are provided below:

i) The formation of a team

A team consisting of six content experts from various nursing disciplines, including medical surgical, critical care, pediatrics, emergency nursing, and midwifery, was formed. The team met on a weekly basis to address and discuss the following topics: how specific or broad the EPAs would be and how to develop the conceptual framework to guide the development of the EPAs. The conceptual framework also enables the future evaluation of the EPAs to explore the underlying causal mechanisms for further adjustments (Brown, 1964).

ii) The development of the conceptual framework

To develop the EPAs, a conceptual framework was essential to ensure that EPAs were: (1) grounded in units of practice, (2) credible, and (3) replicable (Chesbro et al., 2018). In this study, Chesbro et al.'s (2018) EPA conceptual framework was adapted as it provides a foundation that connects EPAs across domains of competence to competencies with milestones specific to nursing care and practice. As professional improvement and development are continuous processes, the framework was constructed across a continuum consisting of 'milestones', 'competence', 'domains of competence', and 'EPAs' (Chesbro et al., 2018) (see Fig. 1).

'Milestones' refer to behavioral descriptors that are crucial touchpoints or stages that indicate a level of performance and the
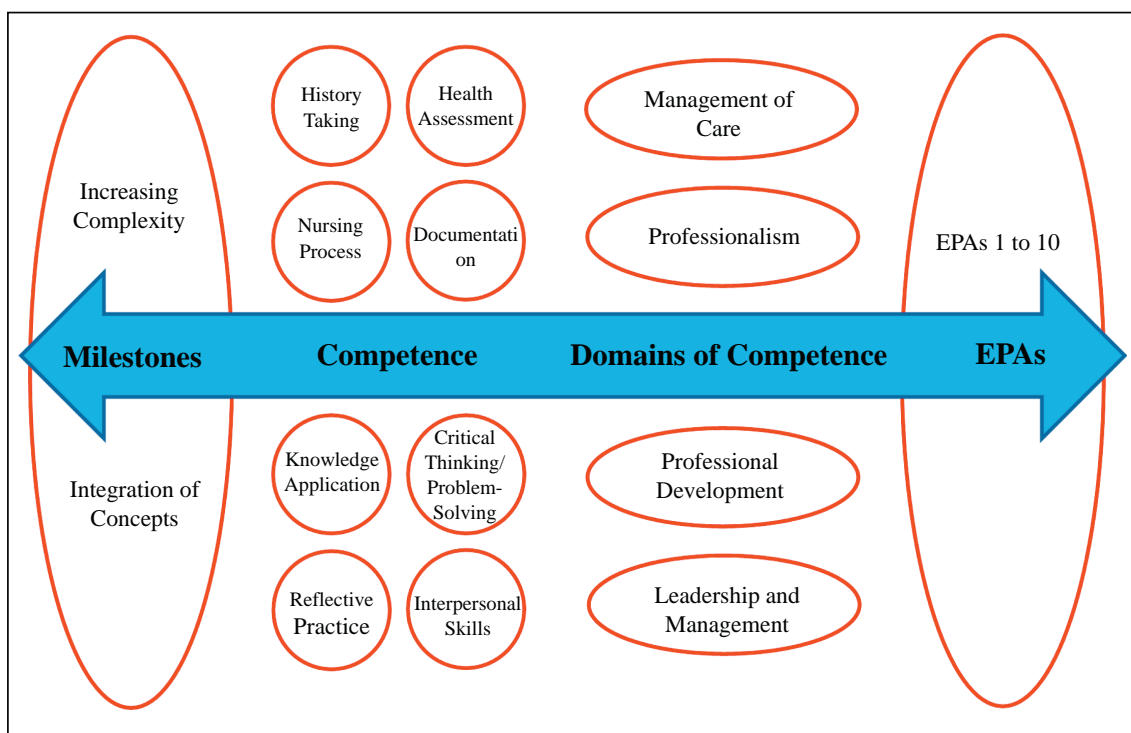
Fig. 1. EPA conceptual framework.

development of a particular competency (Hoyt et al., 2017). The milestones in this study were designed with increasing complexity and integrations of concepts. This implies the application of scaffolded learning whereby learners build on and reinforce their knowledge foundation to engage in deeper learning and, ultimately, work towards greater independence in the learning process (Miller, 1990). For instance, the levels of supervision from preceptors and clinical instructors of specific nursing activities were expected to decrease gradually and the complexity of the activities would increase as student nurses progressed from their first year to their final year of education.

'Competencies' refer to the abilities of an individual to integrate knowledge, skills, attitudes, and values that are observable, measurable, and assessible (Chesbro et al., 2018). To develop EPAs specific to nursing care and practice, the team identified eight relevant competencies that were mapped to the nursing curriculum: (1) communication, (2) knowledge application, (3) health assessment, (4) nursing process, (5) critical thinking/problem solving skills, (6) reflective practice, (7) documentation, and (8) interpersonal skills (see Table 1).

'Domains of competence' are a cluster of competencies or knowledge of clinical practice such as patient care, medical knowledge, interprofessional communication skills, practice-based learning, and professionalism (Singapore Nursing Board, 2018). These domains of competence were mapped to a state-registered nursing board to ensure

consistency across all nursing specialties and departments of the state. In this case, four domains of competencies were mapped to the Singapore Nursing Board (2018): (1) professional, legal, and ethical nursing practice, (2) management of care, (3) professional development, and (4) leadership and nursing management.

'EPAs' are units of professional practice, and student nurses are assessed by supervisors based on their levels of supervision to determine the levels of entrustment given to student nurses for specific tasks or activities (Ten Cate et al., 2016). As such, Chesbro et al.'s (2018) EPA conceptual framework was adapted as it comprised the critical aspects (e.g. milestones, competencies, domains of competence, and EPAs) that are essential to frame EPAs. Furthermore, the study team adjusted the framework with respect to the competencies of the Singapore Nursing Board and the nursing curriculum to guide the development of EPAs specific to nursing care and practice. Specifically, the EPAs were aligned with the academic modules across the nursing academic years (years 1 to 3), helping students to achieve the required clinical competencies according to the relevant milestones. Apart from the EPA conceptual model (Chesbro et al., 2018) and core competencies of the Singapore Nursing Board (Singapore Nursing Board, 2018), the instructional theory, i.e. explicit guidance on ways to help one learn and develop (Reigeluth, 2013), and the curriculum theory, i.e. concerned with values, the analysis of a curriculum, views on the current

Table 1
Description of competencies of the EPA[a] conceptual framework.

Label	Competencies
Communication	Communicate and respond in an appropriate sensitive manner
Health assessment	Perform accurate and focused clinical examinations
Nursing process	Applying the nursing process in care management
Documentation	Document clinical encounters
Knowledge application	Apply knowledge of pathophysiology and its management to the care of patients with particular conditions/problems
Critical thinking/problem solving skills	Recognize and respond to changes in patients' conditions
Reflective practice	Evaluate and revise care
Interpersonal skills	Effective communication with patients and teamwork with co-workers

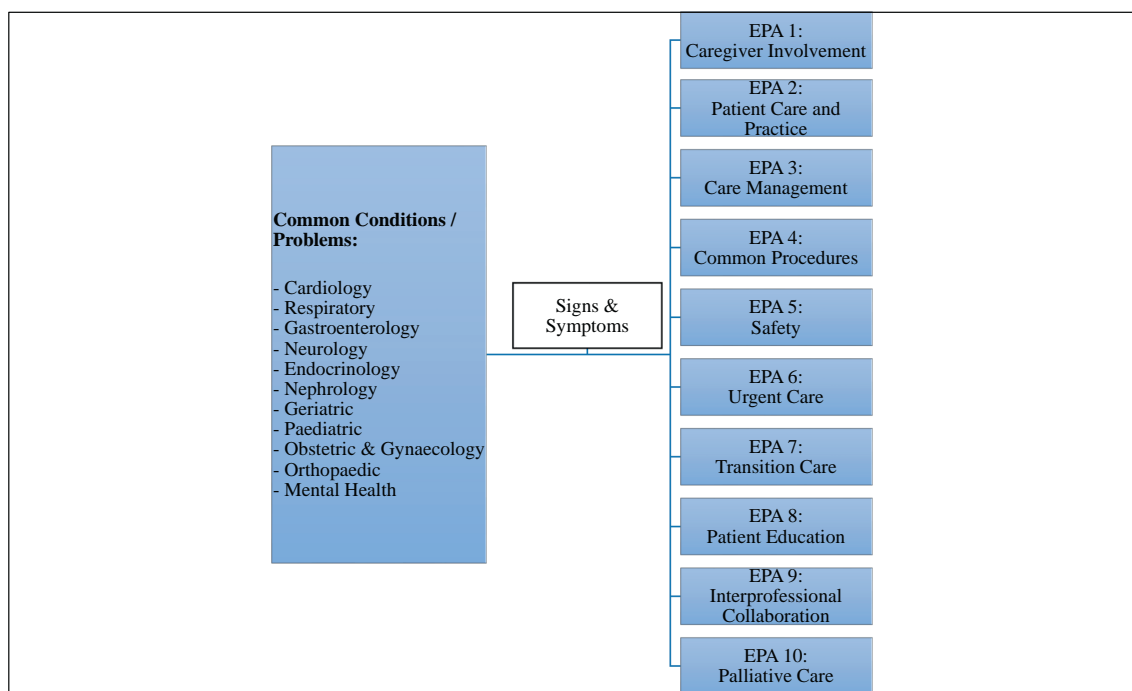[a] Entrustable professional activity.

Fig. 2. EPA development framework.

educational curriculum and policy decisions, and theorizing future curricula (Kliebard, 1989; Wallin, 2011), were two underpinning theories that guided the development and structure of EPAs to facilitate clinical learning and practice. For instance, core competencies and/or instructions guided the development of specific EPAs and activities that student nurses are required to perform, and these EPAs became a part of the clinical practice curriculum that student nurses were enrolled in.

iii) The pooling, reviewing, and revising of core EPAs

The team started by identifying key EPAs using a development framework of EPAs (see Fig. 2). The identification of common clinical conditions was essential as student nurses would be exposed to and assessed based on these conditions during their clinical postings. With reference to the core competencies of the Singapore Nursing Board (2018), the required clinical competencies and milestones of the nursing specialty, existing literature reviews, and clinical content experts, an initial pool of 73 common clinical conditions were identified. After deliberation and discussion with nursing academics and clinical content experts, the team finalized 30 common clinical conditions and categorized them into 11 disciplines that student nurses would be exposed to during their clinical practicums in various areas of posting. The 11 included disciplines were: (1) cardiology, (2) respiratory, (3) gastroenterology, (4) neurology, (5) endocrinology, (6) nephrology, (7) geriatric, (8) pediatric, (9) obstetrics and gynecology, (10) orthopedic, and (11) mental health. Signs and symptoms of the identified conditions were evaluated to reveal relevant observable and demonstrable cognitive, psychomotor, and affective competencies to design EPAs that were specific to nursing care and practice. Details on the finalized EPAs are provided in the section below.

3. Results

3.1. Identifying EPAs

An initial draft pooled 200 EPAs. In consideration of the low preceptor-to-student and clinical instructor-to-student ratios and the entirely new EPA framework, only core and essential EPAs were included.

After constant reviews and revisions, the team established ten core EPAs as it was a manageable number that sufficed to encompass the domains of competencies, competencies, and milestones. The team deliberated and consulted EPA experts to review the ten core EPAs. The final EPAs were evaluated to ensure their qualities and structures using the EQual tool (Tayler et al., 2017) on criteria such as whether they were realistic and generalizable. To improve the clarity and consistency of assessments across all healthcare institutions, specific behavioral descriptors were included for each EPA. These behavioral descriptors depicted the sub-competencies required of the students to perform the units of activities. For instance, EPA 4 consists of six behavioral descriptors (see Table 2).

The finalized core EPAs are detailed below:

1) *Patient engagement*: Engage patients, families, or caregivers to enhance the patient's experience
2) *Patient care and practice*: Prioritize and provide patient care utilizing nursing practice standards
3) *Care management*: Perform comprehensive health assessments and deliver and evaluate care for patients
4) *Common procedures*: Perform procedures (e.g. verify a doctor's/ nurse's order from a medical record or provide the appropriate emotional support to a patient) required of a registered nurse
5) *Safety*: Deliver care utilizing patient safety standards
6) *Urgent care*: Recognize patients requiring emergency care, initiate management, assist in resuscitation, and stabilize critically ill patients
7) *Transition care*: Lead health care professionals in transiting patients within and between teams
8) *Patient education*: Conduct education for patients, families, or caregivers to improve health through health promotion and disease prevention
9) *Interprofessional collaboration*: Collaborate with interprofessional teams to improve the quality of healthcare
10) *Palliative care*: Perform assessments and deliver and evaluate care for patients requiring palliative or end-of-life care in the hospital or community

Table 2
Example of the EPA assessment tool: EPA 4.

Narrative feedback						
Instruction on the use of the rating scale for observed activities: Not observed = No opportunity Needs improvement = Behaviour performed poorly for more than three occasions Meets expectation = Behaviour performed acceptably more than 60% of the time Exceeds expectation = Behaviour performed well more than 80% of the time Legend: **E** = Expected entrustment level **O** = Observed activities rating	**Minimal standard expected by the end of posting**					
	Year 1		**Year 2**		**Year 3/4**	
	E	**O**	**E**	**O**	**E**	**O**
1. Demonstrate knowledge of indications, contraindications, and complications of procedures performed	2		3		4	
2. Verify doctor's/nurse's orders from the medical record before procedure	3		3		4	
3. Explain clearly to the patient/family regarding the procedure to be performed	3		3		4	
4. Perform/assist in the procedure effectively and safely	3		3		4	
5. Provide appropriate emotional support during the procedure	3		3		4	
6. Observe and respond to changes in the patient's condition during the procedure	2		3		4	

Entrustment level:
1: Observed *(Has not obtained the required pre-requisite knowledge)*
2: Direct supervision *(Requires guidance 75% of the time to achieve the outcome)*
3: Moderate supervision *(Requires guidance 50% of the time to achieve the outcome)*
4: Minimal supervision *(Requires guidance 25% of the time or no guidance to achieve the outcome)*
5: Can supervise *(Has the ability to guide/teach others)*

3.2. The EPAs-competencies matrix

The abilities of the students to perform (competencies) and professional activities (EPAs) can be viewed as a two-dimensional matrix. As the nursing program is regulated by the Singapore Nursing Board, mapping EPAs to Singapore Nursing Board's (SNB's) competencies was essential to define the desired qualities of graduates. Table 3 illustrates a sample of the EPAs-competencies mapping matrix. It is understood that executing some EPAs requires multiple competencies as these EPAs are broad and complex (e.g. EPAs 3, 4, and 10), while other EPAs may be more focused (e.g. EPAs 1, 5, and 9). Similarly, some competencies were important requisites and reflected in more EPAs (Competencies 2 and 3), while others were more specific and only needed in fewer EPAs (Competency 4) (Ten Cate, 2013). To give an example, for EPA 4 on performing a procedure, students would be prepared through a competency-based curriculum for areas pertaining to cognition, psychomotor, and affection that reflected the knowledge, skills, values, and attitudes required of nurses. It involved activities such as "1) Demonstrate knowledge of indications, contraindications, and complications of the procedures performed" (cognition), "4) Perform the procedure effectively and safely" (psychomotor), and "5) Provide appropriate emotional support during the procedure" (affection) (see Table 2). For a student to perform a procedure, competencies such as the application of knowledge and the nursing process are critical with different levels of entrustment.

3.3. Entrustment levels

Entrustment levels for EPAs were transitioned from a historic skill checklist assessment tool (see Table 4) that was used among all nursing specialties across three levels (year-one to year-three nursing undergraduates). The skill checklist consisted of a specific nursing activity and its related skills, which were described concisely, and these skills were assessed based on five levels of supervision: i) Observed (O): The

Table 3
Sample of the EPAs[a] competencies mapping matrix.

	Communication	Nursing process	Knowledge application	Reflective practice
EPA 1: Patient engagement	x		x	
EPA 2: Patient care and practice		x	x	x
EPA 3: Care management	x	x	x	x
EPA 4: Common procedure	x	x	x	x
EPA 5: Safety	x		x	
EPA 6: Urgent care	x		x	
EPA 7: Transition	x		x	
EPA 8: Patient education	x		x	x
EPA 9: Interprofessional collaboration	x			x
EPA 10: Palliative care	x	x	x	x

[a] Entrustable professional activities.

Table 4
Example of the nursing skills checklist assessment tool.

Nursing skill		O/PA	PS	SPI	NO	Comments
Emergency care						
Observe and assist in a triage of patients						
Assist in the management of a patient	Observation room					
	Consultation room					
	Emergency resuscitation					
	Crisis situation					
Administer and document emergency medication						
Perform 12 lead electrocardiography						
Perform continuous cardiac monitoring						
Care of a patient on Intra Venous therapy						
Assist in interdepartmental transfer of a patient						
Assist in inter-hospital transfer of a patient						
Assist in checking of an emergency trolley						
Assist in checking of an Automated External Defibrillator						
Assist in checking of controlled drugs						
Additional core conditions learned (to list at the space provided)				Clinical instructor/ preceptor signature		
Additional nursing skills observed				Clinical instructor/ preceptor signature		

Note: O: The student has observed an RN performing the skill; PA: The student was assisted by an RN when performing the skill; PS: The student was supervised by an RN when performing the skill but has yet to be able to perform the skill satisfactorily and independently; SPI: The student was supervised by an RN when performing the skill and considered to be able to perform the skill satisfactorily and independently; and NO: No opportunity to perform the skill.

student has observed a registered nurse (RN) performing the skill; ii) Performance assisted (PA): The student was assisted by an RN when performing the skill; iii) Performance supervised (PS): The student was supervised by an RN when performing the skill but has yet to be able to perform the skill satisfactorily and independently; iv) Skills performed independently (SPI): The student was supervised by an RN when performing a skill and considered to be able to perform the skill satisfactorily and independently; and v) No opportunity (NO): No opportunity to perform the skill. For example, if a student nurse is assisted by an RN in performing a skill, the assessor would sign and indicate the date of assessment in the "PA" cell. As such, it was akin to a tick box approach without assessing students' competencies holistically.

EPAs on the other hand were framed on entrustment for students to carry out nursing activities under designated levels of supervision. These included a holistic guide for both student nurses and assessors to perform and assess the expected holistic nursing care management with reference to the activities listed in the ten core EPAs. Each EPA consists of specific behavioral descriptors to guide the professional activities that student nurses are required to perform. The expected entrustment for each EPA descriptor was not linear as students' learning curves for different sub-competencies varied. The entrustment level for each EPA behavioral descriptor was mapped with the competency-based curriculum and pre-determined by the core team in consultation with content experts.

There are five entrustment levels, and to improve clarity and consistency for the assessors, the team added percentages as units of measurement to this rating scale:

1) Observed (Has not obtain the required pre-requisite knowledge)
2) Direct supervision (Requires guidance 75% of the time to achieve the outcome)
3) Moderate supervision (Requires guidance 50% of the time to achieve the outcome)
4) Minimal supervision (Requires guidance 25% of the time or no guidance to achieve the outcome)
5) Can supervise (Has the ability to guide or teach others)

Depending on the year of study, each EPA and its activities were indicated as "1", "2", "3", "4", or "5" based on the level of entrustment a student nurse was expected to perform by the end of his/her clinical posting (see Table 2). For instance, if a year-three student nurse is required to be entrusted with explaining procedures to patients prior to their performances at all times under minimal supervision, the respective cell under the "entrustment level" of the table would be indicated as "4" for that particular activity.

For "observed activities", the assessors would rate the students based on three categories—(1) Needs improvement: Behavior performed poorly for more than three occasions, (2) Meets expectation: Behavior performed acceptably more than 60% of the time, and (3) Exceeds expectation: Behavior performed well more than 80% of the time—which was used to operationally define the percentage of how well a student nurse performed the required task. When there were no opportunities to observe a particular activity, the assessor may indicate 'not observed or no opportunity'.

The "entrustment" and "observed activities" levels were required to be matched for each activity of the ten EPAs to assess and evaluate the performance of a student nurse. For instance, under "entrustment level", a year-one student nurse is required to exhibit "3" (Moderate supervision) for EPA 4, item 3: "Explain clearly to the patient regarding the procedure to be performed". During the assessment, if the clinical instructor observes that the student nurse is able to carry out the activities with guidance half the time (50%), he or she will indicate a "ME" in the respective cell under "observed activities" (see Table 2). To conclude the assessment, the assessor can also provide a detailed narrative feedback in the space provided.

3.4. Validating EPAs, EPAs descriptors, and entrustment levels

EPAs, EPA behavioral descriptors, and its corresponding entrustment levels for year-one, year-two, year-three, and year-four students were extracted from a thorough literature review of published literature, standards, and guides on EPAs and competencies by the authors. A panel of six content experts evaluated the EPA assessment tool. Seventeen nursing academic, clinical experts, and advisors on EPA assessment tools reviewed the developed EPA assessment tool during consensus face-to-face discussions. During the discussion, the core activities of nursing graduates were deliberated in accordance to the SNB's requirements and the competency-based curriculum to ensure its relevancy and appropriateness. The group discussed what should be included as core activities, mapped these with the curriculum blueprint, and defined the entrustment levels for sub-competencies. To further validate and refine the EPA assessment tool, surveys were done among 12 educators and 62 clinical staff. Almost all the returns were in agreement with the proposed EPAs assessment tool, with some suggestions for refinement. The feedback was taken into consideration and EPAs were revised. These collaborative efforts also improved the buy-in from relevant users of EPAs.

4. Discussion

In the last decade, the concept of EPAs was developed, and the basis of this framework is highly theoretical and preliminary (Wagner et al., 2018). EPAs facilitate the development of educational programs, in

which the essential tasks of the professions are delineated, and relevant knowledge, skills, values, and attitudes are identified to execute these activities to result in entrustment decisions (Rose et al., 2014). Therefore, EPAs translate competencies into practical outcomes such as quality and safety practices that are essential elements of nursing practice (Wagner et al., 2018). Furthermore, other specialties that had developed and tested EPAs as potential frameworks for competencies include medicine graduate programs (Ten Cate et al., 2016), emergency medicine (Beeson et al., 2014), internal medicine (Caverzagie et al., 2015), and nephrology (Yuan et al., 2014). Additionally, EPAs for care continuity (Ng and Ng, 2014) and patient-centered medical homes (Chang et al., 2013) have been considered and developed. The development of EPAs in other specialties has resulted in positive outcomes in their respective fields. Hence, this is a prime time for the nursing specialty to mold the evolution of EPAs and apply them in nursing education (Chesbro et al., 2018; Wagner et al., 2018). In this paper, we aimed to provide a detailed breakdown on the development of EPAs in nursing care and practice for undergraduates.

The team, consisting of content experts from the nursing and medical faculties, adapted Chesbro et al.'s (2018) EPA conceptual framework due to its suitability as it connects EPAs across a continuum consisting of domains of competence to competencies with milestones. Core competencies were mapped to the four core competencies of the Singapore Nursing Board (2018) and the nursing curriculum to develop the subsequent EPAs. The instructional theory and the curriculum theory were used as theoretical bases to the development of specific EPAs and the core competencies that student nurses are required to perform, and these EPAs became a part of the clinical practice curriculum that student nurses were enrolled in. The finalized EPA assessment tool included ten core EPAs, with sub-EPAs nested within three core EPAs. Student nurses would be assessed based on the "entrustment" and "observed activities" levels with respect to the required activities of each EPA. The defined list of EPAs is expected to serve as a guide to inform nursing education and curricula and may provide a basis for future researchers to design performance assessment tools within the nursing specialty to determine nurses' entrustments. Also, the list may spur nursing programs to evaluate their existing curricula and focus on key competencies in nursing practice for future reforms. The EPAs also provide nurses with more distinct framings of the entrustment tasks and competencies that are expected of them, including the required knowledge, skills, attitudes, and values for each EPA. Finally, EPAs enable nursing educators to align core competencies and assessment tools when evaluating nurses across all nursing specialties and departments (AACN, 2015). Therefore, the theoretical bases of the instructional theory and the curriculum theory that underpin the EPA conceptual framework and core competencies can substantiate the formulation of nursing-centric EPAs to facilitate student nurses' learning and practical skills to optimize future care and services.

Some strengths of the EPA development process included an interactive process contributed by a team of content experts who participated in meetings with other relevant stakeholders (e.g. clinical content experts working in hospitals) to develop the list of EPAs. With differing expectations of student nurses, the generous sharing and discussions created a consensus among the faculty and relevant stakeholders. The team also kept a minimal and manageable number of EPAs so that these would not be too daunting for preceptors and clinical instructors to use. The entrustment levels were adapted and adjusted from medical education to fit the culture and context of nursing education for preceptors and clinical instructors and student nurses to better comprehend the concept of entrustment. Furthermore, the behavioral descriptors of each EPA were accorded with varying levels of entrustment. This can help preceptors and clinical instructors to determine the amount of supervision to be provided, resulting in the alignment of expectations among students, preceptors, clinical instructors, and specialties. Hence, these areas were critical to piece the development process together, resulting in the development of the ten core EPAs.

The development process highlighted numerous challenges for competency-based education and other specialties that were interested in EPA development. EPAs are new frameworks and concepts that have been used mainly for postgraduate students who can be entrusted to perform professional activities. As a result, many educators may be unfamiliar with EPAs, hence its application, which might blur the goal of designing them to be fully utilized and practical. The EPAs were developed within medication education in order to support the needs of medical students without direct supervision. However, in the context of nursing education, undergraduate nurse students have preceptors supporting them during clinical education. This difference in context (without direct supervision versus with direct supervision) could have masked the true effectiveness of EPAs and needs further evaluation. The nursing community will face challenges in familiarizing the concepts of "entrustment" and "trust" as EPAs have not been widely introduced in undergraduate nursing programs. Hence, a paradigm shift is required in the community to explore and accept the new frameworks. Finally, EPAs are originally defined to be independently executable (Ten Cate and Scheele, 2007), and it is an important factor to the successful examination of an individual's performance of the required activities. However, for an inherently team-based specialty such as nursing, the original definition of "independently executable" may pose as a practical implementation challenge (Ten Cate and Scheele, 2007).

There are numerous recommendations for future works. The appropriateness, meaningfulness, and usefulness of the developed EPAs are unknown. To optimize the robustness and credibility of EPA development, future works can apply suitable and appropriate theories to provide a sound theoretical basis for the development of EPAs in the respective specialties. Future research is warranted to examine the psychometric properties (e.g. reliability and validity) of EPA-based assessment tools, and focus group interviews can be conducted to garner students' and relevant stakeholders' (e.g. clinical instructors) perspectives on the usability of the EPAs. This will ensure a holistic perspective of the EPAs for future adjustments and improvements. With the existing EPAs developed for medicine specialties, further consideration in adapting or adopting suitable EPAs for advanced nursing practice may also be beneficial to provide the optimal quality of care and practice for patients. To determine the true effectiveness of EPAs in nursing practice, future research can consider evaluating the effectiveness of EPAs via qualitative and quantitative research methods. If the nursing specialty adapts EPAs from the medicine specialty, one should consider that multiple health professionals are adopting "shared" EPAs and that each profession partakes in a certain aspect of the activity. This implies that future works can target the importance of defining role responsibilities among professions to achieve a shared approach as part of interprofessional education.

5. Conclusion

With the foundational basis of EPA conceptual and development frameworks and underpinning the theoretical bases of the instructional theory and the curriculum theory, the team developed a consensus list of ten core EPAs that were specific to nursing care and practice for nursing undergraduates. However, the unfamiliarity of EPAs in nursing education and the inherently team-based nursing specialty may pose as implementation challenges for EPAs. Future research directions can investigate the psychometric properties of theoretically-based EPA assessment tools and conduct both quantitative and qualitative research to garner relevant stakeholders' (e.g. clinical instructors and preceptors) views to determine the effectiveness of EPA implementation. These efforts will ensure a holistic perspective of such EPAs for future adjustments and improvements. If the EPAs are adapted from other professions, such as medicine, inter-professional contributions should be ensured to achieve a shared approach as part of interprofessional education.

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Declaration of competing interest

None.

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