Long-term outcomes of a program to upgrade the nursing faculty in Cambodia: a qualitative study

Kyoko Koto-Shimada (✉ kkoto-shimada@umin.ac.jp)

Tokyo Daigaku <https://orcid.org/0000-0003-1738-5595>

Noriko Fujita

Kokuritsu Kenkyu Kaihatsu Hojin Kokuritsu Kokusai Iryo Kenkyu Center

Sadatoshi Matsuoka

Kokuritsu Kenkyu Kaihatsu Hojin Kokuritsu Kokusai Iryo Kenkyu Center

Masamine Jimba

Tokyo Daigaku Daigakuin Igakukei Kenkyuka

Sokneang Touch

Ministry of Health

Anthony B Zwi

University of New South Wales

Research

Keywords: Nursing Faculties, Capacity Building, Program Evaluations, Case study, Cambodia

Posted Date: August 28th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-64778/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background Well trained nurses are expected to influence their workplaces after completing their training courses. In Cambodia, a high-skill training program has been given for nurses to make them more qualified since 2011. After completing the program, we conducted an immediate post-training study in 2014. In this long-term, post-training study, we evaluated the program's effect on nursing faculty and clinical preceptors and identified factors influencing the long-term outcomes.

Methods This long-term, post-training study took the form of embedded, single-case design. It incorporated focus group discussions (FGDs) for 26 trainees, key-informant interviews for 11 institutional managers, and teaching document reviews. Then, we conducted a thematic analysis using Kirkpatrick's four levels of training evaluation. We evaluated the latter two elements as long-term outcomes, *behavior* (changes in trainees' practice and applying learning to practice), and *results* (the trainees' behavior effect on trainees' organization or department). After that, we assessed factors influencing the long-term outcomes using Bronfenbrenner's ecological systems theory.

Results We identified five themes at the *behavior* level according to program type. They were 1) improved teaching and learning activities, 2) built capacity of nursing faculty and clinical nurses, 3) improved clinical practicum, 4) strengthened clinical nursing management, and 5) involved in professional development activities. At the *results* level, we identified three themes as long-term outcomes from an institutional development aspect. They were 1) enhanced institutional capacity, 2) improved students' learning and *behavior*, and 3) strengthened clinical performance.

The major influencing factors for the above eight themes were 1) institutional managers' support, 2) continuous networking among trainees, and 3) national policy.

Conclusions The upgrading program had a favorable effect on nursing faculty and clinical preceptors at the Kirkpatrick model's *behavior* and *results* levels. Compared with the immediate post-training study findings, the perceived long-term outcomes became more strategically focused and demonstrated the training impact on a considerably broader scale within the workplace. These findings have implications for the monitoring and evaluation of nursing faculty development programs for its sustainable outcomes

Background

Building a competent health workforce is critical to accelerating the achievement of Universal Health Coverage [1]. As upgrading nurses' academic backgrounds are vital to improving clinical outcomes [2], nursing education has put more emphasis on a higher degree-level program [3].

To achieve the optimum outcomes of higher education programs, institutional development of education, and clinical facilities is also crucial. It can provide an environment in which more educated nurses can work better. However, it is challenging to create a mechanism to ensure how individual learning and training outcomes can be well applied in education and clinical workplaces [4]. In Asia, due to many

contextual factors, trained nurses cannot easily use their knowledge and skills after coming back to their workplaces in education and clinical facilities. These include obedience to hierarchy, respect for seniority, lack of consensus among faculty members in the workplace, and dependency on personal commitment [5].

To evaluate nurses' training programs, Kirkpatrick's model is well known, which describes four levels of outcomes; 1) *reaction* and *satisfaction*, 2) *learning*, 3) *behavior*, and 4) *results*. The first level evaluates trainees' immediate reaction to evaluate the degree to which participants find the training favorable, engaging, and relevant to their jobs. The second level evaluates the degree to which participants acquire relevant knowledge, skills, and attitudes. The third level evaluates the degree to which participants apply what they learned during training when they are back on their job. For the last level, it evaluates the degree to which targeted outcomes occur in the broader area of work as a result of the training [6,7].

According to a systematic review of faculty development, more research has been done about *reaction* and *learning* than *behavior* and *results*. In particular, the evaluation of *results* remains relatively unexplored, such as changes in organizational systems and changes in students [8].

Cambodia's faculty development program

In 2011, the Cambodian Ministry of Health (CMoH) started to upgrade the program from the Associate Degree of Nurses (ADN) to a Bachelor of Science in Nursing (BSN). It aimed to overcome the shortage of qualified nursing faculty and clinical preceptors. The upgrading program was comprised of two types: in-country or foreign country training. Both types were completed within 18-24 months.

The in-country program curriculum was developed by the CMoH and delivered in collaboration with the University of the Philippines Manila and the World Health Organization. To date, various development partners have continued in-country programs. More than 150 BSN students, including nursing faculty and clinical nurses, completed the upgrading program (personal communication with the CMoH 2018) between 2011 and 2017.

Meanwhile, the foreign-country program was conducted in Thailand for Cambodian nurses. Thai curriculum specialists customized the existing Thai curriculum, which the Thai Nursing Council certified, to supplement the additional educational needs of Cambodian nurses. It was delivered on-campus setting at St. Luis College, Bangkok, and financially supported by the Japan International Cooperation Agency (JICA). Thirty-two nursing faculty and clinical instructors were trained in four cohorts [9] between 2011 and 2015.

In our immediate post-training study performed in 2014, we interviewed 34 nurses (55.7 % of 61 trainees) and 10 managers from 8 participating agencies (57.1% of 14 participating agencies) sometime after 6 months to two years of "upgrading" through one of two types of programs. According to Kirkpatrick's model, we assessed their 2) *learning* and 3) *behavior* and found the benefits with both professional nursing practice and teaching after completing the upgrading courses. However, the immediate post-

training study focused only on individual behavior outcomes, and we found these trainees were not well accepted by their nursing colleagues and other health professionals at their workplaces [10]. In this long-term, post-training study, we aimed to evaluate the 3) *behavior* and 4) *results* as long-term outcomes of these two training programs and identify influencing factors by emphasizing institutional development of education and clinical facilities.

Methods

We conducted an embedded, single-case, qualitative study. First, we conducted key-informant interviews and focus group discussions. Second, we reviewed teaching documents to triangulate the findings.

First step

We collected data from two different groups (Table1). The first group consisted of 26 trainees who are nursing faculty members and clinical preceptors from four schools and five hospitals. They completed the upgrading program from 2012 to 2014; hence, data were collected some 4 to 6 years since they had completed their training program. All trainees who participated in the immediate post-training study in 2014 were included in this long-term, post-training study. This group comprised (1) eight nursing faculty members who participated in an in-country program, (2) eight nursing faculty members who attended a foreign-country program, and (3) ten clinical preceptors who attended the foreign-country program. The second group comprised 11 managers from nine participating agencies. They held positions such as school directors, technical bureau chiefs, hospital directors, and nursing directors. They supervised the faculty members and clinical preceptors described as the first group. To identify the long-term outcomes from an institutional development aspect, we conducted key-informant interviews or focus group discussions by the institution.

We developed a topic guide and conducted semi-structured interviews at the participants' workplace. In this long-term, post-training study, we assessed Kirkpatrick's model's two elements, 3) *behavior* and 4) *results*.

Table 1 lists the areas of inquiry for the topic guides as follows: postgraduation activities based on acquired skills from the upgrading program (*behavior* evaluation); the program's outcomes at institutions (*results* evaluation); influencing factors (e.g., opportunities and challenges within and outside of the workplaces); and the request to further improve the nursing professionals in the topic guide.

The interviewers (KKS and MS) conducted interviews with a native bilingual interpreter fluent in Khmer (the Cambodian language) and English from April to May 2018. We pilot-tested the topic guide to confirm its face validity and accuracy of interpretation. We audio-recorded all interviews. An author and research assistants took field notes throughout the discussion with the participants' permission.

The research assistants who joined in the interview transcribed the audio recording in English. We went through the transcripts to detect any discrepancies from our field notes. Two of the authors (KKS and NF)

read the transcripts thoroughly and interpreted the data. We conducted a thematic analysis to generate coding from phrases that corresponded to program trainees' *behavior, results*, influencing factors, and further development. We then reviewed them repeatedly. We developed categories and subcategories until none others were apparent. After producing the themes, we compared the themes between nursing faculty, clinical preceptors, and institutional managers. To obtain trustworthiness, we followed the steps outlined by Nowell [11]. We conducted qualitative data analysis by manual-coding using Microsoft Excel 16.3 (Redmond, Washington, USA).

Furthermore, we categorized the influencing factors according to the ecological systems theory. The Bronfenbrenner's ecological system theory explains how human development is influenced by different environmental systems [12]. It consists of the following four levels: (1) microsystem: individual factors, (2) mesosystem: organizational or institutional factors, (3) exosystem: local context or community, and (4) macrosystem: national-level factors [13]. The first author (KKS) presented the summary of findings to the participants' representatives and received valuable comments to refine the findings further.

Second step

The first author and research assistants visited three public educational institutions. The interviewed nursing faculty worked and collected teaching and learning documents from them (June to August 2019).

The research assistants and the first author classified the translated version according to the teaching documents. They then compared them with the themes from interviews for data triangulation (Additional file 1) [14].

Before data collection, we obtained verbal consent from each participant and assured that all personal information would remain confidential.

Table 1 Sampling details and research focus.

Type of Participants	Type of program	Sampling Details	The focus of FGDs or interview
Nursing faculty	In-country program	Three FGDs and one interview (n=8)	Utilization of skill acquired from the upgrading program, outcome of activities at their institution, opportunities and challenges in/out of their institutions, collaboration between in and out- country upgrading program
	Foreign country program	Three FGDs and one interview (n=8)	
Clinical preceptors		Three FGDs and three interviews (n=10)	
Managers of participating agencies	-	Three FGDs and seven interviews(n=11)	Utilization of upgraded personnel, outcome of their activities, opportunities, and challenges

FGD- Focus Group Discussion

Results

General characteristics of participants

The in-country program's nursing faculty had an average of 5.5 years more teaching experience than those who had attended the foreign-country program. There were more female participants among the clinical preceptors.

Table 2 shows participants' demographic information.

Table 2 Demographic characteristic of participants

Type of Participants	Nursing faculty		Clinical preceptors	Managers of participating agencies (n=11)
Type of the upgrading program	In-country program (n=8)	Foreign-country program (n=9)	Foreign-country program (n=9)	-
Average age (range)	44.1 (34-58)	38.0 (31-49)	43.3 (38-49)	51.6 (43-59)
Gender: Female	2 (22.2 %)	3 (37.5 %)	6 (66.7 %)	0 (0.0 %)
Average Teaching experience* (years)	16.6	11.1	-	19.8

*Nursing faculty only

Evaluation of long-term outcomes

Thematic analysis identified five main themes in the *behavior* level and three themes in the *results* level. Figure 1 shows the evaluation for each level based on the type of participant.

Figure 1. Evaluation for each level according to the type of participants.

1. Evaluation of *behavior*

Improved teaching and learning activities

The nursing faculty worked in advancing the following teaching and learning activities: developing course syllabi based on students' evaluation criteria, preparing case scenarios to teach the nursing process, applying student-centered approaches to classroom teaching, and preparing lesson plans among the faculty's nursing unit.

"Before, we used only to give a lecture. Now, we offer more time for students to exercise their activities, research, and work on their assignments." (Nursing faculty from the in-country program 2)

Built capacity of nursing faculty and clinical nurses

Both the nursing faculty and clinical preceptors contributed to building their fellow faculty and clinical nurses through educational activities such as training, conferences, and workshops.

“The trainee conducted training and education to their colleague clinical

nurses to the points when he observed during supervision at the hospital, such as hygiene and infection control.” (Hospital manager 3)

Improved clinical practicum

The nursing faculty and clinical preceptors who learned in foreign-country programs worked on advancing the clinical practicum. They developed a case assignment form for students and provided training to clinical preceptors regarding the nursing process.

“CMoH provides a workbook that concentrates only on the clinical nursing

techniques. We thought this was not enough; students needed to put the theory into practice. Therefore, we provided case assignments for students.” (Nursing faculty from foreign-country program 5)

Strengthened clinical nursing management

Clinical preceptors contributed to improving nursing management, reinforcing the nursing department's function, improving shift handover report, and modifying the ward's working shift. They also developed the nursing policy and nursing protocol of the hospital.

“I was happy to work on a team of nursing leaders. The hospital allowed us to establish the nursing department for nursing activities. When we did not have the nursing department, nurses didn't know who was supervising us” (Clinical preceptor from foreign-country program 2).

Involved in professional development activities such as council and association

Many nursing faculty members and clinical preceptors were involved in professional improvement activities of the council and association. Those from the foreign-country program initiated an alumni association's establishment, which culminated in the Cambodian Association of Nurses in 2019.

“We now have a strong group of nurses and midwives who have always been together, and we discussed things very openly. Sometimes, in Cambodia, it was hard to talk about things openly. However, unlike in this group, we spoke the same language and understood the same things. We faced many challenges, but we were still together.” (Clinical preceptor from foreign-country program 10).

2. Evaluation of results

Enhanced institutional capacity

Through the nursing faculty and clinical preceptors' capacity-building, we identified the following outcomes: improving collaboration among nursing faculty, and enhancing cooperation between an educational institution and hospital on a clinical practicum.

“Clinical preceptors were also interested in case assignments for students during clinical practicum. We explained it to them through the technical meeting.” (Nursing faculty from foreign-country program 5)

Improved students’ learning and behavior

The nursing faculty and their managers reported that the students’ performance and behavior have improved. The influencing factors were arranging the teaching and learning content and enhancing the teaching and assessment methods.

“The students were afraid to ask questions or answer the faculty’s questions. Through encouraging students, they become more active and understand more.” (Nursing faculty from in-country program 4)

Strengthened clinical performance at the hospital

Clinical preceptors and their managers reported improvements in clinical performance by reducing the workload, providing a better quality of care, enhancing communication among nurses, and promoting collaboration among health professionals. Consequently, patient satisfaction was achieved.

“Developing a nursing protocol was also beneficial to other departments. For example, a surgical department developed a nursing care protocol on wound care shared with the Intensive Care Unit. Therefore, both departments follow the same protocol. The patient did not have to be transferred to another department to receive wound care.” (Hospital manager 3)

3. Factors influencing the long-term outcomes

Factors influencing the long-term outcomes were identified and categorized into micro-, meso-, exo-, and macrosystems according to the ecological systems theory. Figure 2 depicts such factors according to each system.

Figure 2. Influencing factors of the long-term outcomes.

At a microsystem level, the nursing faculty and clinical preceptors reported the trainees’ motivation, initiative, leadership, and professional value for improving nursing education.

“I spent my own time and money to continue studying. I registered to be a member of another country’s association and research online.” (Clinical preceptor from foreign-country program 7)

At a mesosystem level, the managers provided the following supports: promoting a managerial position, supporting an activity financially, and providing encouragement. The nursing faculty and clinical preceptors were given more responsibilities to improve teaching and learning activities. They worked as a team.

“I nominated trainees for promotion. They can contribute to the working group for teaching and learning activities, and their salary also increases by promotion.” (School manager 3)

At a mesosystem level, recognition from other health professionals (particularly medical doctors) was a promoting factor for clinical preceptors (printed in blue in Figure 2). The inhibiting factors were teaching and learning environments with defective materials and references (printed in green in Figure 2) for the nursing faculty. For both the nursing faculty and clinical preceptors, the inhibiting factors were the lack of support from a nurse colleague and their limited capacity.

"We had a faculty who didn't understand the nursing process well. In the unit, we discussed what nursing diagnosis means and how we could diagnose; we shared such information among faculty." (Nursing faculty member from foreign-country program 3).

At an exo-system level, we identified external supports such as the technical support from development partners and their faculties of upgrading programs. The nursing faculty and clinical preceptors who learned in a foreign-country program had more opportunities to go abroad for additional training or conferences. The collaborative networking among trainees was also identified.

"I consulted with the faculty in Thailand about reforming the nursing shift from 24 hours to 12 hours. It was a sound system, and it continues until now." (Clinical preceptor from foreign-country program 2).

Finally, at a macrosystem level, strengthening the regulatory framework was a promoting factor. Some managers reported that CMoH's commencing the National Exit Exam in 2013 influenced the school to begin to pay more attention to the quality of education.

"Because we focused on the quality of education, all of my students need to pass the National Exit Exam." (School manager 2)

Meanwhile, the inhibiting factors were identified as follows: inconsistencies in teaching content between educational institutions and hospitals, outdated curriculum, and overburdened workload due to the task concentration. Trainees also frequently mentioned the failure to recognize a BSN in the payroll of the public servant system.

"Although I obtained a BSN, I still receive an ADN salary, which affects my motivation. The government did not give us the value of our academic background." (Clinical preceptor from foreign-country program 5)

Discussion

This long-term, post-training study identified five main themes in the *behavior* level and three themes in the *results* level as long-term outcomes. Furthermore, the above eight themes' major influencing factors were 1) institutional managers' support, 2) continuous networking among trainees, and 3) national policy.

Long-term outcomes at *behavior* level

We identified five outcomes at *behavior* level: 1) Improved teaching and learning activities, 2) built the capacity of nursing faculty and clinical nurses, 3) improved clinical practicum, 4) strengthened clinical nursing management, and 5) involved in professional development activities. In the immediate post-training study, the observable outcomes were directly related to the relevant professional's daily work, such as applying new knowledge to one's work in teaching and clinical practice and disseminating new knowledge to the colleagues [10]. Four to six years after completing the program, the *behavior* outcomes became more strategically focused. Knowledge and skills were being utilized considerably broader and more sustainable scale within the workplace. This finding supports that the training participants shared their knowledge with others and aimed to start activities that would build capacity in their home institutions [15]. Moreover, exploring nurse education and practice in a foreign setting was valuable in considering new ways of working, particularly identifying collaborative working relationships between education and clinical facilities [16].

Long-term outcomes at *results* level

We identified three outcomes for at *results* level: 1) improved students' learning and behavior; 2) enhanced institutional capacity, and 3) strengthened clinical performance at the hospital. In the immediate post-training study, the managers had higher expectations toward the upgrading program outcomes, which was the undergraduate level, such as preparing course syllabi. However, the *results* outcomes that trainees' behavior affects their institution involves a learning process. Thus, the outcomes may not immediately meet expectations from their managers [10]. This finding supports ensuring monitoring and evaluation in the faculty development program's design to enhance accountability for subsequent implementation [4] to maximize the sustainable impact of health professional training from an institutional development aspect [17]. The benefits in such cases would accrue not only to those who participated directly in the program. Nevertheless, by others within their spheres of influence – the educational and clinical care programs they contribute to, the colleagues and junior professionals with whom they have contact, and the institutions within which they operate.

Major influencing factors for the eight outcomes

The first “stimulating” factor contributing to positive institutional benefit, was the type of managerial support operating at the mesosystem level. Strategic managers promoted trainees to responsible positions. In the immediate post-training study, the program trainees faced challenges in understanding the new concepts and methods, among the nurse colleagues and other health professions who had not been exposed to the training [10]. The support from managers is highly influential in a society such as that in Cambodia, where obedience to the hierarchy and respect for seniority is essential [5]. This finding supports that the manager's strategy was hugely influential in determining how best to utilize the institution's upgraded personnel [18].

The second factor was continuous networking among trainees. It provides them a sense of connection with people who share the same passion and values. This finding supports the value of longitudinal programs extending beyond teaching effectiveness, such as facilitating networks and collaborative

meetings over time [8]. In the immediate post-training study, the trainees formed groups to lead strategic improvements in nursing education [10]. Notably, the group culminated in building a community of practice [19], that transformed into, the Cambodian Association of Nurses. The members who continue studying up to master and Ph. D. levels play a crucial role in their continuous professional development as nurse leaders' cohorts and inspire the younger generation of nurses. The findings also demonstrate that the trainees are potential leaders contributing to the advocacy activities, bringing nurses' involvement in health policy formulation [20,21].

The third crucial institution-supporting dimension was the policy direction at the macrosystem level, which was influenced strongly by the Association of Southeast Asian Nations (ASEAN) Mutual Recognition Arrangements (MRA). MRA stimulates the development of relevant laws and regulations towards establishing a mutually acceptable professional regulatory framework among member states. In Cambodia, some policies were developed as a consequence of signing the MRA, commencing the National Exit Examination, and increasing the number of BSN faculty [22]. The number of faculty members who hold BSN academic backgrounds increased from 10 in 2010 [23] to 68 in 2019 in public educational institutions (personal communication with educational institutions, 2019). It enabled the nursing faculty members to work as a team to improve a range of teaching and learning activities. This long-term, post-training study reinforces the value of developing a regulatory framework that influences both the quality of care and pre-service education [24].

There is a possibility that a degree of selection bias may have occurred in this long-term, post-training study. The nursing faculty and clinical preceptors who were active in their workplaces may have been more willing to participate in the interview. The main interviewer was involved in the upgrading program supported by JICA; therefore, participants may also have sought to respond positively to a donor. Among the features that would have promoted effective engagement with the study was the long-term collaboration between the primary interviewer and the trainees, the study's construct validity, and the data triangulation from several sources.

For future research, the extent of the upgrading program's contribution to achieving the ultimate goals could be quantitatively evaluated. The ultimate goal of faculty development is to improve students' performance and learning and enhance the clinical outcomes of patients [25]. Also, identifying the most influential factors that enhanced the program's success suggests the need for ongoing support after completing the upgrading program if the benefits are to be maximized within an institutional context [4].

Conclusion

Nurse faculty development through an upgrading program for Cambodian nurse professionals yielded favorable outcomes when examined in relation to the long-term outcomes with respect to two elements of Kirkpatrick's model. The long-term outcomes of the trainees' activities became more strategically focused and demonstrated the knowledge and skills on a considerably used wider scale within the

workplace. Institutional manager's support, continuous networking among trainees, and national policy, served as major driving factors to improve their institutions' teaching and learning activities.

List Of Abbreviations

ADN	Associate Degree of Nurses
ASEAN	Association of Southeast Asian Nations
BSN	Bachelor of Science in Nursing
CMOH	Cambodian Ministry of Health
FGD	Focus Group Discussion
JICA	Japan International Cooperation Agency
MRA	Mutual Recognition Arrangements

Declarations

Ethics approval and consent to participate

This study was approved by the CMoH Ethical Review Committee (038 and 081NECHR), by the Ethical Review Committee of the National Center for Global Health and Medicine in Japan (# 2443) and by the Research Ethics Committee of the University of Tokyo (2018154NI). The qualitative methods and reporting of results conformed to the Consolidated Criteria for Reporting Qualitative Studies (COREQ) guidelines and Standards for Reporting Qualitative Research. A complete COREQ checklist (Additional file 2) was also attached.

Consent for publication

Not applicable

Availability of data and materials

The data that support the findings of this study are available on request from the corresponding author KKS. The data are not publicly available due to them containing information that could compromise research participant privacy/consent.

Competing interests

The authors declare that they have no competing interests

Funding

The study was funded by a Research Grant for International Health, H29-4, by Japan's Ministry of Health, Welfare, and Labor, and by a Yamaji Fumiko Nursing Research Fund. The funders had no role in the study design, data collection analysis, decision to publish, or preparation of the manuscript.

Authors' contributions

KKS and MS conducted interview. KKS and NF read transcripts thoroughly and interpreted the data as a whole. ABZ, TS and MJ supervised the analysis and the manuscript. All authors read and approved the final manuscript.

Acknowledgements

We express our sincere gratitude to CC, VK and SC for their tremendous help with interpretation, translation and transcription of data collected.

References

1. Campbell J, Buchan J, Cometto G, David B, Dussault G, Fogstad H, Fronteira I, Lozano R, Nyongato F, Pablos-Méndez A, et al: **Human resources for health and universal health coverage: fostering equity and effective coverage.** *Bull World Health Organ* 2013, **91**:853-863.
2. Audet L-A, Bourgault P, Rochefort CM: **Associations between nurse education and experience and the risk of mortality and adverse events in acute care hospitals: A systematic review of observational studies.** *Int J Nurs Stud* 2018, **80**:128-146.
3. WHO: **Global standards for the initial education of professional nurses and midwives.** Geneva: World Health Organization; 2009.
4. Cilliers FJ, Tekian A: **Effective faculty development in an institutional context: Designing for transfer.** *J Grad Med Edu* 2016, **8**:145-149.
5. Kim D-H, Lee J-H, Park J, Shin J-S: **Process-oriented evaluation of an international faculty development program for Asian developing countries: a qualitative study.** *BMC Med Edu* 2017, **17**.
6. WHO: **Evaluating training in WHO.** Geneva: World Health Organization; 2010.
7. Kirkpatrick JD and Kirkpatrick WK. **Kirkpatrick's four levels of training evaluation.** Alexandria: ATD press; 2016.
8. Steinert Y, Mann K, Anderson B, Barnett BM, Centeno A, Naismith L, Prideaux D, Spencer J, Tullo E, Viggiano T, et al: **A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME Guide No.40.** *Med Teach* 2016, **38**:769-786.
9. HRD JICA Project for Strengthening Human Resources Development System of Co-medicals: **Assessment of future needs for teachers' capacity building and producing leadership in nursing and midwifery.** (Cambodia Ministry of Health ed. Phnom Penh; 2015).
10. Koto-Shimada K, Yanagisawa S, Boonyanurak P, Fujita N: **Building the capacity of nursing professionals in Cambodia: Insights from a bridging program for faculty development.** *Int Jour Nurs*

Pract 2016, **22 Suppl 1**:22-30.

11. Nowell LS, Norris JM, White DE, Moules NJ: **Thematic analysis: Striving to meet the trustworthiness criteria.** *Int J Qual Methods* 2017, **16**:
12. Ettekal AV, Mahoney JL: **Ecological systems theory.** In *The SAGE Encyclopedia of Out-of-School Learning*. Edited by Peppler K. Thousand Oaks: SAGE Publications, Inc.; 2017: 239-241
13. Bluteau P, Clouder L, Cureton D: **Developing interprofessional education online: An ecological systems theory analysis.** *J Interprof Care* 2017, **31**:420-428.
14. Bowen GA: **Document analysis as a qualitative research method.** *Qual Res J* 2009, **9**:27-40.
15. Salajegheh M, Gandomkar R, Mirzazadeh A, Sanders J: **Identification of capacity development indicators for faculty development programs: A nominal group technique study.** *BMC Med Edu* 2020, **20**:163
16. Evans C, Razia R, Cook E: **Building nurse education capacity in India: insights from a faculty development programme in Andhra Pradesh.** *BMC Nurs* 2013, **12**.
17. Cancedda C, Farmer PE, Kerry V, Nuthulaganti T, Scott KW, Goosby E, Binagwaho A: **Maximizing the impact of training initiatives for health professionals in Low-Income countries: Frameworks, challenges, and best practices.** *PLOS Med* 2015, **12**:
18. Rotem A, Zinovieff MA, Goubarev A: **A framework for evaluating the impact of the United Nations fellowship programmes.** *Hum Resour Health* 2010, **8**:
19. Burdick WP, Diserens D, Friedman SR, Morahan PS, Kalishman S, Eklund MA, Mennin S, Norcini JJ: **Measuring the effects of an international health professions faculty development fellowship: the FAIMER Institute.** *Medl Teach* 2010, **32**:414-421.
20. Njie-Carr V, Adeyeye O, Marong L, Sarr F: **Enhancing nurse leadership capacity in resource-limited countries.** *Int J Nurs Clin Pract* 2016, **2016**:
21. WHO : **State of the world's nursing 2020: investing in education, jobs, and leadership.** Geneva: World Health Organization; 2020.
22. Fujita N, Matsuoka S, Koto-Shimada K, Ikarashi M, Hazarika I, Zwi AB: **Regulation of nursing professionals in Cambodia and Vietnam: A review of the evolution and key influences.** *Hum Resour Health* 2019, **17**.
23. HRD JICA Project for Strengthening Human Resources Development System of Co-medicals: **Survey on nursing education in the public sector and nursing services at sites for clinical practice in Cambodia.** (Cambodia Ministry of Health ed. Phnom Penh; 2011.
24. Bvumbwe T, Mtshali N: **Nursing education challenges and solutions in Sub Saharan Africa: an integrative review.** *BMC Nurs* 2018, **17**:
25. McLean M, Cilliers F, Van Wyk JM: **Faculty development: yesterday, today and tomorrow.** *Med Teach* 2008, **30**:555-584.

Figures

Figure 1

Evaluation for each level according to the type of participants.

Figure 2

Influencing factors of the long-term outcomes.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1.xlsx](#)
- [Additionalfile2.docx](#)