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Comparative study of nursing curriculum in nursing faculties of Canada, Turkey, and Iran according to SPICES model

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Abstract:

BACKGROUND: Innovation in the development and review of curriculums is one of the requirements of medical education in the present era. SPICES model has been taken into consideration by nursing faculties to promote quality of nursing education and to eliminate conventional curriculums. In Iran, for competency-based nursing education, review and development of curriculums are necessary.

OBJECTIVE: The objectives of the present study were to determine the implementation of SPICES model in nursing curriculums of Tehran (Iran), Western (Canada), and Hacettepe (Turkey) nursing faculties and also to present recommendations to operationalize it in the nursing curriculum of Iran.

MATERIALS AND METHODS: This study using comparative method with Brady's model was conducted in 2018. In this study, curriculums of nursing faculties of Tehran, Western Canada, and Hacettepe were compared. Data were extracted through texts and documents available at electronic pages of universities. Curriculums of these nursing faculties were compared from the perspective of SPICES model strategies (student-based, problem-based, integration, community-based, elective, and systematic) at four steps of description, interpretation, juxtaposition, and comparison.

RESULTS: The results showed that curriculums in Western Canada reside at the end of the innovative spectrum of SPICES model. Curriculums in Tehran and Hacettepe in most of the strategies of this model reside at the beginning of the spectrum, and in most cases, conventional methods were used.

CONCLUSIONS: According to successful experiences of Western Canada in the implementation of SPICES model's strategies and also considering this fact that still conventional approaches are prevalent in Iran, it is recommended to focus on experiences and, according to social conditions and facilities of the nursing community, to implement necessary changes in the curriculums based on this model.

Keywords:

Canada, comparative study, Iran, nursing curriculum, SPICES model, Turkey

Introduction

Teaching is a purposeful process to establish and promote learning. Medical science education is a part of higher education system that deals with the lives of people, and social health depends on the quality of education in universities.^[1] Nursing is one of the independent and complicated medical

sciences, and if no suitable program with high quality exists, irreparable damages occur regarding social health and academic credibility of the university and graduates.^[2] According to the development of technology and rapid healthcare changes, the education system should be consistent with changes to train people who can answer the needs of the community.^[3] The quality of nursing cares depends on how services are provided and this necessitates correct education.

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Therefore, development of appropriate curriculum to train capable and competent nurses with required skills, knowledge, and attitudes to promote health is of crucial importance.^[4] Curriculum is a scientific area that, at least, includes four components of objectives, content, methodologies, and assessment method. The existence of a comprehensive curriculum consistent with the needs of health system constitutes the main basis in training human resources required by the health system.^[5] Nursing curriculum should improve knowledge, skills, and communication of students so that its consequences lead to the promotion of social health.^[6] Nursing education should occur in active contexts considering the future needs of the community in education and health to have competency-based nursing education.^[7] Innovation in compilation and review of curriculum constitutes one of the main requirements of the present era in medical science education.^[8] Harden *et al.* (1984) proposed six innovative educational strategies (student-based, problem-based, integrated, community-based, elective, and systematic) based on the SPICES model that is known as one of the most validated strategy sets in modern medical science education system.^[5] In this model, a continuity exists that on the one end, modern approaches exist, and on the other end, teacher-based old approaches, information gathering, discipline-based, hospital-based, standard program, and apprenticeship-based aspects exist.^[9]

This model provides learning opportunities within a flexible system and creates professional knowledge and skills for students so that graduates in different situations of the community can use their knowledge based on content and activity.^[6] Most of the top nursing schools around the world such as Ohio, John Hopkins, Stonehenge, Western, Sydney, and Chamberlain, to be consistent with the present requirements of the medical science education, changed their curriculum based on the SPICES model.^[10] According to the previous studies, Iranian nursing curriculum to create necessary capabilities does not have the required creative thought in a clinical environment; therefore, in Iran, a comprehensive review based on SPICES model is required.^[10,11]

Educational institutes to provide comprehensive curriculum should review different aspects constantly. One of the review methods is comparative studies.^[12] Comparative studies investigate the curriculums from different countries through scientific exchanges and localize the findings of such studies, which can be used to improve existing curriculum or develop a new curriculum.^[10] For greater success regarding nursing curriculum in Iran and to identify its advantages and disadvantages, comparative studies and their findings with applied suggestions help the compilers and performers of nursing curriculum to focus on developing

curriculums consistent with their social needs.^[12] In this study, nursing curriculums in nursing faculties of Western Canada, Hacettepe in Turkey, and Faculty of Nursing, Tehran University of Medical Sciences, are studied. Hacettepe Nursing Faculty is among the most important nursing faculties in Turkey, and most of the Iranian nurses choose this university. Furthermore, Turkey is a Muslim country with a culture almost similar to Iran. Nursing education in this country is similar to Iran following American nursing education. Western Faculty of Nursing as the first nursing faculty in Canada has a global look toward nursing and trains nurses with interdisciplinary view.

Therefore, the objective of the present study was comparative comparison of nursing curriculum in nursing faculties of Western University, Hacettepe University in Turkey, and Tehran University of Medical Sciences.

Materials and Methods

The present study is a descriptive-comparative study based on Brady's model. Brady's model includes four stages of description, interpretation, juxtaposition, and comparison.^[10,13] At the first stage (description) of the study, information about nursing curriculums of these universities was gathered. At the second stage (interpretation), the gathered information from curriculums was interpreted according to the SPICES model. At the third stage (juxtaposition), similarities and differences of different curriculums regarding the implementation of SPICES model were identified, and finally, at the fourth stage, administrative solutions to implement this model in curriculums were compared to propose solutions to perform this model in the nursing curriculum in Iran. According to this study, at first, nursing curriculums of Iran, Hacettepe, and Western were studied according to the SPICES model, and then, similarities and differences of these curriculums were compared. To achieve the required information from English and Persian sources, both Persian and English sites including CINAHL, PubMed, Science Direct, IranMedex, and SID were used. Furthermore, nursing education keywords, curriculum, student-based, integration, systematic, curriculum, SPICES model, Western Canada, Faculty of Nursing, Tehran University of Medical Sciences, and Hacettepe were also used. Moreover, the websites of Iran's Health Ministry, Ministry of Science and Nursing Community, and websites of Western Canada and Hacettepe were also used, and finally, according to the similarities and differences, applicable suggestions were used to modify educational components in Iran.

Results

At the first stage, information about the SPICE model's strategies for different universities of interest was gathered. At the second stage, the gathered information was interpreted, and at the third stage, similarities and differences were compared. The summary of the first three stages is provided in Table 1. At the fourth stage, administrative solutions to implement strategies in nursing curriculum in Iran are presented.

Student-based strategy

Student-based strategy as one of the SPICES strategies means to give learning responsibility to the student. Learning in this strategy is active. This approach is the opposite of teacher-based approach.^[10] This learning strategy puts learning at higher cognitive area and activates critical thinking.^[14]

Five student-based strategies are as follows:

- Stage 1: the student continues the prescribed program, and there is no trust or emphasis to consider needs and preferences of students
- Stage 2: the coordinator considers courses, needs, and preferences according to his or her preferences and announces them to students, but they continue the same procedure
- Stage 3: the coordinator considers courses, needs, and preferences of students according to his or her preferences and announces them to students. Students are responsible to implement programs and activities in learning process
- Stage 4: students actively participate in planning stages as they participate in implementation phase
- Stage 5: students actively participate in all stages (planning, implementation, and assessment).^[15]

The main curriculum model of Western University is participatory teaching. This participatory model is student based and the student is at the center of all measures. This program provides an opportunity for nursing students to besides medical, pharmacy, and other students of health sciences, In addition to acquiring knowledge, they will meet the needs of their patients. Students and professors work in a coordinated and collaborative manner. Student is responsible for learning. He or she directing the learning procedure should receive suitable feedback and integrate and implement instructions before arriving at the clinic effectively. The assessment procedure is based on portfolio presentation by the student based on a participatory manner. The educational strategy in Tehran and Turkey is teacher based so that the teachers are the main responsible for courses and content transfer to students and determine educational objectives in the curriculum and the students should follow them carefully. Assessment procedures in these faculties are developmental and congestive.

It should be noted that the feedback system in Iranian nursing education system is less considered.

Suitable solutions to implement student-based strategies in Iran

1. Informing the student about rules, developments, and academic achievement: to inform the students about rules and regulations related to the curriculum, a welcome party was used. To inform students about developments, journals, newsletters, and e-mails were used, and finally, to inform students about educational progress, reporting and feedback through a movie at the clinical skills center were also used
2. Independent research centers: To conduct research and for research opportunities and to obtain experience, the establishment of research centers in which students can work independently is helpful
3. The use of new and frequent teaching and assessment methods: considering individual needs of students, their previous knowledge levels, implementing mentorship, preceptorship and coaching, participatory and active learning and evaluation be done through portfolio
4. Flexile curriculum and its review based on students' needs: This is done through facilitating the relationship between students, professors, and management or student membership in decision committees
5. Considering the educational consequences: Student-based strategy without considering educational consequences will not be fully implemented. Identification of educational consequences and preparing the instruments and also characterizing the capabilities of graduates and following them through were scoring.

Integration strategy

Integration means to organize the taught topics and create connections between different topics in different courses. Integration leads to mental coherence of content and deep understanding. Integration includes horizontal and vertical integrations. Horizontal integration indicates parallel interdisciplinary integrations such as anatomy, physiology, and biochemistry. Vertical integration means to integrate different fields that are taught vertically in different periods; for example, integration of clinical and theoretical courses.^[13]

Five stages of integration strategy are as follows:

- Stage 1: Courses are different in terms of objective, content, instructors, and methods
- Stage 2: A series of coordination between related courses based on informing people about other courses or by coordinating the courses as consultation
- Stage 3: Coordination is deeper between courses as temporary coordination or continuous instruction. It means that every field participates in content, courses, and assessment

Table 1: Classification and comparison of activities in faculties to operationalize SPICES model

Faculty	Student-based	Integration	Systematic	Community-based	Problem-based	Elective
Tehran	The strategy used in this faculty is teacher based. However, preceptorship and mentorship are started and it is hoped to be directed appropriately	In Tehran, the courses are separated in terms of objectives, content, professors, and methods. The nursing field independently develops its curriculum Stage 1: Integration	Admission is the same as other fields of studies through competitive examination. Freshmen celebration, students' access to courses description, research interests of professors, existence of ethical charter in the college Stage 2: Systematic	The existence of community health course, adult nursing course, the objective to establish community-based nursing by the Ministry of Health Stage 2: Community-based	To propose a scenario by professors during teaching process, modern teaching methods such as PBL. A number of professors use the strategy, but no force exists for its implementation Stage 2: Problem based	130 units of compulsory and voluntary courses Stage 1: Elective
Western	Participatory model in teaching, preceptorship, giving attention to different needs of students, methodology, transferring learning responsibility to the student, the existence of two participatory and compact programs, examination, student organizations, students' representatives participation in curriculum Stage 5: Student based	Participatory teaching model, interdisciplinary teaching and learning, vertical integration, horizontal integration in anatomy and physiology and pharmacy and nutrition, integration of clinical centers in the faculty Stage 5: Integration	Competition regarding registration, resource allocation according to portfolio, entrance conditions for a clinic and having approval to prescribe medicine and cardiovascular resuscitation skills, classified objectives during education, student promotion program, ethical charter, politeness and professionalism, the presence of coordinator and preceptorship and clinical centers	Solving the health problems of the community, variety in services in social environments, cooperation of Community Health Nursing Resources Center with the faculty, health instruction according to health promotion models Stage 4: Community based	Clinical teaching method of standardized patient Stage 4: Problem based	Protecting the right to select or cancel courses, aware of objectives and assessment method, to choose between physiology and religious studies Stage 4: Elective
Hacettepe	The applied strategy in this faculty is teacher based	Stage 1: Integration	Admission is the same as other fields of studies through competitive examination. Freshmen celebration, students' access to courses description, research interests of professors, existence of ethical charter in the college Stage 2: Systematic	The existence of community health course, legal nursing course Stage 3: Community based	In this faculty, modern and active student-based methods such as PBL are pointed out Stage 3: Problem based	Students have to pass 147 units of compulsory and voluntary courses. Psychology, emotional intelligence development, histology, policymaking and health economy and communicative skills are among voluntary courses Stage 1: Elective

PBL=Project-based learning

- Stage 4: The field's boundaries are vanishing. Comprehensive plan or multidisciplinary courses are implemented as the learning center
- Stage 5: Different fields are interrelated and are implemented as interdisciplinary and multidisciplinary.^[15]

In Western Nursing Faculty, in the 2nd year, pharmacy and nutrition are taught based on horizontal integration. These centers are managed through the coordinator of preceptorship and the coordinator of the clinical center. Providing care by students is according to his or her

education level and capabilities. They are responsible to perform previous instructions. Students are responsible to perform scientific and moral cares for patients according to the theoretical instructions. In Faculty of Nursing, Tehran University of Medical Sciences, and also Turkey, the courses are instructed separately and no horizontal integration program exists. Nursing determines its content and methodology and objectives independently. In internship program, after theoretical instruction or at the same time at the hospital, internship program related to the presence of coach and students is conducted.

Providing suitable solutions to implement integration strategies in Iran

- Horizontal integration: the faculty attempts to integrate related courses to achieve this objective, for example, horizontal integration in anatomy and physiology courses
- Vertical integration: in two ways, (a) integration of theoretical and clinical courses; matching information in courses is not necessarily integration for learners; (b) student faces the hospital so early at the first semester as professional clinical experience course
- Participatory instruction: interdisciplinary teams, for example, in cardiovascular discussion, to teach all topics, only one faculty member should not be used. Medicines, heart surgery, and nutrition should be instructed by experts with cooperation and coordination
- Cooperation and coordination by all faculties in instructing the courses lead to the sense of cooperation and participation.

Systematic strategy

A systematic strategy is a simple way to allow student become familiar with content and obtain necessary skills. This strategy is proposed against opportunistic curriculum.^[12]

Six stages of systematic strategy are as follows:

- Stage 1: Describing the courses (objectives, content, methods, and assessment) is not accessible by students
- Stage 2: Describing the courses (objectives, content, methods, and assessment) for students
- Stage 3: In addition to previous cases, the content of courses and student assessment are related to the objectives
- Stage 4: The objectives are according to the assessment needs. These cases include previous cases
- Stage 5: The course assessment occurs during its implementation and suitable feedback exists during spiral upgrade.^[15]

In Western Nursing Faculty, objectives and content are related to the assessment program. For assessment, special forms are designed in which objectives, assessment method, scores, and comments are inserted. Students at the 1st month, passing courses related to the first aids, should receive approval of this committee to enter the clinic. Further, before entering the clinic, they should be controlled in terms of medical problems, diseases, vaccinations, and criminal problems, and if no negative record exists, they can enter the hospital. All of the students will be covered by job security insurance to be supported against accidents. Students, before entering the clinic and after learning its principles, sign privacy and trust agreement. This faculty is among those nursing

faculties that start nursing clinical education from the 1st year. Registration in nursing in Western Nursing Faculty is competitive so that students at the end of the 1st and 2nd years should obtain 70% of the total mean of courses. Further, before the main nursing program starts, they pass a program called prehealth sciences. In Iran and Turkey, admission of nursing students is the same as other higher education fields from high-school graduates through competitive examination. Students at the first semester at the clinical centers receive necessary guidelines on replica from the instructor and enter the hospital at the second semester.

Suitable solutions to implement systematic strategy in Iran

To implement this strategy in Iran, the following solutions are suggested:

- To be systematic when starting the course: The existence of admission conditions, purposeful selection, and competition
- To be systematic in learning and teaching process: The existence of the main capabilities in competency-based education, classified objectives during education, charter of politeness, courtesy and professionalism, controlling the learning experiences through entrance conditions regarding clinic, mentor's nursing program, supervision on hospitals and clinical environments, different learning environment to obtain various learning experiences, conventional instructors for cooperation between preceptorship and clinical centers, the area of interest and research of professors, the presence of students representatives in decision-making committees to receive feedback from students about professors and curriculum
- To be systematic in learning and teaching consequences: Controlling the effects of graduations and approving the achievement of learning consequences through investigating the performance of nursing graduates, the existence of standard assessment methods, student progress assessment, electronic portfolio system, comprehensive examination, the relevance of the assessment method to the objectives, instructing students entrance to higher levels for graduates, occupational promotion team, and graduates community.

Community-based strategy

According to increased life expectancy and focus on prevention instead of treatment, the movement has been toward providing services in community-based way and change in medical science instruction. In this type of instruction, the community as the learning environment has the highest applications. Community-based instruction leads to increased creative and critical thinking, overall approach toward health issues, and increased student's capability in using preventive

strategies instead of treatment. Community-based instruction occurs when teaching attempts to concentrate on real problems.^[16]

Five stages to implement community-based strategy are as follows:

- Stage 1: Courses do not have any relationship with the problems of the community. They even do not have any relationship with common third-level care problems
- Stage 2: Courses concentrate on third-level care problems (hospital based)
- Stage 3: Courses in objectives, content, and resources concentrate on sociology
- Stage 4: Courses are community based. Therefore, the learning environment and the related consequences are related to real conditions of the community
- Stage 5: Courses are interrelated, and for this purpose, they are implemented as intradisciplinary and transversal. Themes are the main center in organizing the curriculum.^[15]

In Western Nursing Faculty, community health nursing services, caring for adults, and caring for women and children are presented. In this faculty, the clinical center provides different learning opportunities based on urban, rural, and social problems with high variety. Further, nursing students have rich experiences with London community that is directed by Community Health Nursing Resources Center. The main objective of this center is to provide primary care for families and also services for them. Community health instruction for students occurs according to the health promotion models. In Tehran, adult nursing and community health are taught. Recently, the establishment of community-based nursing has been taken into consideration by the Ministry of Health. In Turkey, in addition to community health, one course that seems Iran needs it too is legal nursing.

Presenting suitable solutions to implement community-based strategy in Iran

Necessary measures to implement community-based strategy in Iranian curriculum are as follows:

- Giving attention to community-based strategy through solving health problems: Providing valid nursing services by students to the community through the participation of clinical scientific services
- Giving attention to community-based strategy in curriculum: Considering the community needs in drawing objectives and courses, giving priority to health instead of disease, out-of-school learning programs, community-based projects, tasks as involvement in the environment and community, out-of-school clinical investigation, formation of groups interested in elderlies, establishment of primary care centers, and providing care in house

and nurturing students with these objectives

- Giving attention to community-based strategy in research: Establishment of research center to promote marketing services in health and treatment, nursing electronic cohort research
- Giving attention to community-based strategy through participatory activities: Establishment of organizations and faculty centers such as nursing learning community, mental health committee of the community, nursing clinics with the management of students.

Problem-based strategy

In problem-based program, the content is selected according to the application for problem-solving, and these problems are used as instruments for the genesis of applied science. Problem-based approach is a valuable learning method in which the learner faces a problem and then follows it through student-based research.^[17] Five stages to implement problem-based strategy are as follows:

1. General rules and facts are taught without any example
2. Administrative rules are taught, but no program exists for administration
3. Examples or problems with applied rules are taken into consideration
4. Problem-solving is at the center of activities. Problems are taught without any inferential activity, or inferential rules are used for the same problems
5. Problem-solving is at the center of activities so that it leads to general inferential rules. The problems are real problems during practical work.^[15] In Western Nursing Faculty's curriculum, problem-solving with small groups is used. Clinical instruction in the faculty occurs through clinical education suite that is similar to a real hospital and students receive instruction through a standardized patient. In Hacettepe, use of modern and active learning methods such as problem-based learning was pointed out. In Tehran, the use of active learning methods such as scenario and problem-based learning and creating small groups are taken into consideration by the faculty. A number of professors use problem-based methods, but no uniform guideline exists for that.

Providing suitable solutions to implement problem-based strategy in Iran

The implementation of this strategy through the following methods in three classes in Iranian nursing curriculum is suggested:

- Learning and teaching methods: Teaching based on clinical scenarios, learning while doing to solve community health problems, problem-based meetings, research on the field
- Assessment methods: Problem-based projects according to out-of-school evidence, writing case

- studies and rehearsal examination, clinical examination
- The objectives of courses and their content: The content based on risk factors, community problems, and existence of health policies.

Elective strategy

According to high volume of information, this fact exists that students cannot learn everything. The solution for this problem is elective strategy. In standard program, students should learn a series of topics compulsorily. However, in elective program, the student has the right to select cases. The advantages include student responsibility in learning, providing the needs of students, and change their attitudes.^[15] Elective strategy includes five stages:

- Stage 1: Courses are compulsory
- Stage 2: Students have a right to choose consultants, schedule of courses, and date of examinations
- Stage 3: In addition to previous stage, students choose some examination sources and questions
- Stage 4: The topics of some courses are elective. Furthermore, the arrangement of courses and assessment methods is elective
- Stage 5: Students choose learning method in addition to the above cases.^[15] In Western Nursing Faculty, to consider students' needs, nursing curriculum is participatory and compact. The participatory program includes 4 years, and in selecting the courses, voluntary courses exist, too.

Providing suitable solutions to implement elective strategy in Iran

- The possibility to choose among courses such as religious studies and clinical services course in summer
- The possibility to choose among programs such as normal and compact programs, possibility to choose between semesters, and change in the curriculum with the approval of advisor
- The possibility for technical choice: Within a certain context in nursing such as elective clinical internship and even to be instructor in nursing
- Variety in assessment methods: Assessment method selection to show maximum capabilities.

Discussion

This study was conducted to determine the implementation of SPICES model in the nursing curriculum, in Western, Tehran, and Hacettepe universities to propose solutions for its operationalization in the nursing curriculum in Iran. The results showed that Western Nursing Faculty has operationalized this model better than Tehran and Hacettepe. Brauer and Ferguson stated that the SPICES model is one of the most valid strategies in modern education system. This

model is used to develop a new educational program or to modify the present program.^[5] In this regard, Changiz designed a questionnaire based on the SPICES model and concluded that to review and assess the curriculum, six strategies of SPICES model should be used.^[15] Dent (2014) in his study on the use of SPICES model in modifying new educational opportunities in outpatient care center stated that to create a new innovative program and learning opportunities, SPICES model should be used. Dent suggested that a curriculum should be drawn on this mode, and according to the facilities and capabilities, it should be characterized that which strategy is more applicable. Therefore, each faculty may use one or more strategies of SPICES model in its curriculum.^[16] Omar and Shakil in their review study concluded that a number of faculties successfully implemented this model in their curriculum, but a few still use old methods. Further, they stated that each faculty should implement this model according to its conditions and capabilities.^[18] Therefore, the strategies of this model are applicable in various forms. Different faculties use different and innovative approaches according to the available sources and facilities. Therefore, modifications in the nursing curriculum should be performed with respect to conditions and facilities through scientific steps.

Makerere University of Medical Sciences, to be consistent with the present educational needs, changed its curriculum according to the SPICES model.^[19] In Iran in 2007, Shahid Beheshti University of Medical Science modified its curriculum according to the needs of Iranian community based on this model.^[20] Ayubkhan *et al.* (2015) in their study on the assessment of medical university curriculum with respect to the needs of community stated that the SPICES model improves educational standards of students and makes them consistent with international standards. A number of faculties have chosen one of more strategies of SPICES model in their curriculum. A few universities also have chosen these strategies to change their curriculum.^[9] Therefore, competency-based education according to the SPICES model is important.

Feenstra *et al.* had drawn how to implement community-based strategy in nursing curriculum. They stated that participation with other healthcare centers and interaction with out-of-school center in educational process of this strategy have important roles.^[21] In addition, Salt *et al.* in their systematic review concluded that systematic strategy implementation in learning and teaching process through preceptorship program in maintenance, promotion, and entrance to higher levels is important.^[22]

Conclusions

Since nursing is a practical field of study and its graduates should dynamically work in variable environments, the curriculum should be flexible and be consistent with daily needs of the community. With respect to content and the importance of SPICES model implementation in development, review, and assessment of curriculum and considering this fact that traditional curriculum is common in Iran, it is suggested to implement necessary changes according to the conditions and facilities of nursing community in Iran.

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Conflicts of interest

There are no conflicts of interest.

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