

# The Effectiveness of Using Concept Mapping to Improve Primary Medical Care Nursing Competencies among Fourth Year Assumption University Nursing Students

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## **Abstract**

*The purpose of this investigation was to study the effectiveness of concept mapping on nursing competencies of primary medical care among fourth year Assumption University nursing students using a single group quasi-experimental research design. The conceptual framework was developed by applying the nursing core competencies set forth by the Thailand Nursing Council. Qualitative data and quantitative data were collected using structural interviews and questionnaires. The computer program SPSS version 12.0 was used for quantitative data analysis. Qualitative data analysis methods were used to analyze contents. The results revealed that level-nursing competencies of primary medical care in the respondents before and after participating in research activities were significantly different ( $P=0.00$ ). Evidently, participants had improved their primary medical care competencies in all aspects. The implications of the findings contribute to developing nursing education and improving nursing competencies in other contexts.*

**Keywords:** *Single group quasi-experimental research design, qualitative data, quantitative data*

## **1. Introduction**

Thailand's Education Act B.E. 2542 (1999) states that education shall be based on the principle that all learners are capable of learning and self-development. The teaching-learning process shall aim at enabling the learners to develop themselves at their own pace and to the best of their potentiality (Section 22). Furthermore, the second, third, and fourth paragraphs of Section 10 mention that the substance of the curricula, both academic and professional, shall aim at human development with desirable balance regarding knowledge, critical thinking, capability, virtue, and social responsibility (Commission of Higher Education 1999).

To provide competent nursing care, a registered nurse must acquire, maintain and continuously enhance the knowledge, skill, attitudes and judgments required to meet client needs in an evolving health care system. Therefore, the Thailand Nursing Council established the Nursing Core Competencies as

a standard performance for register nurse and midwifery. It is also a guideline for nursing schools to improve the curriculum and produce qualified graduated nurses (FNS/MU 2001)

The Faculty of Nursing Science, as an integral part of the Assumption University of Thailand, offers the baccalaureate program in nursing that anticipates and reflects the health care needs of society which is composed of individuals, families, groups, and communities. The Faculty of Nursing Science believes that learning is a dynamic process which is developed by study and experience through the process of knowing, understanding, and changing attitude as well as competency. The learner who eventually develops critical thinking and clinical decision making on the basis of knowledge regulates the center of learning process. Regarding the complexity of the social changes, the preparation of learners to socialize with the modern society is a necessity. We believe that the Faculty is a society of scholars committed to be excellent in teaching, to advance the nursing profession,

and to facilitate the personal development of students, instructors, and staff through a variety of mechanisms. This commitment will bring the benefits of new knowledge to consumers and provide the betterment of health care services for the people. The Faculty of Nursing Science is committed to provide high quality educational process with the best academic resources, using student-centered approach, advanced information technology and innovations to educate nursing graduates who:

- demonstrate sense of maturity and in professional growth,
- possess high professional qualification,
- literate in health care informatics and management,
- having leadership qualities and an ethical mind, and
- being well versed in English

The Community Health Nursing Division in Faculty of Nursing Science is committed to strengthen the high quality of teaching and learning. Therefore, the division has adopted a variety of teaching methods and applies student centered approach into the teaching and learning process. As the responsible division for primary medical care subject, the division recognizes that conceptualize idea and integration all knowledge is importance in teaching and learning process both theory and practice. The knowledge in classroom should apply to practicum field. Therefore, the researcher would like to apply the teaching innovation in developing learning process of nursing students.

### **1.1 Objective**

To study the effectiveness of concept mapping on nursing competencies of primary medical care among fourth year Assumption University nursing students.

### **1.2 Limitation**

There were no nursing curricula that use English as a medium of instruction for the 4<sup>th</sup> year students in academic year 2004. Moreover, the number of the 4<sup>th</sup> year nursing students was only 15 students. Therefore, this study used single group research design without a comparison group.

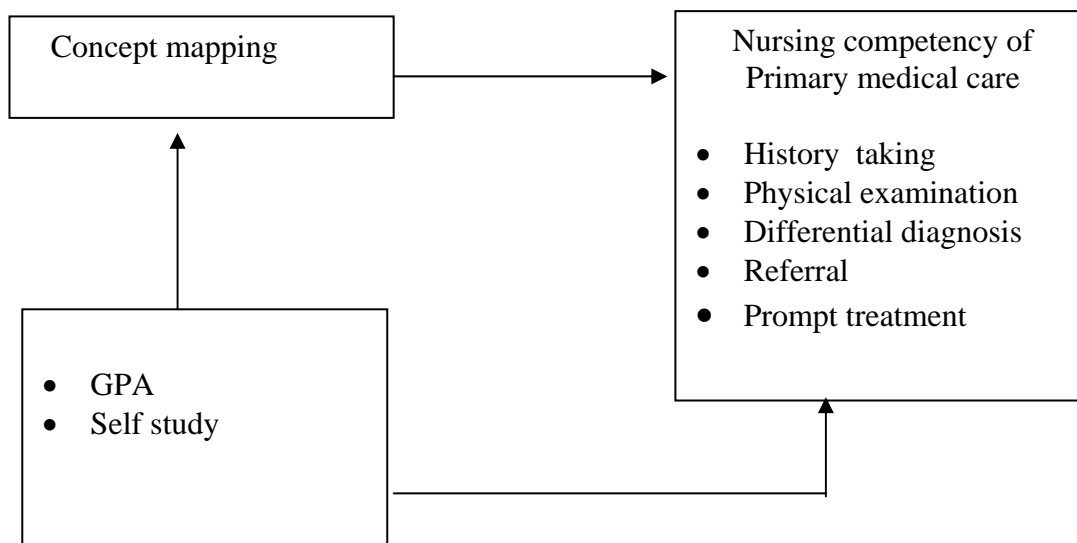
### **1.3 Benefit of the study**

The research result can be applied in the teaching and learning process as a guidelines to improve the nursing competencies in all aspect.

### **1.4 Ethical Consideration**

1. Participant received explanation on objectives and research activities Survey including benefits.
2. Participants have freedom to withdraw from the research and all data will be confided.

## Conceptual framework



### 1.5 Conceptual Framework

The Effectiveness of Concept Mapping an Nursing Competencies of Primary Medical Care's among the 4<sup>th</sup> year Au Nursing Students

## 2. Literature Review

### 2.1 Concept Mapping

Mapping is defined as a graphic or pictorial tool used to arrange key concepts. In nursing education, the key concepts are assessment data that students collect either through case studies or clinical assignments. The map develops as students diagram schematically the relationships among various clinical data. This process assists the students to visualize complex relationships and to apply theory to the clinical area.

The purpose of mapping nursing practice in nursing education is to have students develop critical thinking skills; that is, assess the patient, gather information from the literature, select relevant points, relate all of this information to the care of the patient, and illustrate the information graphically. This process helps the students establish priorities, seek relationships among

information, and build on previous knowledge.

Concept mapping is well documented in education literature, especially in the fields of math and science. It has been used to analyze changes in the development of concept understanding held by students and to promote meaningful learning. Mapping has been given various labels, depending on the intended use. It has been called cognitive mapping, idea mapping, patterned mapping, patterned note taking, and flow charting. Jones and Sims state that mapping facilitates creativity; students are able to access their own thinking and experiences, find new associations, and generate a new set of ideas.

To create a map, the student must think, select important points, relate the information, and then illustrate the information graphically, all of which require the student to think critically. In the literature, concept mapping is defined as a method of organizing information in graphic form and concept mapping is a tool to enhance meaningful learning. Several authors have discussed using concept mapping as a tool to link nursing theory and clinical practice.

Mapping is appropriate for undergraduate and graduate students. Students can use it as an independent process, it can be used for small group work or in a very

large classroom situation. It is especially useful in assisting students to think critically about the interrelated of new information, as well as to look at old information and relate it in different ways. Mapping can be simple or complex and can be varied widely to suit many learning situations. It is important to introduce this process in a way that students with a variety of experiences and knowledge can relate to it and see its usefulness (All and Havens 1997). The method to construct a map were:

- There was no right or wrong way to do the map
- The map should be what they felt was useful information
- To take risk and try out different representations.

Initially, map construction is done by identifying relevant concepts in the material. From this identification a hierarchical structure is developed selecting appropriate linkages to form valid propositions. Two or three versions of a map often need to be constructed in order to obtain a valid, satisfying map. The processing of information that occurs during concept map construction requires and encourages meaningful learning. The task of nursing educators is to provide content and feedback. Educators are the motivating force in successful concept mapping. Promotion of a positive reaction to mapping and its effectiveness can be accomplished by giving sufficient time in class for creating maps, allowing for individual to create the structure and appearance and encouraging students use it by integrating this strategy into assignments (Lowenstein and Bradshaw 2001)

## 2.2 Nursing Competencies

Competency of registered nurses is an essential element of safe and quality nursing practice. Competency is one of main aspect to consider when evaluating quality of care. Therefore, registered nursing graduates require broad-based preparations that include a wide scope of knowledge and skill from nursing and related fields to meet the complex client health

needs and constantly changing practice environment. Thus, registered nurses need to maintain and continuously enhance their competencies through continuous learning in order to base their practice knowledge and skill relevant to client health needs.

As nursing educators, we have the responsibility to prepare nursing students with the competencies necessary to provide safe, competent and ethical nursing care in variety setting. Also, to assure that their competencies are relevant to their nursing practice and promote Optimal health outcomes in their clients and to advance their knowledge, skill, attitude and judgment in specific area of practice.(Canadian Nurse Association 1998).

Competency, as discussed in Competency standard approach to professional education and practice, is defined as “A combination of attributes enabling performance of a range of professional tasks to the appropriate standard” (Gonczi and Oliver 1990) Competency does not mean expert there exist various levels of competence but each of these has a minimum acceptable level or standard. Beginners are rarely expert, but they can be competent. They perform a wide range of nursing skill and speed in time (Hird 2004)

The Thailand Nursing Council (FNS/MU 2001) developed the 14 core competencies that deserve the attributes and performances require by qualified nurse. Moreover, the Thailand Nursing Council set forth competencies for each specific area of nursing the core competencies of primary medical care consist of 5 items as follows:

1. Complete health history taking
2. Systemic physical examination
3. Differential diagnosis
4. Refer complex disease for proper management
5. Common disease treatment

## 2.3 Research Design

The research design of this study was a quasi-experimental with single group which collecting data before and after the 4<sup>th</sup> year nursing students did the concept mapping and used it in primary medical care practicum course.

## 2.4 Sample

The samples of this study were:

1. Fifteen 4<sup>th</sup> year nursing students who studied primary medical care subject (NS4317) and primary medical care practicum (NS4401).
2. A doctor who is the nursing student's preceptor at practicum area.
3. Instructor in community health nursing division.

## 2.5 Research Methodology

1. Informed all of the 4<sup>th</sup> year nursing students about objectives and research methodology.
2. Distributed questionnaire of primary medical care's nursing competency to the 4<sup>th</sup> year nursing students (Pre-test).
3. Set up focus group about primary medical care's nursing competencies for nursing students to assess their primary medical care's nursing competency and how to improve it (45 minutes, one time).
4. Instructed the students about concept mapping, its advantage and how to create concept mapping (45 minutes, one time).
5. Encouraged students to create their own concept mapping after finished teaching-learning process in every topic of NS 4317 Primary Medical Care by integrate all knowledge and conceptualize on mapping (30 minutes for one topic, 12 times).
6. Prepared the nursing students to apply their concept mapping to practice when performing primary medical care's nursing competency (30 minutes, one time).
7. Motivated the 4<sup>th</sup> year nursing students demonstrate their primary medical care's nursing competencies with the patients who came to Damnoen Saduak Hospital and Don Klang Primary Care Unit in NS 4401, Subject of Primary Medical Care Practicum.

8. Collected data at the end of NS 4401 course by distribute questionnaire (Post-test) to the 4<sup>th</sup> year nursing students to evaluate their primary medical care's nursing competencies.
9. Set up focus group about primary medical care's nursing competency for nursing students to assess their primary medical care's nursing competency and how to improve it. (45 minutes, one time)
10. Interviewed the doctor who is nursing students' preceptor about nursing primary medical care's nursing competencies.
11. Interviewed the instructor who supervise the nursing student about student's primary medical care's nursing competencies.
12. Analyzed the data.

## 2.6 Data Collection

Both qualitative data and quantitative data were collected.

### 2.6.1 Quantitative Data

- The researcher distributed questionnaires to the 4<sup>th</sup> year nursing students to assess their own primary medical care competencies before and after using concept mapping.

### 2.6.2 Qualitative Data

- The researcher set up a focus group for nursing students to assess their primary medical care's nursing competency before and after finished course of primary medical care practicum.
- The researcher also interviewed the doctor who was the preceptor of nursing students and nursing instructors who is supervise the nursing students in practicum.

## 2.7 Data Analysis

SPSS version 12.0 were used for quantitative data analysis and pair-test and content analysis was used in qualitative data analysis.

### 3. Results

#### 3.1 Quantitative Data

##### 3.1.1 Socio-demographic Characteristics:

The socio-demographic characteristics of the 4<sup>th</sup> year nursing students show that 60.0%

were Thai, 33.33% were Chinese, and 6.67% were Myanmese. The majority, 86.67%, were female, and 13.33% were male. As for the grade point averages, 33% were between 2.51 to 3.00, and 3.01 to 3.50 were equal, and 13.34% were above 3.50 (Table 1).

Table 1. Number and percentage of the 4<sup>th</sup> year nursing students by socio-demographic characteristic

Socio-demographic characteristic		Number 15)	Percent
<b>Race:</b>	Thai	9	60.00
	Myanmese	1	6.67
	Chinese	5	33.33
<b>Gender</b>	Male	2	13.33
	Female	15	86.67
<b>GPA</b>	2.01 – 2.50	3	20.0
	2.51– 3.00	5	33.33
	3.01– 3.50	5	33.33
	> 3.50	2	13.34

**3.1.2 Nursing Competency of Primary Medical Care:** This study used the nursing core competencies of primary medical care set forth by Thailand Nursing Council as a guideline for study. The results revealed that the mean score of the nursing competency of primary medical care before the 4<sup>th</sup> year AU nursing students participating in research activity was 43.27 and the standard deviation was 5.06. Meanwhile, the mean score of the nursing competency of primary medical care after the 4<sup>th</sup> yeas Au nursing students participating in research activity was 58.40 and standard deviation was 2.00. Comparison of mean score between before and after participating in research activity, shows a significant difference (P = 0.00) (Table 2). According to the nursing core competencies set forth by Thailand Nursing Council, nursing competency of primary medical care is divided into 5 competencies namely history taking, physical examination, differential diagnosis, referral, and prompt treatment. The results are presented in each competency as follows:

**3.1.2.1 History Taking:** The results of history taking competency showed that the mean score of history taking in Pre-test was 18.93 and standard deviation was 2.89. The post-test shows that mean score of history taking were 25.60 and the standard deviation was 3.25. Comparing of mean score between pre-teat and post-test, revealed that the history taking competency of the 4<sup>th</sup> year Au nursing students before and after participating in research activity was significantly different (P = 0.00). (Table 3)

**3.1.2.2 Physical examination:** The results of physical examination competency showed that mean score of history taking in pre-test are 3.87 and standard deviation was 0.64. The post – test shows that mean score of physical examination was 5.87, and the standard deviation was 0.64. Comparison of mean score between pre-test and post-test, the results revealed that the physical examination competency of the 4<sup>th</sup> year Au nursing students before and after participating in research

activity was significantly different (P = 0.00) (Table 3).

*3.1.2.3 Differential diagnosis:* The results of differential diagnosis competency showed that mean score of differential diagnosis in pre – test was 3.87 and the standard deviation was 0.64. The post – test shows that mean score of differential diagnosis was 5.87 and standard deviation was 0.64. Comparison of mean score between pre-test and post-test, the results revealed that the differential diagnosis competency of the 4<sup>th</sup> year Au nursing students before and after participating in research activity was significantly different (P = 0.00) (Table 3).

*3.1.2.4 Referral:* The results of referral competency show that mean score of referral in pre-test was 3.87 and the standard deviation

was 0.64. The post-test shows that mean score of history taking are 5.87 and the standard deviation was 0.64. Comparison of mean score between pre-test and post-test, the results revealed that the referral competency of the 4<sup>th</sup> year Au nursing students before and after participating in research activity was significantly different (P = 0.00) (Table 3)

*3.1.2.5 Prompt treatment:* The results of prompt treatment competency show that mean score of prompt treatment in pre-test was 13.80 and the standard deviation was 1.97. The post-test shows that mean score of prompt treatment are 20.20 and standard deviation was 3.12. Comparison of mean score between pre-test and post-test, the results revealed that the referral competency of the 4<sup>th</sup> year Au nursing students before and after participating in research activity was significantly different (P = 7.12) (Table 3)

Table 2. Differences of mean score in overall nursing competency of primary medical care between before and after participating in activities

Nursing competency of primary medical care	$\bar{x}$	S.D.	t-test	df	p-value
Before	43.27	5.06	6.342	14	0.00
After	58.40	7.00			

Table 3. Differences of mean score in each nursing competency of primary medical care between before and after participating in activities

Nursing competency of primary medical care	$\bar{x}$	S.D.	t-test	df	p-value
History taking					
Before	18.93	2.89	6.143	14	0.000
After	25.60	3.25	11.83	14	0.000
Physical examination					
Before	3.87	0.64	5.61	14	0.000
After	5.87	0.64	-7.12	14	0.000
Differential diagnosis					
Before	3.87	0.64	-6.49	14	0.000
After	5.87	0.64			
Prompt treatment					
Before	13.80	1.97			
After	20.20	3.12			
Referral					
Before	3.73	0.59			
After	5.27	0.80			

### 3.2 Qualitative Data

The qualitative data was collected by conducting a focus group with students and interviewing the doctor who served as the instructor and preceptor at the practicum site.

#### 3.2.1 4<sup>th</sup> year Nursing Students:

**Verbatim:** A Chinese student (GPA 2.99) said: *“I can’t remember all of knowledge and this subject should apply all knowledge to practice and care the patients. The concept mapping helps me to improve my nursing competency because I put all concepts in one paper. The way that I do is occur from what I understanding. So it is easy to understand.”*

**Verbatim:** A Thai student, GPA 2.15 said: *“It is very easy to find out the information because I gather all information in one page. If I did not do concept mapping, I think that when I get a case, I can not recall all data and it very difficult to differential diagnoses and provides treatment to the patient. I think that in the future.”*

**Verbatim:** A Burmese male student (GPA 3.13) said: *“It help me to diagnoses the disease and provide the treatment. I will apply it in my study to improve other competence.”*

**Verbatim:** One Chinese student (GPA 2.56) said: *“I like concept mapping a lot because it help me to use my heart and brain to summarize knowledge by myself. And it shows the important clear points and really helpful for me to improve my nursing competency of Primary Medical Care. I have more confidence to take care patient when I have my concept mapping. I think it so effective and useful to promote my creativity and ability to do nursing care with self confidence.”*

**Verbatim:** One Chinese student (GPA 3.6) said: *“I have more motivation and interest to read. Sometimes, I’m missing some knowledge for diagnosis the disease but the concept mapping can solve my problems. I thinks concept mapping make me diligent and to be intelligent nursing student.”*

**Verbatim:** One Thai student (GPA 3.35) said: *“At the first time, I know that PMC subject should integrate all knowledge. I quite worried about my ability and knowledge. I’m not sure that I can gather all of knowledge or not. When Achan (teacher) teaches I how to do the concept mapping and I start doing it by myself. I am not sure that it can help me in practicum. When I apply it in the real situation, I know that it help me a lot especially when I practice and start to take care-patient by taking history, Providing physical exam, differentiating diagnosis, and providing treatment.”*

**Verbatim:** One Thai student (GPA 2.10) said: *“When I got case assignments, I started to take history and perform physical exam then diagnose disease and provided common treatment. I think concept mapping help me to improve knowledge. I have more self confident when I perform the nursing care to patient.”*

**Verbatim:** One Thai student (GPA 2.80) said: *“Concept mapping is very good. It helps me to summarize all the main point in one sheet of paper. And when I take care patients, I can do the best thing which confident. I plan to use concept mapping the other subjects too.”*

#### 3.2.2 The clinical supervisor, doctor and community health nursing instructor:

##### 3.2.2.1 Level of nursing competency in health screening and early detection:

**Verbatim:** The doctor said: *“The students have high level of health screening competency. All of them concern people as a whole, not only physical but also mental, family and environment. The main importance issue is the students not concern only the signs and symptoms that bring the patients to hospital but they try to screen other systems too.”*

**Verbatim:** The nursing instructor said: *“The students have high competence in performing health screening. Some students also concern about psychological and physical screening.”*

3.2.2.2 *Level of nursing competency in history taking*

**Verbatim:** The doctor said: “*Most students perform history taking well. They have good competency in performing the history taking by covering all symptoms in appropriate time.*”

**Verbatim:** The instructor said: “*This academic year, most students have complete history taking in the short period of time. They can set the questions related to signs and symptoms for each patient. The chief complaint is correct, present illness and past illness are also completed.*”

3.2.2.3 *Level of nursing competency in physical examination*

**Verbatim:** The doctor said: “*The students can perform systematically physical examination. They have good techniques and emphasize on the importance system. It is noted that almost cases are URI cases, student should practice more in others to improve their skill.*”

**Verbatim:** The instructor said: “*80 percent of students perform physical examination with gentle and soft techniques. They perform head to toe physical examination with systemically. Even though, there are limitation of rooms and beds, students can manage their time and emphasize on effected organ.*”

3.2.2.4 *Level of nursing competency in data recording*

**Verbatim:** The doctor said: “*Because of the limitation of paper. Students can not record all information that they take. However, students can select all importance information in the OPD card.*”

**Verbatim:** The instructor said: “*Most students have systematically recording with complete patients’ information, wording, and technical term.*”

3.2.2.5 *Level of nursing competency in differential diagnosis*

**Verbatim:** The doctor said: “*When compare ABAC students with others, I think*

*they have high competence and knowledge. The students can differential the common disease with confidence. They have good knowledge in the disease and they are well prepare in practice.*”

**Verbatim:** The instructor said: “*Most students have high competence in differential diagnosis. They can differentiate diseases with reasonable. When compare with other classes of students. This class has good time management.*”

3.2.2.6 *Level of nursing competency prompt treatment:*

**Verbatim:** The doctor said: “*Most students can provide appropriate treatment for patient assigned. They can calculate the dose of medicine base on patient’s age. Even though there are several name of drugs but students can use the general name correctly I would like to suggest students to study more about the list name of drug in this hospital.*”

**Verbatim:** The instructor said: “*The students have moderate competence in prompt treatment. They can select group of medicine according to patient’s signs and symptoms. However, some students need more experiences about calculation of dosage.*”

3.2.2.7 *Level of nursing competency in referral:*

**Verbatim:** The doctor said: “*Students have good decision mating on refer patients from PCU to hospital. However, the students did not get used to the working system of hospital, so they still need the supervision from nurses. In the hospital, students have good decision making on counseling the case with specialist.*”

**Verbatim:** The instructor said: “*Students know their roles and functions as well as their ability therefore. They perform a high competence in referral. Besides, they can make decision in counseling the specialist according to patient’s signs and symptoms.*”

#### 4. Discussion

From the present investigation, it was found that concept mapping is a good education innovation for assisting nursing students to summarize their own concepts and improve their nursing core competency in primary medical care. It can be seen that the 4<sup>th</sup> year AU nursing students have mean scores which are statistically significant difference in all aspect of primary medical care competency before and after participating in the research ( $P=0.000$ ). The focus group demonstrated that most students recognized the benefit of concept mapping in improving their competency of primary medical care. Evidently, the clinical supervisor of primary medical care realized that the students have systematically physical examination with good techniques. Most students have high competency in history taking. They took a complete health history according to patient's signs and symptoms. The students also have good time management skills. The students have high level of knowledge about differential diagnoses and diagnose disease with reasonable accuracy. It is noted that almost students can provide prompt treatment to patients and refer the complicated patients to specialists or the proper health care agency. All above results shown that this teaching style, using the concept mapping as an integral part of teaching-learning process, can improve the nursing competency of primary medical care.

It is recommended that nursing instructors adopt concept mapping into teaching and learning process both in theory and practicum subject. This is because it can improve the nursing core competency, and if nursing instructors recognize the benefit and apply it to other subjects, the nursing students will be well prepared in nursing competencies and be a good professional nurse in the future. The researcher also suggests that other researchers who are interested in concept mapping and nursing competencies do further study in other subjects, at other universities, and other competencies as well. Besides, the researchers may design the research methodology as control group and experimental group. However, further follow-

up study of graduate nurses about nursing competencies should be initiated.

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