Numerous teaching strategies, such as case studies, concept maps, mind maps, and games, are used to stimulate active learning and facilitate the organization of nursing knowledge in undergraduate nursing students (Shin, Sok, Hyun, & Kim, 2015). Specifically, the mind map
is a graphical representation that is used to connect key concepts, aid in the recall of information, take notes, and learn collaboratively (Spencer, Anderson, & Ellis, 2013). The current authors developed the knowledge tree as an example of a mind map to conceptually and visually map the development and progression of chronic health conditions and their respective applications in the nursing care process.

In many ways, the development of chronic health conditions mirrors that of a growing tree. For example, for a tree to grow and develop, it must have roots; similarly, for a chronic condition to develop, it must have root causes. The knowledge tree activity consists of drawing a tree that shows the roots, a trunk, the branches, and colored leaves (Figure), which represent the following:

- **Assessment:** The tree roots represent the root causes or risk factors, and the trunk represents the signs, symptoms, and diagnostics that stem from the root causes.
- **Diagnosis, planning, and intervention:** The branches correspond with the extending nursing interventions and medical management.
- **Evaluation:** The leaves denote the blossoming outcomes. Specifically, green leaves can symbolize the positive or expected outcomes, and brown leaves symbolize the negative or unexpected outcomes (the colors of the leaves are based on the preference of the student working on the assignment). Outcomes can be physiological, psychosocial, or spiritual in nature.

The number of roots, branches, and leaves of the knowledge tree depends on the complexity of the health condition and the depth to which the students or instructor wish to delve.

**Piloting the Knowledge Tree**

The authors introduced the knowledge tree activity to undergraduate junior-level students in a gerontological nursing course that uses the TILE (Transform, Interact, Learn, Engage) pedagogy, which is a collaborative, interactive, and technology-infused active-learning class environment (Ingram, Jesse, Fleagle, Florman, & Van Horne, 2013). The authors piloted the knowledge tree with two different student cohorts, using two different approaches.

**Student Cohorts**

For the first cohort, students were asked to review content on chronic obstructive pulmonary disease (COPD) prior to attending class. During class, the students listened to the National League for Nursing’s Advancing Care Excellence for Seniors (n.d.) monologue of Mr. Henry, who has COPD. At the commencement of the activity, the instructor (S.Q.B.) explained the purpose and representative components of the knowledge tree.

Using a document camera for display, the instructor drew and completed the tree by having the students verbally respond to the information needed for each tree component. Students simultaneously drew and completed their individual trees.

Students were asked to provide anonymous, voluntary feedback on the knowledge tree. Overall, 89% (n = 53) of students reported that the concept of a knowledge tree made sense. Students were evenly split regarding whether the tree was helpful in taking and organizing their notes, which is not surprising, given that nursing students are socialized to PowerPoint® presentations. More than half of the students found the knowledge tree to be helpful in illustrating the development of a chronic condition. On a formal examination, which included two questions of greater than an 80%-level of difficulty evaluating COPD content, 89% and 93% (n = 69), respectively, of students answered these questions correctly.

In contrast, the second cohort was given a homework assignment to develop an individual mind map for heart failure in an older adult. Students were given the option of creating their own mind map or using the knowledge tree; approximately half of the students chose the knowledge tree. Then, during class, while working in groups, the students compared their individual maps to develop a comprehensive group knowledge tree. Students used sketch paper or the whiteboard to draw their group tree. Some students took pictures of other groups’ trees that were drawn on the whiteboard to use as supplementary notes. Although a standard template for the knowledge tree was provided, the groups were encouraged to customize their tree. The groups were creative and drew additional components, such as clouds and rain, that represented risk factors and used color-coding systems for the components of their trees. For the branches, several students added
explanations on the mechanism of action for each intervention. For the class discussion, each group explained a component of the tree. Using this approach, 94% (n = 49) of students agreed that the knowledge tree made sense, and nearly 75% (n = 56) found the tree to be helpful in visualizing the development of heart failure and understanding the content. Sixty-two percent (n = 55) of students reported that the knowledge tree was a helpful method to make and organize study notes. Several students anecdotally stated that this activity helped them to learn the content and found the tree to be an acceptable amount of work.

At the time this article was submitted, students had yet to be formally tested on heart failure content, but based on the evaluations of both cohorts, the knowledge tree appears to be beneficial to student learning and is a feasible active learning strategy.

In addition, the knowledge tree strategy can be used for other courses and is not limited to only gerontology content.

**Conclusion**

Because the students were asked to prepare for the activity before class, their level of engagement in discussing and completing the individual- and group-based knowledge tree served as an informal evaluation method of their knowledge and completion of the preassigned activities.

The knowledge tree can be used with general nursing concepts or can be tailored to a case scenario.

In addition, the knowledge tree assignment can be completed individually or as a group and before or during class, depending on the time available and the level of student engagement desired by faculty.

Most importantly, the knowledge tree supports the pedagogical paradigm shift in nursing education that emphasizes interactive and experiential learning.

**References**


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