Chapter 2: Theoretical Foundations of Health Informatics
Test Bank

MULTIPLE CHOICE

1. What is the primary difference between an open and closed system?
    a. An open system has no boundary, and therefore there are no limits to the inputs and outputs between an open system and the environment.
    b. An open system has a semipermeable boundary and therefore will filter both inputs and outputs when interacting with the environment.
    c. A closed system has a semipermeable boundary and therefore will filter both inputs and outputs when interacting with the environment.
    d. A closed system does not have a boundary and therefore will not interact with the environment.

    ANS: B
    With an open system the boundary is semipermeable, thereby controlling what will be accepted as input and what will be permitted to leave the system.

    DIF: Cognitive Level: Understand   REF: p. 20

2. The primary characteristics used to analyze an open system include:
    a. structure, purpose, and functions.
    b. sub-system, target system, and super-system.
    c. boundary, attributes, and environment.
    d. hierarchical, web, and hybrid.

    ANS: A
    Using these three characteristics, one can determine why the system exists, what functions it performs to achieve its purpose, and how it is structured to achieve its purpose.

    DIF: Cognitive Level: Analyze   REF: p. 20

3. A change made to any aspect of an open system, whether it is a health care system or a computer system, will produce change in other aspects of that same system. As a result, any change can produce unintended consequences. This process is called:
    a. dynamic homeostasis.
    b. semi-planned change.
    c. negentropy.
    d. reverberation.

    ANS: D
    Change within any part of the system will be reflected across the total system through a process termed reverberation. Reverberation is reflected in the intended and unintended consequences of system change.

    DIF: Cognitive Level: Remember   REF: p. 23

4. Chaotic systems are in a constant state of change. This degree or scope of change that can occur has been described as the butterfly effect. The butterfly effect refers to:

a. a minor change in input can create a major change in output, or a major change in input can result in minor changes in output.
b. a major change in input will create a major change in output, and a minor change in input will create minor changes in output.
c. a minor change in input can create a minor change in output; however, a major change in input will result in minor changes in output.
d. a minor change in input may create a major change in output; however, a major change in input will create a major change in output.

ANS: A
Chaotic systems are dynamic systems with reiterative feedback loops. A minor change in input can create a major change in output. This is often described as the butterfly effect. A butterfly's flapping wings in California can over time become a hurricane in New York.

DIF: Cognitive Level: Analyze   REF: p. 24

5. Which statement describes the measurement of information as defined by the Shannon and Weaver model?
a. The amount of information is measured by the amount of data in the message.
b. The amount of information is measured by the number of meanings that can be assigned to a message.
c. The amount of information is measured by the extent the message decreases entropy.
d. The amount of information is measured by the number of characters used to create the message.

ANS: C
By decreasing entropy one decreases uncertainty. If a coin is thrown into the air, it may land on either of two possible sides, heads up or tails up. Once it lands, the other side of the coin can be determined. The options are coded zero (0) and one (1) and are the basis for building computer code.

DIF: Cognitive Level: Remember   REF: pp. 25-26

6. The number 190 is an example of:
a. data.
b. information.
c. knowledge.
d. wisdom.

ANS: A
The number 190 could refer to anything such as a person's weight, blood glucose level, or systolic blood pressure reading and therefore has no meaning by itself.

DIF: Cognitive Level: Apply   REF: p. 26

7. Knowing when and how to use knowledge is referred to as:
a. procedural knowledge.
b. cognitive knowledge.
c. decision support system.
d. wisdom.

ANS: D
Wisdom is defined as the appropriate use of knowledge in managing or solving human problems. It is knowing when and how to use knowledge in managing patient need(s) or problem(s).

DIF: Cognitive Level: Remember   REF: pp. 26-27

8. Which concepts are used to describe the different types of learning outcomes and can be used to write learning objectives?
   a. Input, throughput, and output
   b. Adult learning theories, constructionist theories, and learning styles
   c. Cognitive, affective, and psychomotor
   d. Short, intermediate, and long-term memory

   ANS: C
   Learning is defined as an increase in knowledge, a change in attitude or values, or the development of new skills.

   DIF: Cognitive Level: Apply   REF: p. 30-31

9. Which group will test out new technology but are not usually seen as leaders within an organization?
   a. Innovators
   b. Early adopters
   c. Early majority
   d. Late majority

   ANS: A
   Innovators will test out a new technology; however, they are too far ahead of the social group to be seen as leaders by other members of the social system. Early adopters are seen as much more discreet in their selection of new technology and are therefore better at selling a new technology to a group of potential users.

   DIF: Cognitive Level: Understand   REF: p. 33

MULTIPLE RESPONSE

10. The systems life cycle (SLC) is a guide for informatics projects. Typical phases of the SLC include (select all that apply):
    a. implementation.
    b. planning.
    c. evaluation.
    d. security.
    e. diagnosis.

    ANS: A, B, C
    According to published reports, the SLC contains between 3 and 7 stages. The three that are common in each of these reports are implementation, planning, and evaluation.

    DIF: Cognitive Level: Remember   REF: p. 35