THE FLIPPED CLASSROOM AND SITUATIONAL AWARENESS: CLINICAL REASONING FOR BACHELOR'S DEGREE STUDENTS

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Learning Objectives:
1. Describe the framework of clinical thinking course:
   1.1 Flipped classrooms model
   1.2 Endsley's Situational Awareness Model (SA)
   1.3 Concept based learning

2. Describe the students’ learning process and the learning outcomes

3. Formulate strategies to engage and promote experiential learning in practice orientation for the Y-generation

Conflict of Interest: no conflict of interest
In the flipped classroom, students learn new material at home and have the opportunity to practice the new material in the classroom.

At home: The student has the responsibility to independently access and learn on-line material, recorded videos, and lectures.

In the classroom: The students participate in interactive activities to gain practice with the new material. Learning activities may involve small groups, question and answer sessions, and the creation of small projects.
This method enables students to:
1. share information and knowledge
2. be involved in higher-order learning designed to improve academic achievement
3. work in partnership and participate in team-based learning
4. prepare students to be responsible for their own self-directed learning
1.2. Endsley's Situational Awareness Model (SA)

A. Level I - the Perception of the Elements in the Environment - involves awareness of the status, attributes, and dynamics of relevant elements in the topic area, and gathering all the information that is currently available;

B. Level II - Comprehension of the Situation - is the synthesis of the amalgam of elements (Level I), and organizing this synthesis of knowledge so that the implication and context of the topic area and its relevance forms a clear, holistic mental picture to the clinical practitioner.

C. Level III - Projection of future status – further builds on the foundation of knowledge of the previous levels so the students can project the future actions of the elements in the environment.
1.3 concept based learning

Concepts
- provide the organizational framework and structure for the curriculum and are the foci within courses.
- allow learners to structure learning by providing a coherent method for material to be grouped together for future reference.

<table>
<thead>
<tr>
<th>Category</th>
<th>Concept</th>
<th>Definition</th>
<th>Exemplar/ Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biophysical</td>
<td>Fluid and electrolyte</td>
<td>The physiological mechanisms that maintain fluid and electrolyte balance</td>
<td>Fluid balance/imbalance Electrolyte balance/imbalance Acute and chronic renal failure</td>
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<tr>
<td>Acid base</td>
<td>The physiological mechanisms that maintain the production and elimination of hydrogen ions</td>
<td>Acid-base balance Respiratory and metabolic alkalosis Respiratory and metabolic acidosis</td>
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<tr>
<td>Elimination</td>
<td>The secretion and excretion of bodily wastes</td>
<td>Bladder: incontinence, retention Bowel: incontinence, constipation, impaction BPH Kidney stones Irritable bowel disease</td>
<td></td>
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<tr>
<td>Metabolism</td>
<td>All biochemical</td>
<td>Diabetes</td>
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The learning needs of current students of the “Y generation“:
1. are technically savvy (e.g., computers, smartphones, I-pads),
2. prefer immediate feedback,
3. enjoy being active and engaged.
FLIPPED CLASSROOMS  MODELS OF LEARNING

Methods:
1. Five classrooms of third year, fall semester, baccalaureate nursing students (n=140) enrolled in the Clinical Thinking course.
2. Preparation - rewriting lecture material for video-taped lectures; construction and arrangement of an interactive modules; creation of quizzes; and placement on an online platform.
Methods:

3. Student interface - No access to quizzes unless they already had opened the lecture material, and taken the lectures in sequence. Focus is on Level I and Level II perception.

4. Classroom activities - puzzles, question-and-answer sessions, games, and peer-learning activities (this latter element was administered as a reward to the highest achieving students). Classroom activities were relegated to Level III perception.
<table>
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<tr>
<th>Date</th>
<th>The lessons</th>
<th>Situational Awareness</th>
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| 22.10.2016-30.10.2016 | Concept: Fluid and electrolyte balance  
Lecture on the subject: fluids in the human body - anatomy, physiology  
A short quiz at the end of the lecture | Level I |
| 30.10.2016 | Class practice: Completion of sentences on fluids in the human body - anatomy and physiology  
Game - "Look for the liquid". A game that focuses on the three sections of the body and the transition of fluids in ailments: heart failure, encephalopathy, kidney failure, anaphylactic shock | Level I |
| 30.10.2016-6.11.2017 | Concept: the balance of fluids and electrolytes - Lecture for home viewing on: Conditions of cow in the balance of liquids and electrolytes  
A short quiz at the end of the lecture | Level II |
| 7.11.2016 | Class practice: Signs and symptoms of fluid and electrolyte imbalance - Puzzles. An accumulation of symptoms that must be organized together to arrive at a diagnosis of the type of disturbance in the fluid and electrolyte balance | Level II |
No 1 - Fluid and electrolyte balance
No 2 - The electrolyte pathway in the body
Situational Awareness - Level I

- feeder arteriole
- capillary bed
- drainage venule
- tissue cells
- precapillary sphincter
- metarteriole
- true capillaries
### Clinical Case + Questions

Patient, 65 old, arrived at the emergency room in the middle of the night with severe breathlessness and a feeling of suffocation. In the background is heavy smoking - 20 years of box, ischemic heart disease, type 2 diabetes, and hypercholesterolemia. The patient has been receiving regular home oxygen for two years. Receiving vital signs: pulse 110, 110/50, rotation 82% in room air, heat 36.5°C, PO2, number of breaths per minute - 42. In the examination of arterial gases, the following values were obtained: PH-7.1, PCO2-110, HCO3-3

### Pathophysiology

- **alveolus**: Oxygen desorbed in mucous layer diffuses through alveolar and capillary walls
- **capillary**: Carbon dioxide gas to be exhaled
- **HCO3 ions in plasma of blood converted back to CO2, which diffuses across barrier**
- **Birds to haemoglobin in red blood cells to form oxyhaemoglobin**

### Answers

1. The patient's problem - Exacerbation of COPD
2. The patient suffers from hypoxic hypoxia due to the absence of a large surface area that will allow the gas to pass through and the insertion of sufficient oxygen molecules into the blood vessels. This is due to the long-term effect of smoking that causes a decrease in the amount of alveoli.
3. The patient accumulates carbon dioxide because there is a decrease in pulmonary ventilation, as there is difficulty in inserting oxygen in. It is difficult to remove carbon dioxide out.
4. Respiratory suppression up to the condition of the floor
5. In the first stage, experience in drug therapy and oxygen. If the ventilation problem is not resolved then the patient should be connected to a non invasive invasive ventilator. The last alternative is the intubation,
Situational Awareness - Level III

Differential diagnosis between inflammation and infection
Results:
1. Grades attained by students on quizzes were similar to those from the traditional course in previous years.
2. Students' scores on Level II perception exercises were high.
3. Student satisfaction was high and the learning obtained was at a higher level.
4. Faculty satisfaction was high. Teaching was more focused and at a higher level.
Conclusions:
1. Combining the flipped classroom with the three levels of Endsley Situational Awareness Model instills student responsibility, autonomy, engagement, and matches the attributes of the “Y generation”.
2. Flipped classrooms using the three levels of Endsley Situational Awareness Model is a better methodology for current students compared to the traditional methodology of teaching.
FLIPPED CLASSROOMS MODELS OF LEARNING


• Houston, M. & Lin, L. (2012). Humanizing the classroom by flipping the homework versus lecture equation. In P. Resta (Ed.), Proceedings of Society for Information Technology & Teacher Education International Conference 2012 (pp. 1177-1182).
