**Objective:** In aiding a struggling learner, assessment of their learning style is needed. VARK™ by Fleming categorizes dominant styles as visual, aural/auditory, read/write, and kinesthetic. Multimodal or mixed/non-dominant style is also a type of learning style possibility under this model. The introduction of electronic tools and computers has provided opportunities to aid struggling learners. We introduce electronic flowcharting and mind-mapping with the addition of threshold concepts as one method.

**Method:** An internet, cloud-based charting and diagraming tool is utilized. Teachers and learners with .edu domain email addresses are offered a fully functioning license at no cost.

The normal menstrual cycle is utilized as an example. The three basic steps involve:
- Flowcharting the process or concept (e.g. the hypothalamic, pituitary, ovarian, uterine axis)
- Mind-mapping important base concepts (e.g. basic science knowledge)
- Mind-mapping in a separate colored box threshold concepts that aid in applying knowledge (e.g. using concept of LH surge in ovulation induction)

The learner saves the documents and modifies as more knowledge is gleaned or concepts change. The documents should be easily accessible at any time for the learner to review (e.g. on smartphone).

Conclusion: This process provides a tool to use with struggling learners. It addresses the visual, read/write, and kinesthetic learners. By using the tool to teach others, it can help aural/auditory learners. Since the process is not static, it can be used to evaluate the learners progress in knowledge acquisition longitudinally. Finally, the learner can use the tool in preparation for in-service training exams, written/oral board examinations, and in the general care of their patients.

**Introduction**

The VARK™ modalities of learning introduced by Fleming and Mills in 1992 is a useful model in helping a struggling learner. Introduction of electronic methodologies for the organization of information can also be helpful for learners with specific learning styles especially with the millennial and digital generations. We introduce electronic flowcharting and mind-mapping as a learning aid.

**Abstract**

**Exercise:**
- Flowchart the hypothalamic, pituitary, ovarian, uterine axis represented by boxes.
- Connect the boxes indicating how each component communicates to the other
- Mind-map a concept for the hypothalamus and anterior pituitary integrating the basic science and it’s clinical application
- Share your flowchart and mind-map and explain it to someone

Examples for use in a struggling learner:
- Difficulty in assessing a patient with secondary amenorrhea (no menses for 6 months)
- Difficulty in choosing contraception options for patients

**Learning Modality Addressed**

<table>
<thead>
<tr>
<th>Modality</th>
<th>How Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>Flowchart and mind-map serve as visuals</td>
</tr>
<tr>
<td>Aural/Auditory</td>
<td>Use finished product to teach someone</td>
</tr>
<tr>
<td>Read/Write</td>
<td>Typing information in flowchart and mind-map in their own words</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>Application of concepts to patient care</td>
</tr>
</tbody>
</table>

**Conclusions**

Electronic flowcharting and mind-mapping can be useful tools for a struggling learner. The technique addresses the four different types of learning modalities. Further studies are needed to validate this methodology.

**References**


**Contact**

Robert F Flora, MD, MBA, MPH
McLaren Health Care
One McLaren Parkway, Grand Blanc, MI 48439
robert.flora@mclaren.org
(810)342-3650

**References**


**Abstract and Poster**

**Lucidchart (limited free account)**

**Lucidchart for .edu emails (free full feature account)**

**Examples of Step Two and Three**
The Application of the WHO’s Definition of Health and Determinants of Health in Aiding Struggling Learners: Developing Healthy Learning

Robert F Flora, MD, MBA, MPH
McLaren Health Care, Michigan State University College of Human Medicine

Abstract

Objective: The WHO’s definition of health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Determinants of health of a population have five contributing factors: biological, socioeconomic, psychosocial, behavioral, and social factors. This framework is utilized to address and improve health of populations. This framework can be used in approaching the healthy learning of an individual or a group. Description of the framework and examples are presented.

Description: When aiding a struggling learner, an assessment of issues that fall within the five factors is performed. Often, multiple issues are identified that are independent of each other but may result because another identified issue. Physical or mental weakness is rarely the only factor. A multifactorial approach is required to help the learner especially in gaining insight to these factors.

Conclusion: The ACGME is a start to addressing these factors through its clinical learning environment reviews. A learner, who prior to residency training exhibited no learning issues but had underlying factors, may have reached a level of being unable to compensate due to the unique nature of residency training. Additionally, a learner with no underlying factors or issues may exhibit difficulties due to being thrust into an unhealthy learning environment. Though not all struggling residents will be successful in completion of their training, most can be successful if a structured, all-encompassing approach is used.

Introduction

The World Health Organization developed the definition of “health” and the “determinants of health” to address improving the health of populations. This framework has been adopted by the Center for Disease Control and is utilized in the Healthy People 2020 national objectives for the United States. In aiding a struggling learner, this framework, the determinants of healthy learning, can be used in an analogous manner to diagnose, help and develop a healthy learner.

WHO Definition of Health

"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

WHO Determinants of Health Factors

Biological
Socioeconomic
Psychosocial
Behavioral
Social

ACGME Clinical Learning Environment

Supervision
Professionalism
Healthcare Disparities
Duty Hours
Transitions of Care
Healthcare Quality

Approach

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Chronic fatigue</td>
<td>Health check-up</td>
</tr>
<tr>
<td></td>
<td>Poor test taking</td>
<td>Education on sleep debt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neuropsychologic testing</td>
</tr>
<tr>
<td>Socioeconomic</td>
<td>Debt</td>
<td>Financial counseling</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>Stress</td>
<td>Introduce coping skills</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>Medications</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Disruptive behavior</td>
<td>Psychology referral</td>
</tr>
<tr>
<td></td>
<td>Personality disorder</td>
<td>DISC personality assessment</td>
</tr>
<tr>
<td>Social</td>
<td>Lack of social support</td>
<td>Assess and address</td>
</tr>
<tr>
<td></td>
<td>Bullying environment</td>
<td>Organizational psychologist</td>
</tr>
</tbody>
</table>

Conclusions

A healthy learner in a healthy learning environment is needed to meet society’s demands of a well-trained physician. When a learner is struggling the “determinants of healthy learning” framework may assist in addressing the situation. Further study and evaluation is needed.

Contact

Robert F Flora, MD, MBA, MPH
McLaren Health Care
One McLaren Parkway, Grand Blanc, MI 48439
robert.flora@mclaren.org
(810)342-3650

References

**Abstract**

**Objective:** In aiding a struggling physician learner, one must understand that they are in a unique educational environment that includes but is not limited to: a large and increasing volume of knowledge; chronic fatigue due to workhours; service demands; family demands; stressors such as debt; and difficulty meeting internal and external expectations. Most students adjust to the demands of medical school but some experience difficulty when entering residency. Knowledge acquisition skills either deficient in entering residency or adequate but unable to adjust to the residency environment are one reason. A major sign is poor performance on in-training exams. Other symptoms may be poor behavior, withdrawal, risk-taking or other unhealthy activities. It is necessary to understand how physicians learn and think to help the struggling learner.

**Description:** In the field of epistemology or reasoning, Aristotle and Kant introduced the concept of a priori knowledge (based on facts) and a posteriori knowledge (based on experience of empirical evidence). In applying knowledge to situations, those without a posteriori experience default back to their a priori knowledge. When applying their knowledge, due to the large amount of knowledge needed, availability heuristics or mental shortcuts, as introduced by Tversky and Kahneman, are used to develop a response. In the learning environment, learners are in a “zone of proximal development” as introduced by Vygotsky. Scaffolding is an incorporate component of the learner environment. However, this type of learning may result in very “black and white” thinking which may lead to application of knowledge issues. Thinking becomes very “convergent” vs. “divergent”. The inability to address issues in a divergent manner may also be a reason for difficulty for the learner.

**Conclusion:** How physicians learn and think is their greatest strength but also their greatest weakness. An issue in their baseline knowledge, knowledge acquisition skills, knowledge retrieval and application skills, or the learning environment may contribute individually or in combination may lead to a struggling learner. Understanding of the physician learning process may aid in the diagnosis for one’s struggles.

**Introduction**

In aiding a struggling physician learner, one must understand that they are in a unique educational environment. It is necessary to understand how physicians learn and think to help the struggling learner.

**Types of Knowledge**

![Diagram of Types of Knowledge](image)

- **a priori knowledge**: based on Aristotle and Kant
- **a posteriori knowledge**: based on experience of empirical evidence

**Availability Heuristics**

![Diagram of Availability Heuristics](image)

Physicians use availability heuristics or mental shortcuts to assess and develop a response to a situation.

**Convergent and Divergent Thinking**

![Diagram of Convergent and Divergent Thinking](image)

- **Convergent thinking**: converges around solutions
- **Divergent thinking**: generates many solutions

**Zone of Proximal Development and Scaffolding**

![Diagram of Zone of Proximal Development and Scaffolding](image)

- **Zone of Proximal Development**: Resident physicians become competent by going through the zone of proximal development with appropriate scaffolding by teachers and experience in an adequate learning environment.

**Examples of Issues**

<table>
<thead>
<tr>
<th>Learning/Thinking Process</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficit in a priori knowledge</td>
<td>Poor performance on in-training exams early in training</td>
</tr>
<tr>
<td>Deficit in gaining a posteriori knowledge</td>
<td>&quot;Book smart&quot; but cannot learn from experience</td>
</tr>
<tr>
<td>Difficulty with using mental shortcuts</td>
<td>Unable to make quick decisions</td>
</tr>
<tr>
<td>Too convergent in thinking</td>
<td>Too black and white in thinking</td>
</tr>
<tr>
<td>Too divergent in thinking</td>
<td>&quot;Forest through the trees&quot; thinking</td>
</tr>
</tbody>
</table>

**Conclusion**

How physicians learn and think is their greatest strength but also their greatest weakness. An issue in their baseline knowledge, knowledge acquisition skills, knowledge retrieval and application skills, or the learning environment may contribute individually or in combination may lead to a struggling learner. Understanding of the physician learning process may aid in the diagnosis and action plans in helping a struggling medical student or resident physician.
PURPOSE OF THE RAC

Although we invest significant resources in the selection of residents, prediction of resident success in the program is far from perfect. Residents enter training with differing levels of knowledge and skills and progress toward competency at different rates. Not surprisingly, on occasion, a resident falls behind their peers in their trajectory toward competence. The RAC provides a confidential, supportive approach to residents struggling with academic and other performance issues.¹

DOMAINS OF MEDICAL PRACTICE²

Epistemic Aspect. Medical Knowledge incorporates the basic science of disease, diagnostic categories, and treatment. Residents’ lack of knowledge may result in poor In-Training performance and/or difficulties in clinical practice. The RAC proposed study plans incorporated some of the following: review of In-Training Exams, select AFP journal articles, and Challenger questions; attendance at review courses; and one-on-one tutoring.

Pragmatic Aspect. Patient Care incorporates skills in the diagnosis and treatment of disease. Residents’ lack of diagnostic skills may be due to the failure “to develop ‘illness scripts’ and schemas around prototypical clinical problems.” (p.31)³ Residents may possess adequate knowledge of treatment, yet struggle to tailor treatment to the unique biological and social/emotional needs of the patient. A RAC precepting plan for the outpatient setting required faculty to walk the resident through presenting symptoms, history, differential diagnosis, and treatment plan. Inquiry into experiences with similar presentations facilitates resident development of illness scripts and schemas. Preceptor questions and suggestions alert residents to treatment-related risks and prepare residents to negotiate plans consistent with patient needs and values.

Ethical Aspect. Professionalism incorporates awareness and commitment to professional responsibilities, knowledge of ethical principles and ethical decision making, and sensitivity and responsiveness to the needs of diverse populations. Deficiencies in communication and professional behavior account for a large percentage of resident performance problems; remediation of these deficits may be particularly challenging.⁴

To address concerns regarding teamwork, self-directed learning, and public complaining, the RAC proposed biweekly meetings with the resident advisor to:
1. Reflect on interactions with program & clinic personnel;
2. Review entries in an Independent Study Log;
3. Discuss appropriate responses to frustration and threats to well-being and performance.

PROCESS OF REFERRAL & EVALUATION

- Faculty, hospital attendings, and residents bring concerns to the PD.
- The PD meets with the resident and resident advisor informing them of the concerns.
- When concerns persist despite intervention, the PD writes a formal letter to the RAC describing the concerns and requesting the committee’s assistance.
- The RAC chair summarizes information in the resident file, then convenes and reviews the information with the RAC membership—composed of medical and behavioral science faculty and a chief resident.
- The RAC committee interviews the principals and drafts a faculty survey addressing resident performance in the six ACGME Competencies and the specific concerns prompting the referral.
- The committee summarizes the survey findings and submits a plan for remediation to the PD for approval/revision.
- The PD meets with the resident and advisor to review the findings and plan for remediation; the resident is asked to sign an agreement endorsing the plan.
- The RAC monitors resident compliance and progress and conducts a follow-up faculty survey.
- The RAC does not make recommendations for disciplinary action.

REFERENCES


DISCUSSION

The RAC—implemented over a decade ago—resulted in some hard-fought successes and a few disappointments. We maintained confidentiality, and most residents came to view the RAC intervention as beneficial. Some early plans were overly complicated placing considerable strain on the program and could not be fully implemented. Advisor advocacy contributed to resident perceptions of the RAC intervention as counseling and supportive rather than punitive. Tutoring on core family medicine topics helped build resident confidence. Faculty modeling—tangible evidence of program investment in resident success—helped build trust and strengthen motivation to succeed.

FUTURE DEVELOPMENT

Going forward, the RAC will look to strengthen performance measures, e.g., greater use of checklists, direct observation, and more clearly defined target objectives. Additionally, we will link objectives to specific Subcompetencies and Milestones. And we will more consistently solicit resident feedback on process and outcomes.

FACULTY

Carol Baker, MD, Chair, Resident Assistance Committee
Nicholas Boggs, DO, Associate Program Director
Michelle Diebold, MD, Associate Program Director
Karen Weaver, MD, Program Director
Chin Yi, MD, Associate Program Director
Lawrence R. Fischetti, PhD, Director of Behavioral Science
Utilization of Glynn’s Teaching-With-Analogies Model to Aid a Struggling Learner

Robert F Flora, MD, MBA, MPH
McLaren Health Care, Michigan State University College of Human Medicine

Abstract

Objective: In aiding a struggling learner, one of the reasons found may be due to the learner having difficulty in grasping concepts. One method used in early and secondary education is teaching with analogies and championed by Glynn (2004 and 2008). In higher level education such as engineering schools, analogies are a crucial tool in teaching abstract or complex concepts. A description of Glynn’s Teaching-With-Analogies is described. The application of this tool is described using the target concept of female pelvic floor anatomy and the analog concept of a house.

Description: Daughter and Mentzer (2008) describe the building of one’s cognitive structure through either the symbolic or associative reasoning systems. Use of analogies is utilized in the associative reasoning realm. Glynn’s model (see figure) utilized the concept of analogs and targets. The components include: (1) Introduce the target concept; (2) Remind learner of the analog concept; (3) Identify relevant features of both; (4) Connect (map) the similar features; (5) Indicate where the analogy breaks down; and (6) Draw conclusions about the concepts.

The application of this tool is described using the target concept of female pelvic floor anatomy and the analog concept of a house.

Conclusion: The utilization of the Glynn Teaching-With-Analogies model may provide added techniques to assist in helping a struggling learner.

Introduction

One possible issue with a struggling learner is difficulty in grasping complex concepts that are prevalent in medicine. Analogies are used in elementary and secondary education as an aid. They are also used in advanced education such as engineering. The Glynn Teaching-With-Analogies is presented to teach female pelvic anatomy with a house analogy.

Target Concept – Female Pelvic Anatomy

Analogies in Acquiring Knowledge

Analog Concept - House

Glynn Teaching-With-Analogies

Conclusions

A struggling learner may be experiencing difficulty in grasping abstract or complex. The use of analogy concepts in the learning of target concepts may be a useful tool. The most effective approach may be analogies generated by the learner with oversight and assistance from a teacher or mentor. Having the learner teach others the analogy may also help reinforce comprehension and retention. Studies are needed to assess the validity and reliability of this learning tool in medical education.

Contact

Robert F Flora, MD, MBA, MPH
McLaren Health Care
One McLaren Parkway, Grand Blanc, MI 48439
robert.flora@mclaren.org
(810)342-3650

References