Application of Design Thinking in Prospectively Identifying Difficult Learners in Graduate Medical Education
Innovation Opportunities

Forensic Learning and Teaching Science

• Application of educational science, educational psychology, and educational technology in a prospective manner to identify and prevent a struggling learner in graduate medical education

• Concepts applied
  – Determinants of a healthy learner and learning environment
  – Specialty specific knowledge-base assessment
  – Critical thinking assessment
  – Objective structured clinical exam
  – VARK learning style assessment (visual/aural/read-write/kinethetic)
  – Perfectionism assessment
  – Professionalism assessment
  – Entrustable professional activities expected of graduating medical student
  – Emotional intelligence self-assessment

• Administered to all incoming 1st year residents
All new entering residents will undergo a new process utilizing the “Determinant of a Healthy Learner” framework that is based on the “Social Determinants of Health.” Interns will be undergoing multiple assessments to help residents reach their potential and to be successful during residency.
Training a physician occurs in a continuum. Transition from each level can become problematic if successful completion of the prior step does not occur. A need for reassurance of achieving prior competency is needed by both the resident and the residency program. An early assessment prior to starting residency may ease that transition.

Source - ACGME  
Source - AAMC
Training a physician occurs in a continuum. Transition from each level can become problematic if successful completion of the prior step does not occur. A need of reassurance of prior competency is needed by both the resident and the residency program is needed. An early assessment prior to starting residency may ease that transition.
Needs decomposition

Competencies and EPAs Requiring Baseline Assessment Prior to Start of Residency Training.

ACGME Competencies
- Medical Knowledge
- Patient Care
- Interpersonal & Communication Skills
- Professionalism
- Practice-Based Learning and Improvement
- Systems-Based Practice

Core Entrustable Professional Activities

EPA 1: Gather a history and perform a physical examination
EPA 2: Prioritize a differential diagnosis following a clinical encounter
EPA 3: Recommend and interpret common diagnostic and screening tests
EPA 4: Enter and discuss orders and prescriptions
EPA 5: Document a clinical encounter in the patient record
EPA 6: Provide an oral presentation of a clinical encounter
EPA 7: Form clinical questions and retrieve evidence to advance patient care
EPA 8: Give or receive a patient handover to transition care responsibility
EPA 9: Collaborate as a member of an interprofessional team
EPA 10: Recognize a patient requiring urgent or emergent care and initiate evaluation and management
EPA 11: Obtain informed consent for tests and/or procedures
EPA 12: Perform general procedures of a physician
EPA 13: Identify system failures and contribute to a culture of safety and improvement
Solutions

List the sub-needs and their potential solutions.

<table>
<thead>
<tr>
<th>Medical Knowledge</th>
<th>Patient Care</th>
<th>Interpersonal and Communication Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NBME Self Assessment Exam</td>
<td>• Critical Thinking Assessment</td>
<td>• OSCE</td>
</tr>
<tr>
<td>• OSCE</td>
<td>• OSCE</td>
<td>• ITE</td>
</tr>
<tr>
<td>• 1st In-training Exam (ITE)</td>
<td>• Entrustable Professional Activity Assessment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professionalism</th>
<th>Practice-Based Learning and Improvement</th>
<th>System-Based Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>• OSCE</td>
<td>• OSCE</td>
<td>• OSCE</td>
</tr>
<tr>
<td>• Perfectionism scale</td>
<td>• Online literature search assessment</td>
<td>• ITE</td>
</tr>
<tr>
<td>• 1st In-training Exam</td>
<td>• Learning Style Assessment</td>
<td></td>
</tr>
<tr>
<td>• Emotional Intelligence</td>
<td>• ITE</td>
<td></td>
</tr>
</tbody>
</table>

* OSCE- Objective Structured Clinical Evaluation  ** ITE – In-training Exam
Solution concepts

Determinants of a Health Learner Assessment

[Flowchart showing the assessment process with decision points and outcomes]
The Opportunity

Was Your Doctor a Healthy Learner?

- Fifteen percent of physicians in residency encounter learning difficulties.
- Assessments at the beginning of training can help to identify and prevent issues earlier.
- In the long-term, successful practice-based learning and improvement skills will help them be successful in providing care to their patients.

"Students have to Maslow before they can Bloom."

Source: https://bit.ly/3elF0B5
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 populations” 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

The first six focus areas.
Setting a standard for a “healthy” clinical learning environment.

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 he 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


QR CODE TO DOWNLOAD ABSTRACT
Can It Win?

Was Your Doctor a Healthy Learner?

- Application of the *Determinants of a Health Learner* can help identify, mitigate or prevent residents experiencing learning difficulties
- All current programs address difficult learners in a reactive versus a more proactive approach
- The proposed assessment is a more holistic approach and proactive
- Downstream benefits
  - Develops competency in practice-based learning and improvement for all learners
  - Decrease chance of burnout, anxiety, depression, etc. in learners
  - Decrease burden on faculty, program, and other residents
  - Decrease attrition rate
  - Improved program moral
  - Increase competitiveness for best medical students
Can It Win?

Determinants of a Health Learner Assessment

- Medical School
- NBME Assessment
- IM ITE
- EPA assessment at 6 months
- Assessments
  - Critical thinking
  - VARK
  - OSCE
  - Perfectionism
  - Disc Profile
- Advise on best learning style and tools
- Progressing well
- Academic remediation
- Progressing?
- Probation
- Successful
- Non-renewal of contract
- Completion of Internship
Is It Worth It?

Was Your Doctor a Healthy Learner?

• An NPV calculation was performed using the following assumptions.

  Assumptions
  • 1000 new interns
  • 3-year training program
  • 15% difficult learners = 150
  • Identified PGY1 15% (22), PGY 2 75% (113), PGY 3 10% (15)
  • $4780 cost per learner experiencing difficulty
  • Discount Rate 7%

  Cost of Assessment Counseling $200 (all incoming residents = $200000)

  Sensitivity Analysis – % Decrease in # difficult learners
  • 25% - 113 difficult learners
  • 50% - 75 difficult learners
  • 75% - 38 difficult learners

  • NPV
    – No intervention (628,734)
    – 75% avoidance (327,919)
    – 50% avoidance (514,367)
    – 25% avoidance (671,551)
Recommendation

Was Your Doctor a Healthy Learner?

- Recommendation is implementation of assessment program
- The unbudgeted cost of addressing difficult learners in 15% of 1000 residents is $628k (baseline)
- Preventing 50% or 75% decreases the –NPV thus saving expenses
- Even if only 25% are prevented, with adding additional cost of $42k, the downstream effects are immeasurable but outweighs the additional cost
# NPV Analysis

<table>
<thead>
<tr>
<th>Learners</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty</td>
<td>15% 75% decrease</td>
</tr>
<tr>
<td>Difficulty Learners</td>
<td>150</td>
</tr>
<tr>
<td>Cost per learner</td>
<td>$200.00</td>
</tr>
<tr>
<td>Remediation cost</td>
<td>$4,780.00</td>
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</tbody>
</table>

Initial Costs | $200,000.00 |

## Base Spend

<table>
<thead>
<tr>
<th>% Difficulty</th>
<th>#</th>
<th>Yearly Cost</th>
<th>Total 3 Year Cost</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY 1</td>
<td>15%</td>
<td>23</td>
<td>$107,550</td>
<td></td>
</tr>
<tr>
<td>PGY 2</td>
<td>75%</td>
<td>113</td>
<td>$537,750</td>
<td></td>
</tr>
<tr>
<td>Pgy 3</td>
<td>10%</td>
<td>15</td>
<td>$71,700</td>
<td>$717,000.00</td>
</tr>
</tbody>
</table>

## 75% Avoidance

<table>
<thead>
<tr>
<th>% Difficulty</th>
<th>#</th>
<th>Yearly Cost</th>
<th>Upfront Cost</th>
<th>Yearly Cost</th>
<th>Total 3 Year Cost</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY 1</td>
<td>15%</td>
<td>6</td>
<td>$26,888</td>
<td>$17,925</td>
<td>$179,250.00</td>
<td>$(327,919)</td>
</tr>
<tr>
<td>PGY 2</td>
<td>75%</td>
<td>28</td>
<td>$134,438</td>
<td>$17,925</td>
<td>$179,250.00</td>
<td>$(327,919)</td>
</tr>
<tr>
<td>Pgy 3</td>
<td>10%</td>
<td>4</td>
<td>$17,925</td>
<td>$17,925</td>
<td>$179,250.00</td>
<td>$(327,919)</td>
</tr>
</tbody>
</table>

## 50% Avoidance

<table>
<thead>
<tr>
<th>% Difficulty</th>
<th>#</th>
<th>Yearly Cost</th>
<th>Upfront Cost</th>
<th>Yearly Cost</th>
<th>Total 3 Year Cost</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY 1</td>
<td>15%</td>
<td>11</td>
<td>$53,775</td>
<td>$35,850</td>
<td>$358,500.00</td>
<td>$(514,367)</td>
</tr>
<tr>
<td>PGY 2</td>
<td>75%</td>
<td>56</td>
<td>$268,875</td>
<td>$35,850</td>
<td>$358,500.00</td>
<td>$(514,367)</td>
</tr>
<tr>
<td>Pgy 3</td>
<td>10%</td>
<td>8</td>
<td>$35,850</td>
<td>$35,850</td>
<td>$358,500.00</td>
<td>$(514,367)</td>
</tr>
</tbody>
</table>

## 25% Avoidance

<table>
<thead>
<tr>
<th>% Difficulty</th>
<th>#</th>
<th>Yearly Cost</th>
<th>Upfront Cost</th>
<th>Yearly Cost</th>
<th>Total 3 Year Cost</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY 1</td>
<td>15%</td>
<td>17</td>
<td>$80,663</td>
<td>$53,775</td>
<td>$537,750.00</td>
<td>$(671,551)</td>
</tr>
<tr>
<td>PGY 2</td>
<td>75%</td>
<td>84</td>
<td>$403,313</td>
<td>$53,775</td>
<td>$537,750.00</td>
<td>$(671,551)</td>
</tr>
<tr>
<td>Pgy 3</td>
<td>10%</td>
<td>11</td>
<td>$53,775</td>
<td>$53,775</td>
<td>$537,750.00</td>
<td>$(671,551)</td>
</tr>
</tbody>
</table>

**Total Savings:**

- 38 $300,815
- 75 $114,367
- 113 $42,817
# Evaluate your solution concept

<table>
<thead>
<tr>
<th>RWW</th>
<th>Relevant questions</th>
<th>Answers and evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the opportunity real?</td>
<td>How big is the customer segment?</td>
<td>There are currently 140,000 resident physicians in training. Fifteen percent or 21,000 residents will experience some difficulty in their learning process.</td>
</tr>
<tr>
<td></td>
<td>Is there a real unmet need?</td>
<td>There is an annual attrition rate of trainees ranging from 0.6 to 6%. Most hospitals, particularly community-based do not have the infrastructure for remediation.</td>
</tr>
<tr>
<td>Can we win?</td>
<td>Do we have a solution better than the alternatives in the eyes of the customer?</td>
<td>The difficult learner is usually identified well into their training. Prospectively identifying them early will allow resources to be used to prevent or re-mediate earlier.</td>
</tr>
<tr>
<td></td>
<td>Do we have a real competitive advantage?</td>
<td>There is only one accredited health psychology fellowship in the U.S. that focuses on medical education.</td>
</tr>
<tr>
<td>Is it worth it?</td>
<td>Is it financially viable?</td>
<td>CMS spends $150-$200k per resident per year for training. The cost of remediation per case is on average an extra 39 hours of faculty time. Another study estimates $4780 additional costs to the training program per case.</td>
</tr>
</tbody>
</table>
Brainstorm and research 3 ways to improve (add value to) the experience for each innovation opportunity.

**Opportunity 1: Assessments**
- Improvement A: Utilize different validated assessment tools
- Improvement B: Compare assessment tools
- Improvement C: Develop and validate internal assessment tool compared to gold standard

**Opportunity 2: Meet with Health Psychologist**
- Improvement A: Develop standardized approach to counselling
- Improvement B: Research on association of assessments with outcomes
- Improvement C: Provide tools to decrease anxiety, stress, and burnout

**Opportunity 3: Individualized Learning Plan**
- Improvement A: Use as a longitudinal tool to develop pathway to practice
- Improvement B: Helps identify strengths and weaknesses during residency
- Improvement C: Can help with career counselling
All new entering residents will undergo a new process utilizing the “Determinant of a Healthy Learner” framework that is based on the “Social Determinants of Health.” Interns will be undergoing multiple assessments to help residents reach their potential and to be successful during residency.