Taking Aim at Good Teaching: Developing Psychomotor Skills through Mastery Learning

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Psychomotor Skills: Motivation to Revise Curriculum

- Clinical partners report skill weaknesses
- Declining clinical skill opportunities
- All skills previously front-loaded
- No assurance skills retained
- Students desired additional skill practice
- Lack of standardized teaching
- Conceptual reasoning within skills not adequately understood
- Failure to master essential skills because abundance of skills in curriculum
Previously Used Instructional Methods

- Student pre-sim learning before labs (Videos & Didactic)
- Faculty taught skills in labs (See one-Do one)
- Student skill check-off at end of semester (only in junior year)
Typical Outcomes from Previous Psychomotor Curriculum
Intentional Development and Implementation of Psychomotor Mastery Learning Curriculum
ML Curriculum Process

Objective:
To develop and implement a Mastery Learning/Deliberate Practice curriculum for training and evaluating essential psychomotor skills in undergraduate program:

Critical Measures to Meet Objective:

- Secure feedback from clinical partners
- Identify essential skills not secured by all students through clinical experiences
- Align ML curriculum/placement of skills to meet overall program and clinical course objectives
Curriculum Developed By

- Engaging clinical partners in intentional discussions with UG administrators
- Securing feedback from Undergraduate Curriculum Committee & clinical faculty
- Mapping psychomotor skills to match concepts taught within UG courses/program.
- Engaging Clinical Experts w/in Each Clinical Course to
  - Develop ML tools using evidenced-based science and Delphi method
  - Set Minimum Passing Scores (MPS) using Angoff calculations
# Essential Skills Identified & Scaffolded

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>2nd Semester</th>
<th>3rd Semester</th>
<th>4th Semester</th>
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<tbody>
<tr>
<td><strong>N313S Clinical Immersion I</strong></td>
<td><strong>N362S Clinical Immersion II</strong></td>
<td><strong>N462S Clinical Immersion IV</strong></td>
<td><strong>N495S Clinical Immersion VI</strong></td>
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<tr>
<td>Handwashing</td>
<td>IM Injection</td>
<td>Peripheral IV Access</td>
<td>All Mastery Learning Skills</td>
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<td>PPE Donning &amp; Doffing</td>
<td>SubQ Injection</td>
<td>IV Push</td>
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<td>Patient Transfer</td>
<td>Indwelling Urinary Catheter Insertion</td>
<td>Central Line Dressing Change</td>
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<td>Tracheostomy Suctioning</td>
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Beliefs Upheld Regarding Deliberate Practice/Mastery Learning Curriculum

- All students are intelligent, capable, does their best, and wants to improve © (CMS, 2004-20)
- All faculty are committed to student engagement and success.
Process to Prepare for Mastery Curriculum

1. Curricular mapping between clinical and non-clinical courses.
2. Measurement tools developed, piloted, and revised as necessary.
3. Interrater training and calibrations performed.
4. Schedules changed to accommodate baseline measurements that are essential to guide deliberate practice and inform curricular needs.
5. Mastery assessments planned each semester to promote practice readiness.
Mastery Learning Approach at UTKCON

- Student pre-sim learning (Videos & Didactic)
- Baseline Pre-Test in scheduled labs
- Deliberate Practice based on pre-test
- Standard Not Met
- Mastery Learning Post-test During Open Labs or Finals Week Determined by student readiness
- Pass Mastery Met
Operationalizing ML Curriculum Within Clinical Courses

Semester 1

N313S / Clinical Immersion I
- Initial Instructional Skills Labs
  - 3 separate labs with 3 ML skills embedded in addition to non-ML Skills
  - Baseline evaluations performed

Deliberate Practice Lab #1
  - Peer-to-peer practice with faculty facilitators

Scenario Day Labs
  - 2 separate sessions with ML Skills
  - 3 scenarios each session

Deliberate Practice Lab #2
  - Peer-to-peer practice with faculty facilitators
  - Optional ML Checkoffs

Final Mastery Evaluations
  - 3 - 1st semester ML Skills Also Operationalized in Clinical Experiences

Semester 2

N362S / Clinical Immersion II
- Initial Instructional Skills Labs
  - 3 separate labs with 4 ML skills embedded in addition to non-ML Skills
  - Baseline evaluations performed

Deliberate Practice Lab #1
  - Peer-to-peer practice with faculty facilitators

Scenario Day Lab
  - 3 scenarios with ML skills

Deliberate Practice Lab #2
  - Peer-to-peer practice with faculty facilitators
  - Optional ML Checkoffs

Final Mastery Evaluations

Semester 3

N462S / Clinical Immersion IV
- Initial Instructional Skills Labs
  - 3 separate labs with 4 ML skills embedded in addition to non-ML Skills
  - Baseline evaluations performed

Deliberate Practice Lab #1
  - Peer-to-peer practice with faculty facilitators

Scenario Day Lab
  - 3 scenarios with ML skills

Deliberate Practice Lab #2
  - Peer-to-peer practice with faculty facilitators
  - Optional ML Checkoffs

Final Mastery Evaluations
  - 3 - 1st semester ML Skills Also Operationalized in Clinical Experiences

Semester 4

N495S / Clinical Immersion VI

- Deliberate Practice Lab #1
  - Optional peer-to-peer

- 2 Scenario Day Labs
  - 2 separate sessions

- Deliberate Practice Lab #2
  - Required peer-to-peer practice with faculty facilitators
  - Optional ML Checkoffs

- Final Mastery Evaluations

Operationalizing ML Curriculum Within Clinical Courses
Deliberate Practice

Features:
- Motivated and engaged learners; by delivering
- Evidenced-based content using standardized instruction at an
- Appropriate level of difficulty; followed by
- Focused, deliberate practice; employed and guided by
- Rigorous, precise tools; yielding
- Informative feedback; to promote
- Concept knowledge; followed by
- More DP; resulting in
- Psychomotor skill mastery and readiness to practice safely.
Mastery Measurement Tools:

- Evidenced-based
- Experts engaged in Delphi process
- Pilot tested
- Shared with students following baseline evaluations
- Guide Deliberate Practice
- Operationalized during final evaluation of mastery

N4625 Mastery Learning
Peripheral Venous Access

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Clinical Instructor:</th>
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<tbody>
<tr>
<td>Evaluat:</td>
<td>Date:</td>
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<tr>
<td>Mastery Learning Evaluation (circle one):</td>
<td>Final Check-Off</td>
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<tr>
<td>Pre-Test</td>
<td>Re-test #:</td>
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1. Perform hand hygiene with sanitizer at bedside.
2. Identify patient with 2 indicators (name and date of birth) (checking EMAR/ename hand), verifies order, AND checks allergies.
3. Gather supplies (angiocath, IV start kit, extension tubing, saline flush, and towel).
4. Prepare supplies: cleanse extension tubing hub port with alcohol pad and flush with NSS using sterile technique (keep cap on extension set that connects to catheter hub); spans IV kit; opens angiocath.
5. Place clean towel under patient IV site.
6. Palpate and select vein.
7. Apply a tourniquet correctly (3-4 inches above the venipuncture site with ends of tourniquet away from entry site).
8. Don clean gloves.
9. Clean IV insertion site with chlorhexidine using a back and forth motion for 15-30 seconds & allow to dry (do not wipe or blister).
10. Hold the skin taut against the vein using non-dominant hand without touching the prepared site.
11. Hold catheter by the hub in dominant hand, bevel side up, at a 10-15 degree angle.
12. Insert catheter using sterile technique directly over the vein or from the side of the vein.
13. Assess for blood return and advance catheter.
15. Release tourniquet.
16. Attach extension tubing to catheter, maintaining extension tip sterility.
17. Stabilize catheter and flush gently with 3-5ml saline, observing the site for infiltration and leaking and then clamp extension tubing.
18. Place sterile, transparent dressing over venipuncture site. Loop the tubing near the entry site and anchor with tape. Anchor with additional tape if needed.
19. Remove gloves and perform hand hygiene.
20. Label the IV dressing with date and time without writing on the patient. Discard needles, flushes and trash into appropriate containers.
21. Verbalize documentation of the IV insertion procedure (site, catheter size, # of IV attempts, amount of saline flushed, & patient response).

Minimum Passing Score: 19/21

Student Score: 21

PASS: YES  NO

*STUDENT MUST SUCCESSFULLY COMPLETE ALL BOLDFACED ITEMS TO OBTAIN SKILL MASTERY*

Participant Instructions: Evaluator states: “The patient needs an IV for administration of an IV medication, please obtain venous access for this patient.”

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ML Curriculum Delivered Either in Virtual or Face-to-Face Labs
Example Mastery Learning Outcomes
Expert Panel Discussion And Questions
References


