PWR Act
Transitional Math

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Today’s plan

1. Overview of PWR Act and transitional math
2. A closer look at transitional math with a focus on a teacher’s perspective
3. Q&A
Postsecondary Workforce Readiness Act (PWR Act)

Public Act 99-0674 (HB 5729); signed by Governor on 7/29/16

1. Postsecondary and Career Expectations (PaCE)
2. Pilot of Competency-based High School Graduation Requirements
3. College and Career Pathway Endorsements on High School Diplomas
4. Transitional Math Courses
   - 4th year high school math courses designed to smooth transition to college and reduce remediation rates
   - Not dual credit or AP courses
   - Not for college credit
Transitional Math Courses Overview

Comprised of 3 pathways related to career pathways (meta majors): STEM, QL/Statistics, and Technical Math

- High school courses designed to provide guaranteed placement at IL community colleges (without a placement test)
- Developed and administered through high school and college partnerships
- Portability beyond local colleges when they meet statewide criteria
- Provides schools flexibility with implementation
- Statewide scaling over next 4-5 years
- Work in conjunction with co-requisite redesigns
- Align with the Common Core/Illinois Learning Standards
Rethinking Math: 12th Grade to 1st Year College

Transitional Math Pathways

Community College
- College Algebra
- Credit-Bearing General Education Math:
  - General Education Statistics
  - General Education Mathematics
  - Quantitative Literacy
  - Elementary Math Modeling
- Credit-Bearing Technical Math:
  - In the same CTE Career Pathway

Guaranteed Placement

High School
- Transitional STEM Math
- Transitional Quantitative Literacy/Statistics
- Transitional Technical Math:
  - within a Career Pathway

Students who change to a path requiring more algebra may take a placement test or use alternative options, such as bridge courses or co-requisite courses, to accelerate that change.
Transitional Math Courses & Policy Development

Includes administration, faculty, policy experts, and agency personnel at the K-12, community college, and university levels

Works on policies for entrance, exit, and portability

Faculty who are create competencies to define required content and approach of the courses

STEM
QL/Statistics
Technical Math
Transitional Math Logistics

- Students must have met graduation requirement to take transitional math
- Placement lasts 18 months after receiving it
- Students do not have to take a placement test at the end of the course
  - Schools can use placement tests as a component of assessment of courses
- Courses will be transcripted at high school and college level (details still to be determined)
- Approval of courses will be done at the state level
  - Verify competencies and policies are met
  - Similar to IAI but not identical
Why?
Issues of remediation and college readiness are shared concerns. There is no single group responsible for the current state.
Satisfying graduation requirements ≠ College readiness as measured by 1 test
9\textsuperscript{th} – 11\textsuperscript{th} grade

Placement test underplaces many students
End up in dev ed focused on college algebra prep
Only 10 – 11% make it through a credit bearing course eventually
Remediation Rates in Community College

<table>
<thead>
<tr>
<th>% Post-Secondary Remediation</th>
<th>Overall</th>
<th>Reading</th>
<th>Mathematics</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>49</td>
<td>17</td>
<td>41</td>
<td>22</td>
</tr>
</tbody>
</table>

Class of 2014

<table>
<thead>
<tr>
<th>Description</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduates (N)</td>
<td>132,661</td>
</tr>
<tr>
<td>Attending Illinois Community Colleges (N)</td>
<td>42,256</td>
</tr>
<tr>
<td>Attending Illinois Community Colleges (%)</td>
<td>31.9%</td>
</tr>
<tr>
<td>Enrolled in Remedial Courses (N)</td>
<td>20,894</td>
</tr>
<tr>
<td>Enrolled in Remedial Courses (%)</td>
<td>49.4%</td>
</tr>
</tbody>
</table>

Source: Illinois Report Card
# Assessment and Placement Research

By: Clive Belfield & Peter M. Crosta — February 2012  
New York: Community College Research Center, Teachers College, Columbia University

<table>
<thead>
<tr>
<th>Student Ability</th>
<th>Placement According to Exam</th>
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<tbody>
<tr>
<td></td>
<td>Developmental</td>
</tr>
<tr>
<td>Developmental</td>
<td>✔️</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>College Level</td>
<td>Under-placed</td>
</tr>
<tr>
<td></td>
<td>(English – 29%)</td>
</tr>
<tr>
<td></td>
<td>(Math – 18%)</td>
</tr>
</tbody>
</table>

Placement Tests: Accuplacer and Compass
Readiness from a college math perspective: a working knowledge

Students can:

- Read and think critically
- Use mathematical skills
- Use technology
- Solve problems with words

NOTE: Traditional developmental math doesn’t always address this either
Some transitional math courses exist in IL as a natural evolution of college dev math reform
Done with local partnerships and grants

**Issues:** Not at scale, inconsistent approach, no portability
Use multiple measures to determine college readiness
Address issues before college (in senior year) when it is less punitive and expensive
Provide a different experience than traditional developmental math – contextualized problems that combine many concepts
Who?
Junior year: determine college readiness

11th Grade Projected Readiness Determination
- Use statewide criteria
- Based on each student’s postsecondary math pathway

Not Projected Ready
- Transitional math co-developed by school district and community college

- Successful Completion of Transitional Math
  - Placed in college-level math course in applicable math pathway

- Unsuccessful Completion or No Math Senior Year
  - Subject to general placement processes

Projected Ready
- Student decides whether to take math in 12th grade

- Successful Completion of Rigorous Math in 12th Grade
  - Placed in college-level math course in applicable math pathway

Metrics: GPA, course grades, standardized test scores
Why would a student want to take a transitional math course?

• Avoid a placement test

• Save time and money when going to college

• Address the math weaknesses they have in interesting problems

• Students get to “do math”
  – See how math comes together and applies to their lives, work, and courses
Who can teach a transitional math course?

- A teacher must be certified to teach high school math.

- As transitional math courses are not for college credit, a teacher need not meet HLC accreditation requirements applicable to community college faculty.

- If transitional math instruction is integrated with other academic content or taught through a CBE model, a teacher certified to teach high school math must have primary responsibility for determining if the transitional math competencies have been met.
  - A teacher in another academic area and a math teacher may have shared responsibility for instruction.
What?
PWR Act Transitional Math: A new experience

• Designed for seniors to give them a different experience their last year (from first 3 years or traditional dev math)

• Integrate contextualized learning, problem solving, and college and career readiness

• Focus on complex problems, not just complex procedures
Competencies vs. Standards

- Competencies are broad learning goals for a mathematical area called a domain.
- Competencies illustrate how a student can integrate and apply skills in context for a domain.
- Key performance indicators (KPI’s) are more like standards.
  - Emphasize higher elements of Bloom’s taxonomy.

Competencies define a core foundation with the ability to supplement for additional specific fields.
Continuing the work of the Common Core

- Competencies align with CC/ILS
- Combine many skills in ways they were taught in CC but into bigger problems
  - Emphasize problems, not just exercises
- Use contexts relevant to a 17-year-old
- Emphasize content and process
Process Competencies: building college readiness

TM courses satisfy the **Common Core Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Process Competencies: building college readiness

TM courses satisfy the non-cognitive skills outlined in the **Illinois Essential Employability Skills Framework**.

<table>
<thead>
<tr>
<th><strong>Personal Ethic</strong></th>
<th><strong>Work Ethic</strong></th>
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<tbody>
<tr>
<td>Integrity</td>
<td>Dependability</td>
</tr>
<tr>
<td>Respect</td>
<td>Professionalism</td>
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<tr>
<td>Perseverance</td>
<td></td>
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<tr>
<td>Positive attitude</td>
<td></td>
</tr>
<tr>
<td><strong>Teamwork</strong></td>
<td><strong>Communication</strong></td>
</tr>
<tr>
<td>Critical thinking</td>
<td>Active listening</td>
</tr>
<tr>
<td>Effective and</td>
<td>Clear communication</td>
</tr>
<tr>
<td>cooperative work</td>
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</tbody>
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Quantitative Literacy and Statistics

Aligns to PMGE courses like math literacy; default pathway

**Outcome course goal:**
Use numeracy and basic algebra skills in general education math courses

**TM course emphasis:**
Reading word-based problems and determining the needed algebraic and numeric concepts

![Graph showing the concentration of acetaminophen over time for Adult TYLENOL Liquid and Extra Strength TYLENOL Caplets.](image)
Quantitative Literacy and Statistics

Domains:

• **Numeracy**: Operation sense; estimation; measurement; quantitative reasoning

• **Algebra**: Operations on expressions and functions (must include at least one factoring technique in context); construction and solving of equations

• **Functions and Modeling**: Characteristics of functions including graphical analysis; modeling with geometry; modeling with linear and nonlinear functions (must include at least three types of nonlinear functions from the following list: polynomial, rational, radical, exponential, logarithmic)

Additionally, the course must also expose students to at least one of the following topics:

1. Applications of systems of equations and/or inequalities
2. Applications of probability and statistics
3. Applications of proportional reasoning
Technical Math

Supports a smooth transition to a particular technical field and its math requirement

**Outcome course goal:**
Use numeracy in a technical math course

**TM course emphasis:**
Using numeric skills easily in a variety of applied situations

A doctor orders dicloxacillin sodium 125 mg p.o. q.6.h. for a child who weighs 55 lb. The recommended dosage of dicloxacillin sodium for children weighing less than 40 kg is 12.5 to 25 mg/kg/day p.o. in equally divided doses q.6.h for moderate to severe infections. Is the dosage safe?

**Abbreviation definitions**
- p.o. – medication is taken orally
- q.6.h. – frequency of medication taken (every 6 hours in this case)
Technical Math

Domains:

• **Number Systems**: Operation sense; unit conversions, exponents and radicals

• **Geometry**: Area, perimeter, and volume; angle properties and applications; scale figures; Pythagorean theorem

• **Basic Algebra**: Constructions and solving of linear equations and inequalities; use of formulas
STEM

Develops and/or improves Algebra 2 skills while working in function contexts
Can be used as an Algebra 2 course or after one
Emphasis on problem solving, often in context, but also in non-contextualized situations

Outcome course goal:
Use algebra 2 skills and concepts successfully in a College Algebra class

TM course emphasis:
Transition from procedural algebra to graphical representations
Stacks of Cups Problem

You are the package design director for a paper products company that has decided to introduce different-sized paper cups in the general shape shown below as a new product line. Your design team has been given the assignment of designing a cardboard carton that could be used to package the cups for sale. Your supervisor has given you the following requirements.

- All faces of the carton are to be rectangular.
- The square base should be just large enough to accommodate a single stack of cups.
- The height of your carton should be given as a function of the maximum number of cups it will hold, since the marketing director has not yet determined the number of cups that would be best to include for optimum sales.
- All measurements should be given in metric units, preferably centimeters, since the company is an international one.
- The expense of constructing the container should not be a factor in your proposal.

Since this is a new product for the team, you decide to study actual stacks of cups to help you discover which features of the cup affect the height of the stack. To do this, the team uses two types of plastic cups that were found around your office. Complete your study, then summarize your findings in a report that you will submit to your supervisor.

Source: The Pacesetter Curriculum, College Board

NOTE: This is the problem statement. In the Pacesetter Curriculum activity, many additional questions and problems related to the stacks of cups are included.
Domain: Algebra

(numeracy and functions & modeling are emphasized in contexts used)

In addition to basic function concepts and solving 2x2 systems of equations without matrix methods, students should be able to simplify expressions, solve equations, and graph functions in the following required function families:

- Linear
- Polynomial
- Rational
- Radical
- Exponential
How?
Statewide Policies

• Define who can teach and take courses
• Outline needs of advising and professional development
• Establish course requirements to ensure rigor and standards
  – High schools and colleges determine policies and grading in line with the statewide policies
  – Create a MOU to explicitly state them
  – Course syllabus, topic outline, and pacing determined
Rigor and standards: input needed

The high school and college must agree to a grading structure that will include formative and summative assessments such that receiving a C or better indicates the competencies for the course were met and the student is considered ready for college-level math coursework in the appropriate pathway. Grading standards that support college readiness should be mutually established between the high school and college.

Option 1:

Grading limits on formative and summative assessments (e.g., 25% of the grade is from homework) should be established and agreed upon by both the high school and college so that the final grade is not determined entirely by participation nor by a single assessment. Problem and/or project-based learning tasks must be included in the grading scheme.

Option 2:

- At least 25% of the overall grade must come from problem or project-based learning tasks
- A single assessment may not be more than 50% of the final grade in the course
- No more than 25% of the course grade can come from formative assignments such as homework.
Implementation

- ICCB supporting statewide implementation of transitional math through grants and staffing
- Draft policies and competencies in the three math pathways available for public comment now through Dec 31, 2017
- Pilot activities occurring in 20+ community college districts
- Outreach occurring with 4-year universities to obtain acceptance of transitional math courses
- Sample materials, MOU’s, and PD will be created
- An approval and tracking/assessment process will be developed
Will they all pass?

No.

Pass rates in pilots are often in the 70 – 85% range

Often higher than colleges for many logistical reasons

Students who don’t earn a C or better will be subject to placement at colleges

Bridge courses

Co-requisite courses
When?
Policies and Competencies Timeline

July 2016
- PWR Act signed into law

August 2017
- Subcommittees review competencies

Oct 23 – Dec 31, 2017
- Public commenting on policies and comps; informational presentations

Feb – Mar 2018
- Competencies voted on by state agencies

March 2017
- Subcommittees and statewide panel begin work

October 2017
- Statewide panel reviews policies, comps
- Projected Readiness workgroup begins work

Jan 2018
- Statewide panel reviews comments and PR benchmark

Jan – May 2018
- Sample MOUs, course outlines, materials created; implementation plan created

By June 2018, polices and competencies must be approved.
By Jun 2019, ICCB and ISBE establish a statewide implementation plan.
For more information

Contact Kathleen Almy
kalmy@niu.edu

Public commenting  http://www2.iccb.org/iltransitionalmath/
•  Documents
•  Survey to leave feedback
•  FAQ
•  Webinar recordings

PWR Act
pwract.org