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Educational and Technological Advantages of WME

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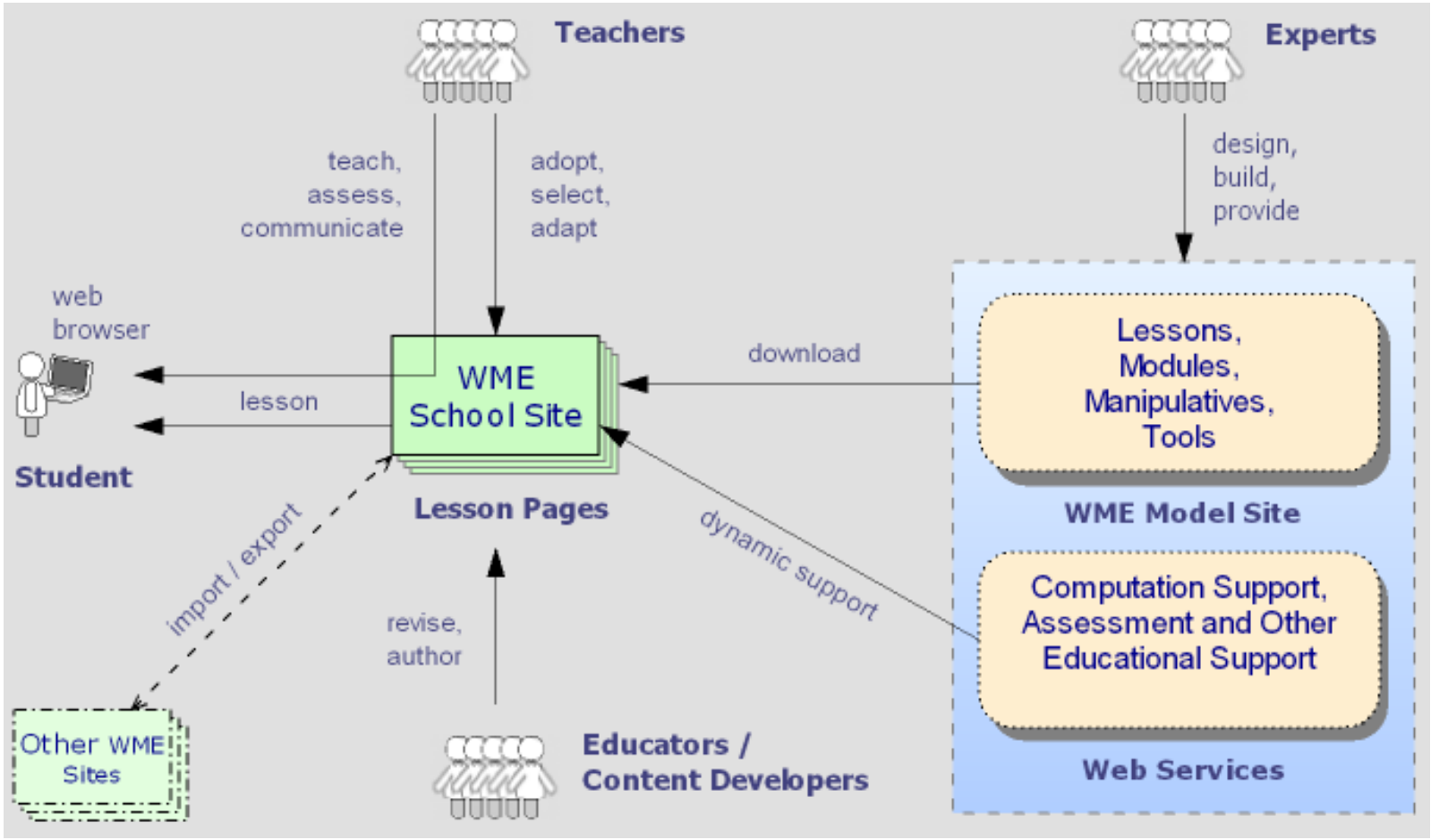
Kent State University

The WME Concept



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WME Project at Kent State University

- Paul's ICM WME group started research around 2000
- Michael and students from College of Education joined the WME effort in 2003.
- Obtained OBR Research Challenge support for 2004.
- Built website, piloted modules and lessons at Kimpton Middle. Added many collaborators and published papers.
- Seeking continued funding and exploring collaborations with ORC, ODE, and OBR (2006).
- WME project site: `wme.cs.kent.edu`

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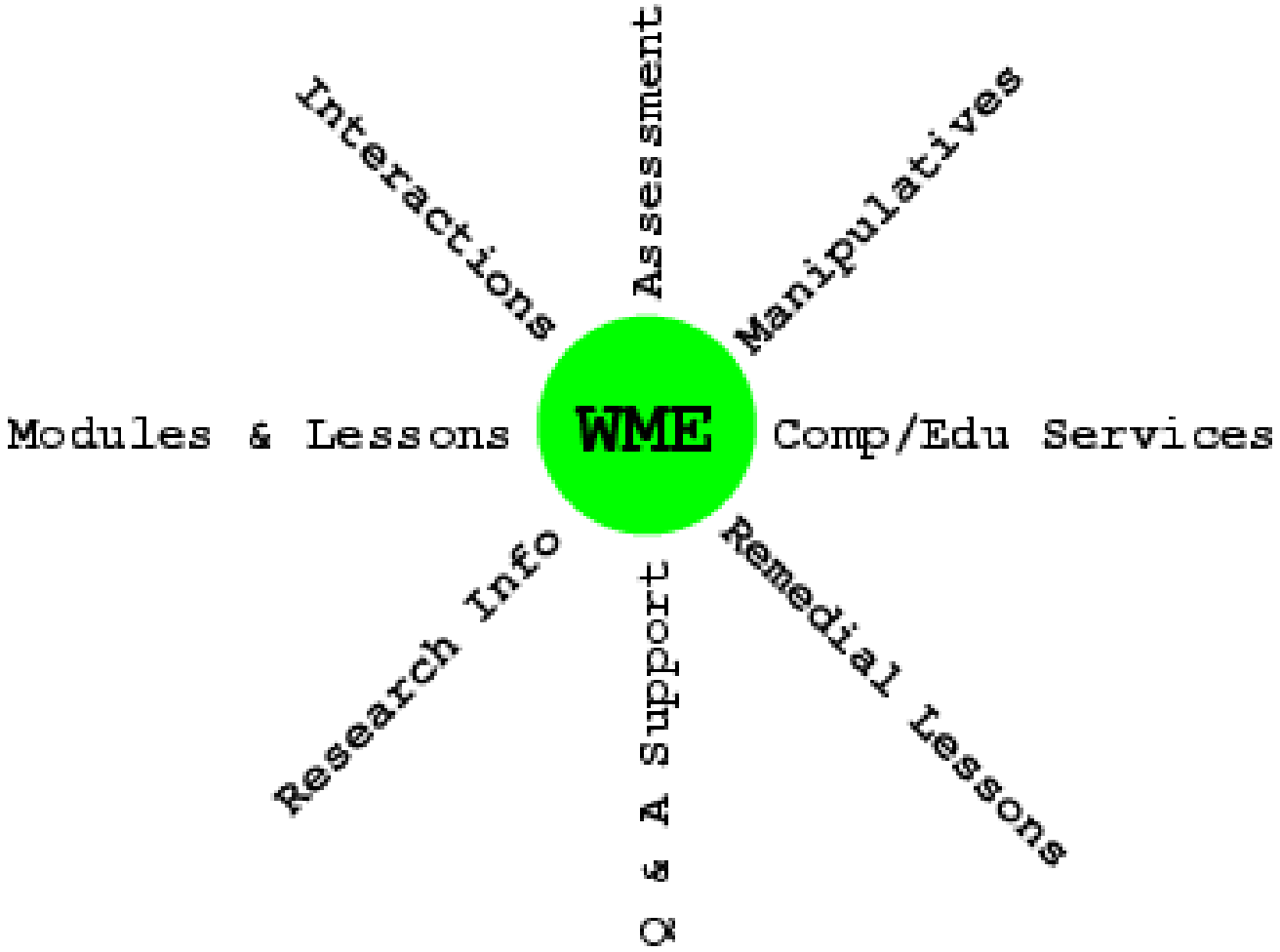
The WME Integration



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Collaboration with Local Schools

- Kimpton Middle School, Stow Ohio
- Lakeview Elementary School, Stow Ohio
- Lake Middle School, Hartville, Ohio
- Shore Junior High, Mentor Ohio

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Important Technical Characteristics of WME

- Open-source and compliant to open standards.
- Leading-edge support for mathematics: formula representation, editing, and display; interactive geometry; graphing/plotting; animation.
- Interactive, integral, self-contained, and classroom-ready.
- Easy to configure and customize at multiple levels.
- Interoperable modules, lessons, manipulatives, tools, and services.
- School-centered: WME sites are deployed and operated per-school.

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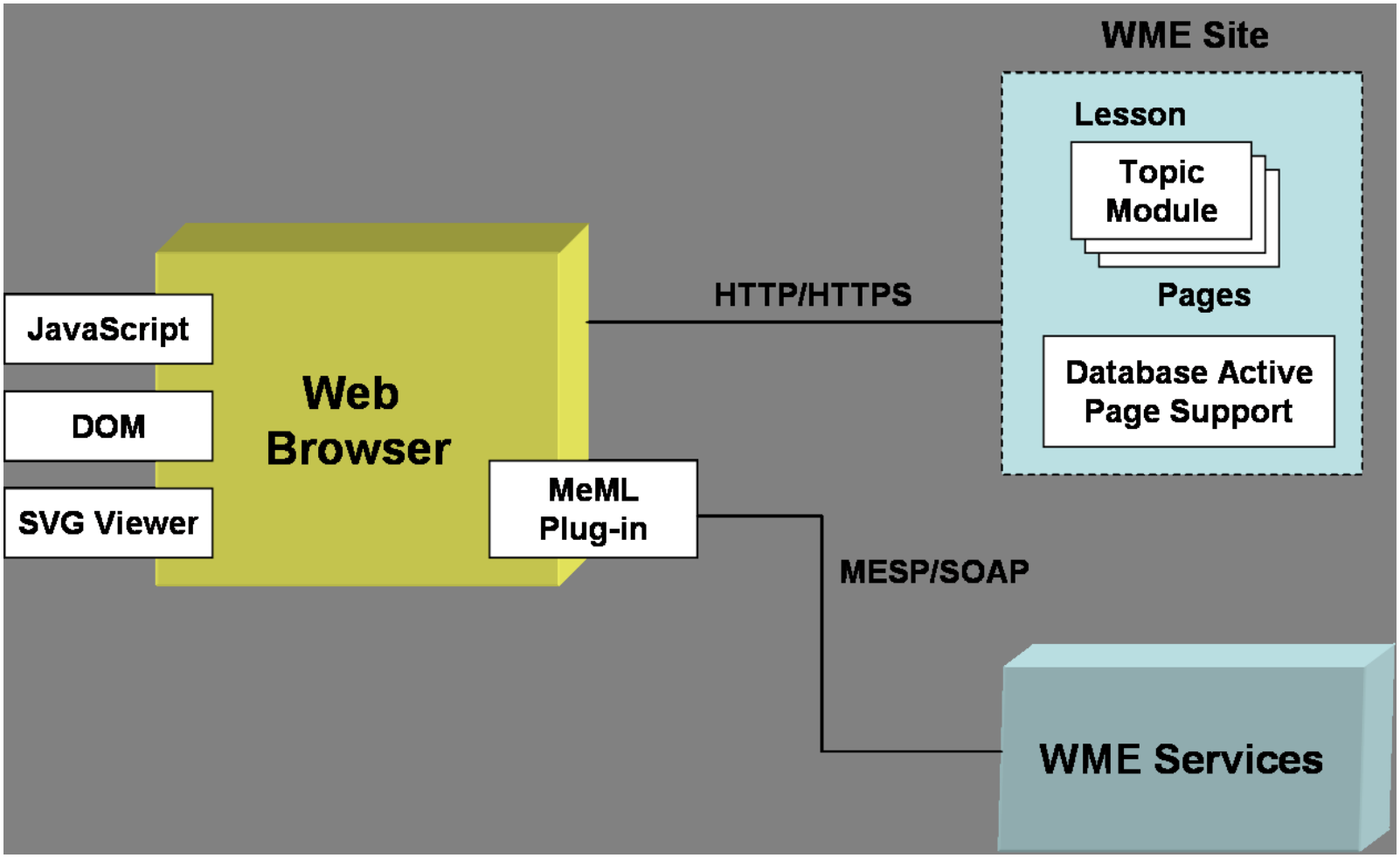
The WME Architecture



WME Components

- *Manipulatives*, *Active Lessons* and *Topic Modules*
- Teacher guide and assessment support
- Client-side Support—regular browsers, javascript, SVG viewer, DOM, browser plug-in.
- Server-side Support—active pages, database
- Content-markup Support—MeML, page translation and MESP service access.
- WME Services—MathGlossary, MathChat, MathBoard, ...
- Protocols—MESP, MCP and SOAP/REST.

Manipulatives

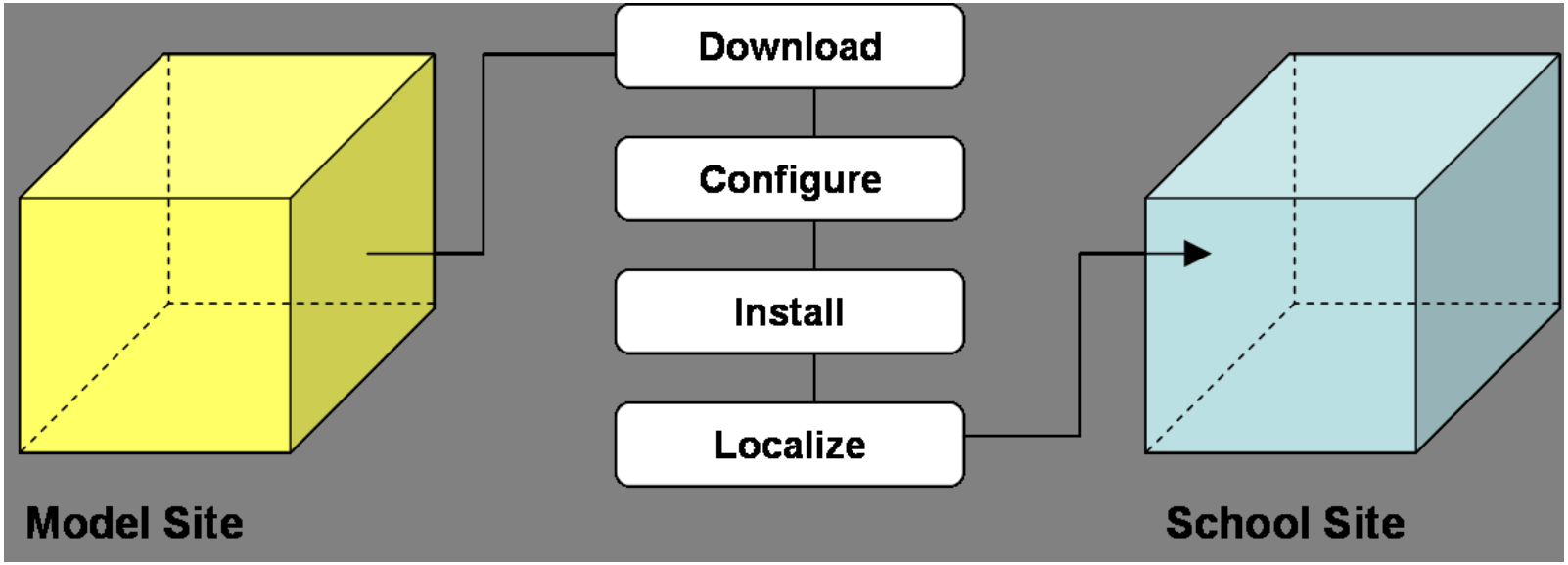
Roll Start Over

Roll count (the number of rolls you made): 0.

Sum	2	3	4	5	6	7	8	9	10	11	12
Count	0	0	0	0	0	0	0	0	0	0	0

Example 1, Example 2, Example 3.

WME Model Site Download

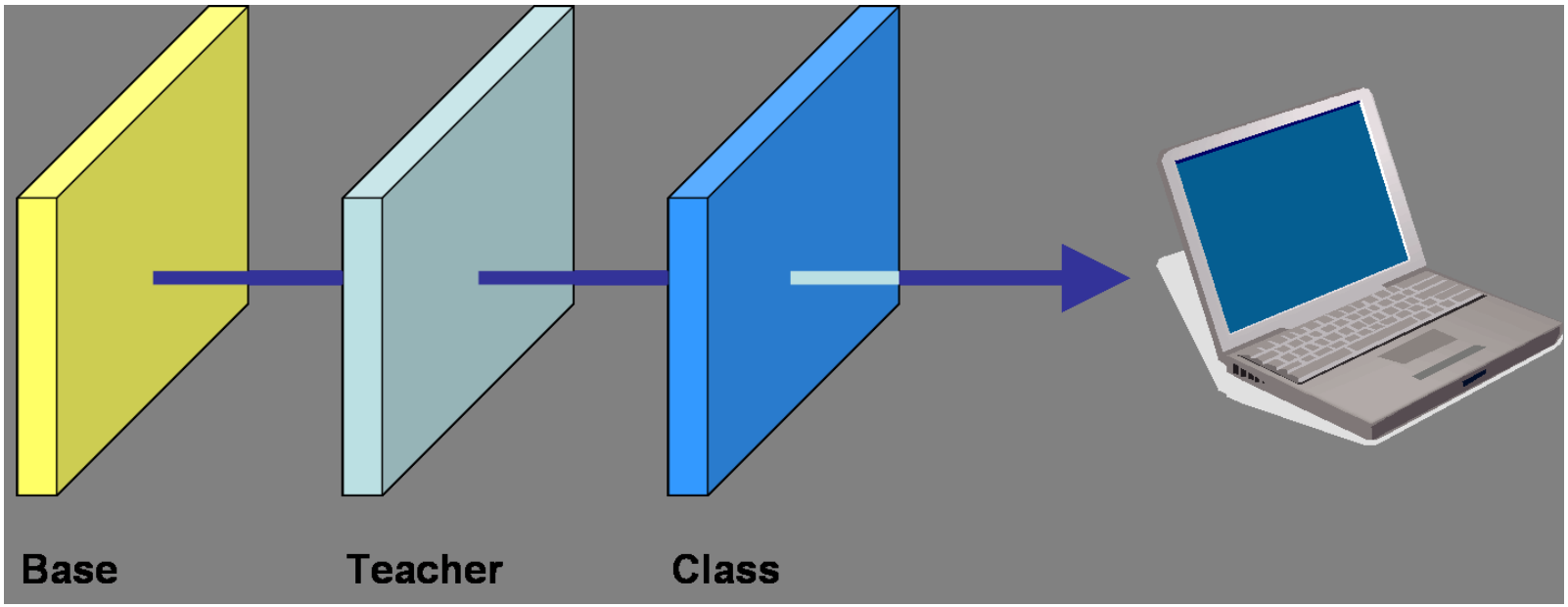


WME Customizations

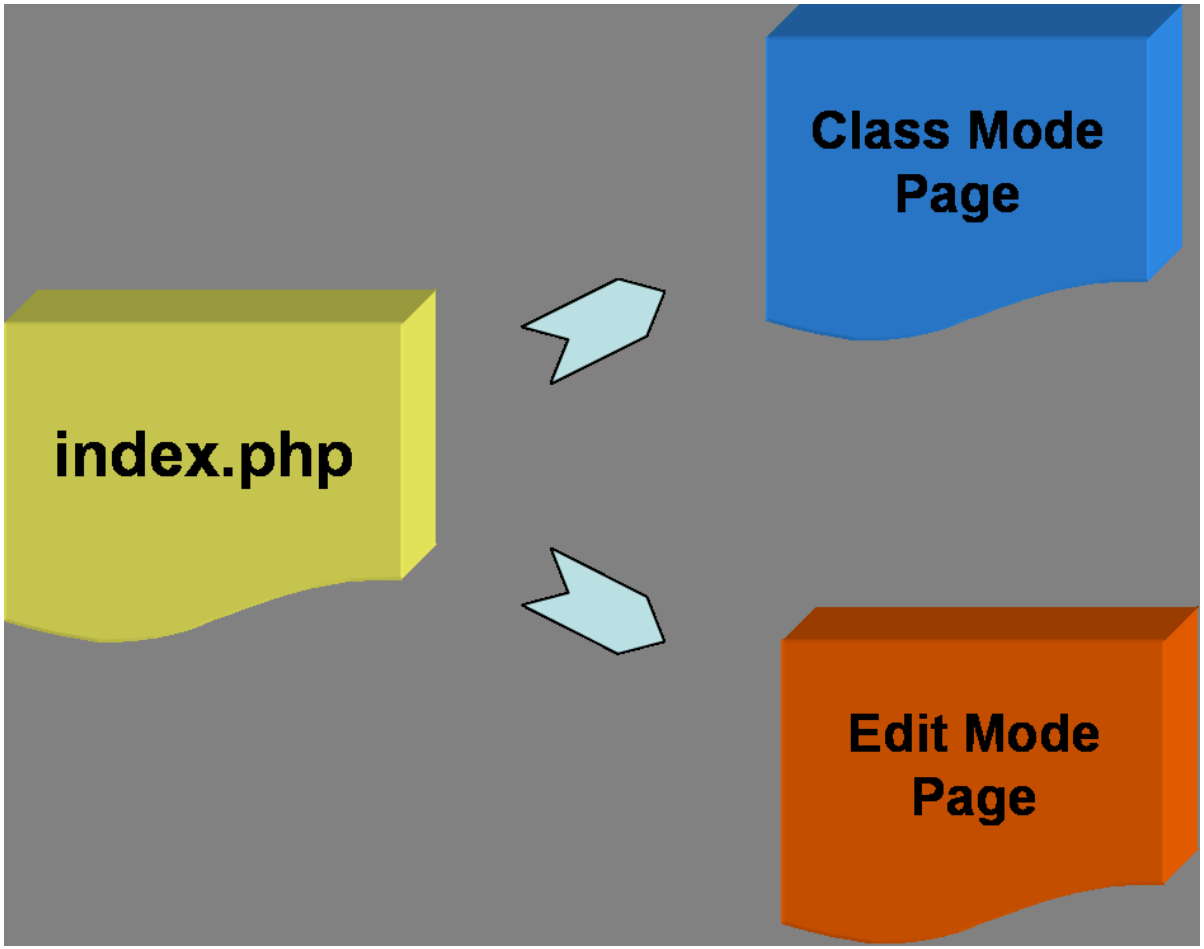
- For each school—user accounts, grade levels, course listings, course sections.
- For each course—TM and AL selection, student list.
- For each lesson—manipulatives editing: including text, presentation, and functionality, assessment and challenge questions.

Page Customization Layers

Customizations are per-teacher and per-class.



Dynamic Page Generation



Assessment Help and Automation

- Test authoring, construction, and editing
- Online test taking
- Importing and exporting test questions
- Automatic grading and test data management
- Results evaluation, diagnoses and suggested interventions

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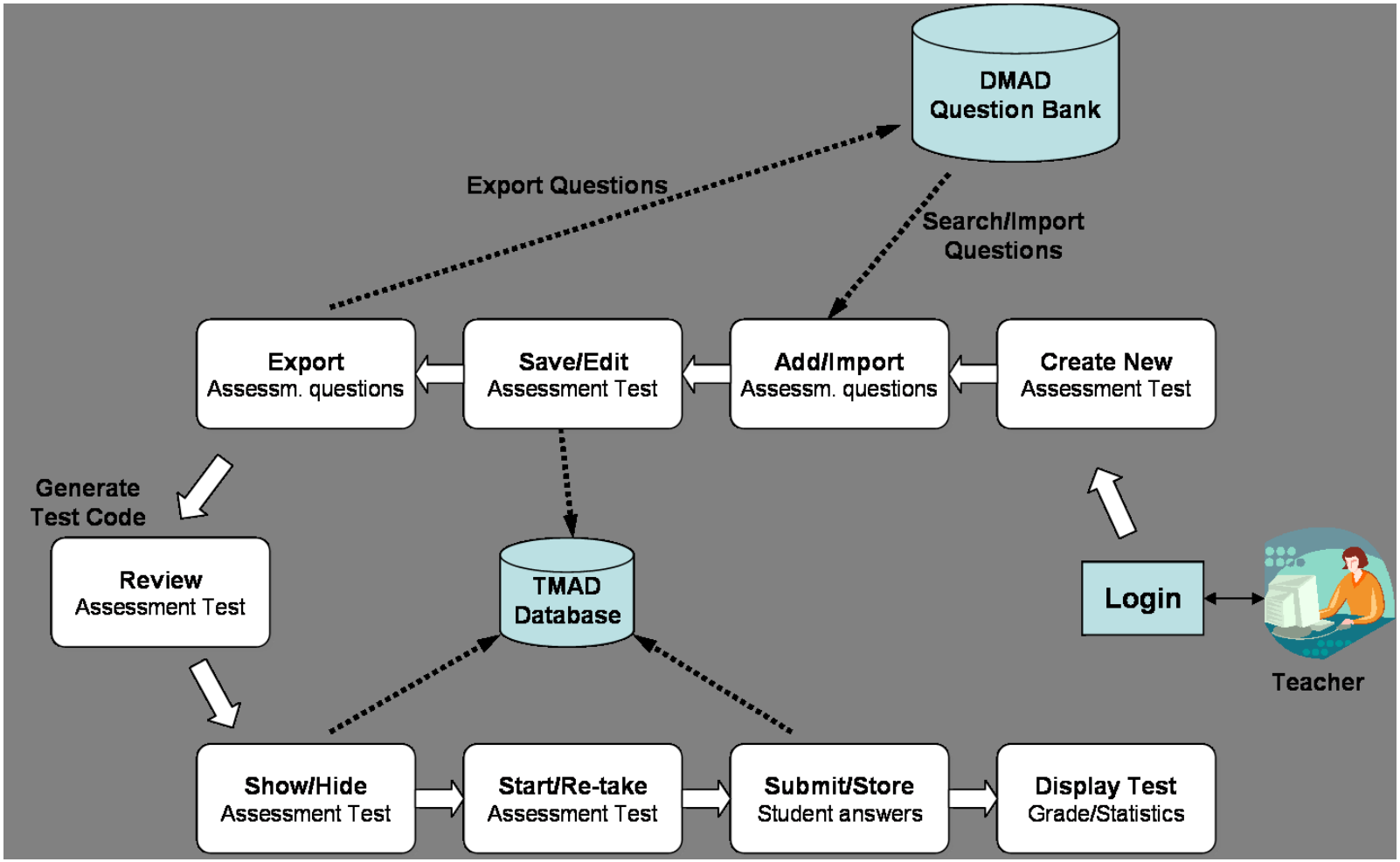
DMAD Functionalities



SVG-Based Interactive Geometry

- Scalable Vector Graphics is an emerging W3C standard.
- Compactly delivers interactive graphics to support authoring and running manipulatives.
- Geometry-aware manipulatives support constraint-preserving user operations.

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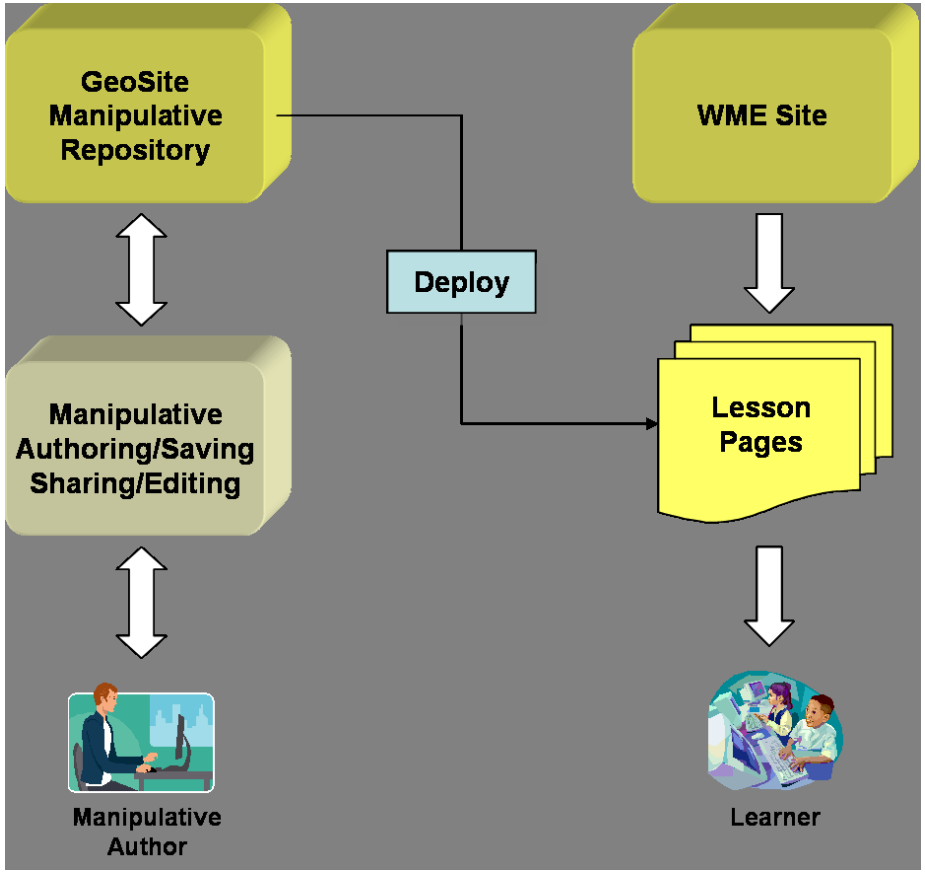
GeoSVG Usage Overview



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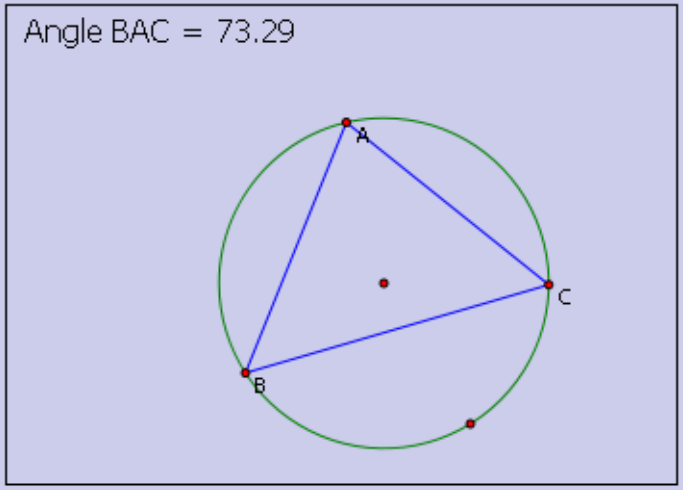
A GeoSVG Generated Manipulative

Inscribed Triangle of a Circle

A triangle is inscribed in a circle if all three of its vertices are on the circle.

1. An inscribed triangle is shown in the following diagram. You can drag the vertices to change the triangle.



The diagram measures the angle BAC. Make BAC a right angle. This can be done in many ways. What observations do you have when BAC becomes a right angle?

BC is a diameter Submit

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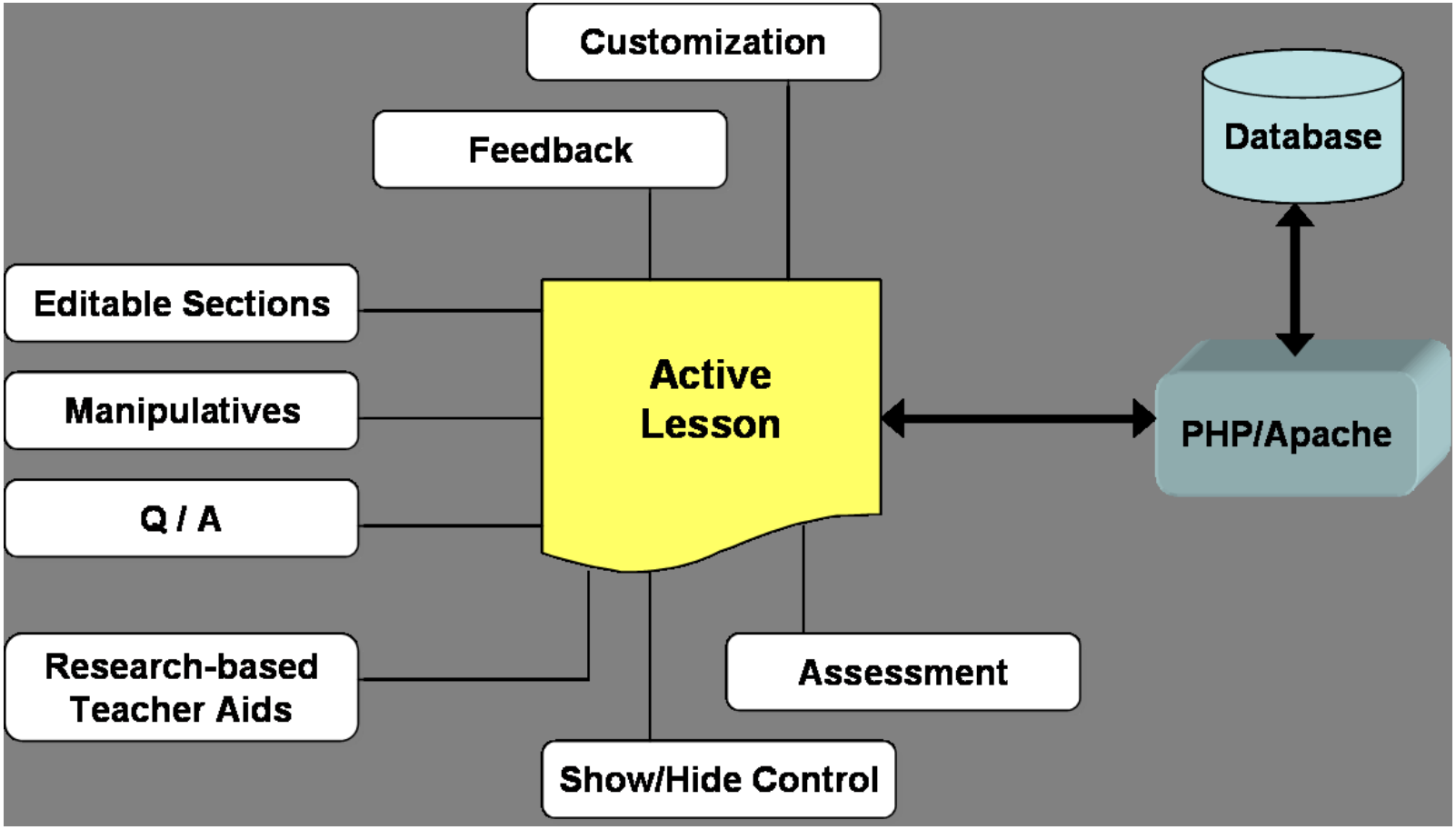
Interoperable Modules and Lessons



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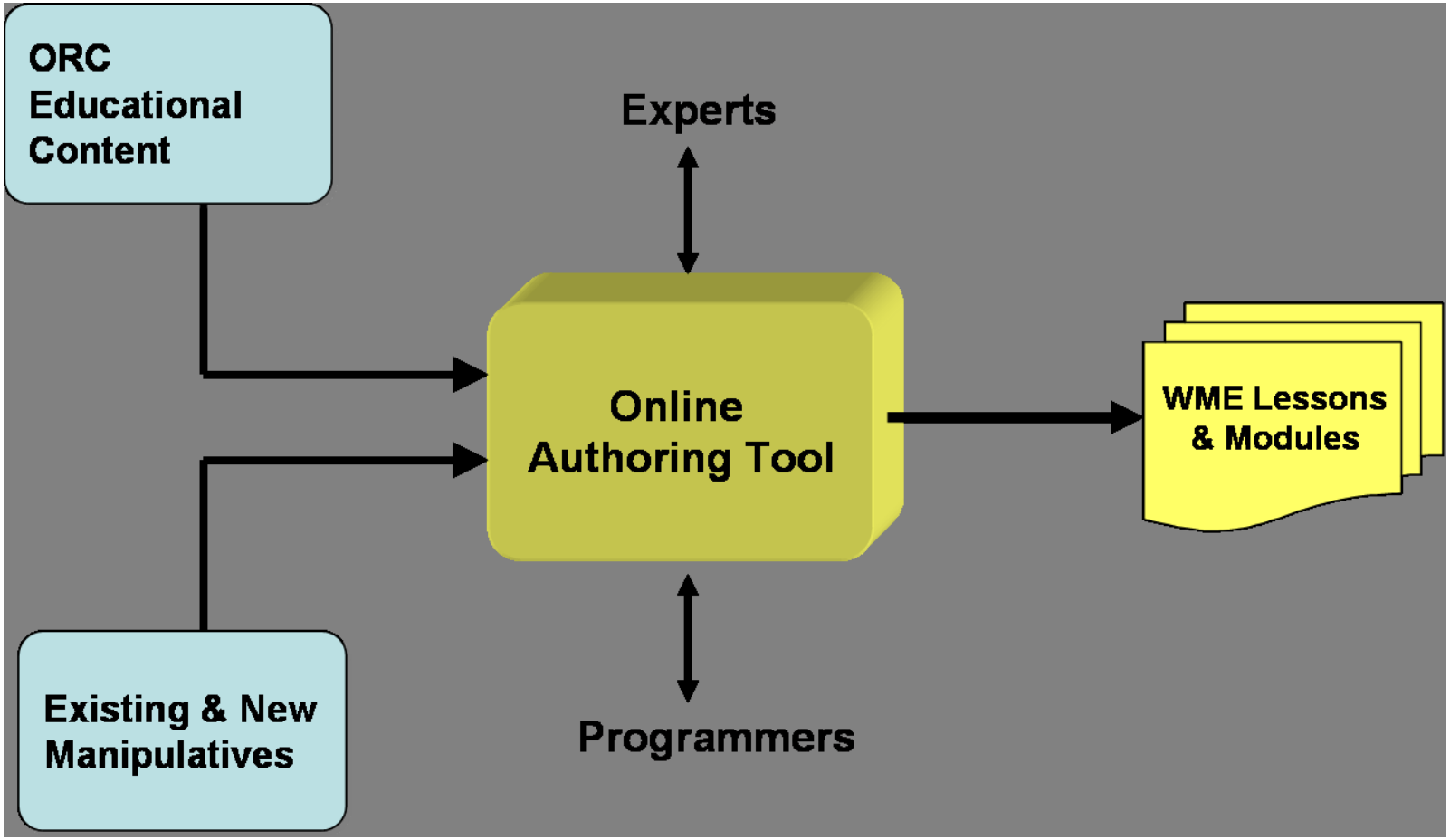
Collaborations



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Partners

- Ohio Board of Regents (OBR)
- Ohio Resource Center (ORC)
- College of Education, Kent State University
- Institute for Computational Mathematics (ICM), Kent State University
- Kimpton Middle School, Munroe Falls (and other schools)
- Northeast Ohio Center of Excellence (NEOCEx)
- Ohio Department of Education (ODE)

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What's Next

- The Ohio vision for WME
- Goals and time lines
- Organization and Resources