

eNLVM Research Questions

When evaluating eNLVM materials, we are gathering data to measure and describe:

- Technical robustness
- Teacher and student appeal
- Effectiveness
- Ease of use
- Efficiency
- Assessment validity
- Actual classroom use
- Interaction effects between teacher, student, usage, and equipment, and outcomes

During formative evaluation we will measure the evaluation criteria for the purpose of helping to refine the materials. Our final report will describe improvements achieved through refinement and the levels that were reached. The summative evaluation will pick up where we left off and confirm the levels that were reached. Descriptions of field use of the materials will be used to help teachers learn about and learn how to use eNLVM materials.

Technical robustness

1. Bugs - Does the software work?
2. Cross platform - What platforms does the software work on?
3. Performance - Does the software/website run/respond fast enough so that it is usable?
4. Text - Are the words good?
 - a. Reading level - Is the text at the level that the target audience can easily understand?
 - b. Grammar - Is the text free from typos and grammatical mistakes?
 - c. Clarity - Are explanations and questions technically correct?

Appeal

1. Appearance – How visually appealing do teachers and students find the materials?
2. Motivation – How well do students stay on task and show interest when using the materials?
3. Connections – How well do the materials help students recall and build upon what they already know?
4. Applications – How well do the materials help students see how what they are learning could be applied?

Effectiveness

1. Alignment – How well are standards, text book sections, activities, and assessments aligned?
2. Length – Is there enough material to last for the length of at least one period and structured so that teachers can easily break it into multiple coherent class days?
3. Difficulty – Are practice items challenging but not too challenging for the target audience?
4. Motivation – How motivating do students find the materials?
5. Sequence – How well do materials progress in a logical sequence from easier to more difficult, building upon what was previously covered?
6. Scaffolding – How well do the materials support both slower and faster learners?
7. Concepts – How well do materials help students form concepts, identifying the parts and characteristics of the concepts being taught?
8. Relationships – How well do the materials help students learn to discover relationships?
9. Algorithms – How well do the materials help students gain skill in carrying out targeted algorithms?
10. Feedback – When teaching simple knowledge and algorithmic skills, how well do the materials give precise, immediate feedback?
11. Language – How well does the language in the materials encourage students to think about the content?
12. Handouts – Are handouts provided that support student computer work where appropriate?

Ease of use

1. Browse – How easy is it for teachers to learn if the eNLVM contains materials covering the topics they are looking for?
2. Navigation – How easy is it for teachers and students to find what they are looking for and return to it later?
3. Discoverability – How easy is it for students to recognize and figure out how the interactive software works and what they are supposed to do with it?
4. Consistency – Are the design of the materials consistent within each eModule and across eModules?
5. Adherence to standards – Do materials conform to established user interface standards?
6. Adaptability – How easy do teachers find it to make minor adaptations to the materials?

Efficiency

1. Setup – How easy do teachers find it to set up materials for use with their students?
2. Startup – How quickly can teachers and students get started using eNLVM materials?

3. Learning – How does the rate of learning with eNLVM materials compare to traditional methods?
4. Assessment – How quick and easy can teachers review and evaluate student work done in the eNLVM?
5. Diagnosis – How quick and easy can teachers evaluate how well the class is doing on specific topics?

Assessment validity

1. Reliability
 - a. Internal consistency (as described by a reliability coefficient)
 - b. Scorer consistency
 - i. Inter-scorer consistency
 - ii. Intra-scorer consistency
2. Relevance
 - a. Content validity – Does it measure the content targeted?
 - b. Construct validity – Does it measure the cognitive level targeted? (simple facts, algorithmic skill, recognize an instance, create a concept, discover a relationship)

In order to achieve internal consistency we will gather data on test item difficulty and validity. Over time we will work toward assessment items that have the qualities:

- Items range in difficulty (25% easy, 50% moderate, %25 hard).
- There are enough items to achieve variability.
- Items are clearly stated.

Interaction effects between teacher, student, usage, and equipment, and outcomes

1. Teachers – How did teacher background differentially affect their perception of eNLVM materials?
2. Students – How did student background differentially affect what they learned from eNLVM materials and their perceptions of the materials?
3. Usage – How did method of usage differentially affect the perception and effectiveness of eNLVM materials?
4. Equipment – How did availability of equipment differentially affect teacher and student experiences with and perceptions of eNLVM materials?