

Mastery Connect Logic Model

Study Type: ESSA Evidence Level IV

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EXECUTIVE SUMMARY

Instructure developed a logic model for Mastery Connect and designed the logic model to satisfy Level IV requirements (*Demonstrates a Rationale*) according to the Every Student Succeeds Act (ESSA).¹

Logic Model

A logic model provides a program roadmap, detailing program inputs, participants reached, program activities, outputs, and outcomes.

Study Design for Mastery Connect Evaluation

Informed by the logic model, the next phase will focus on planning ESSA studies to examine how Mastery Connect is related to student learning outcomes and instructional decision-making. Specifically, Instructure plans to begin ESSA Level II and III studies to answer the following research questions:

- 1) Did classrooms who used Mastery Connect in 2022-23 have higher end-of-year classroom achievement compared to those who did not use Mastery Connect?
- 2) Was greater classroom usage of Mastery Connect in 2022-23 related to higher classroom achievement (i.e., end-of-year assessments)?
- 3) Do educators who demonstrate greater Mastery Connect engagement in fall 2023 report a greater understanding of students' content mastery, increased teaching self-efficacy, and a greater likelihood of creating content and using data for instructional decision-making? How do effects vary by type of Mastery Connect use (i.e., Mastery Connect Suite, MIB, MVFA, MVPA)?

Conclusions

This study satisfies ESSA evidence requirements for Level IV (*Demonstrates a Rationale*). Specifically, this study met the following criteria:

- ✓ Detailed logic model informed by previous, high-quality research
- ✓ Study planning and design is currently underway for an ESSA Level III or higher study

¹ Level IV indicates that an intervention should include a "well-specified logic model that is informed by research or an evaluation that suggests how the intervention is likely to improve relevant outcomes; and an effort to study the effects of the intervention, that will happen as part of the intervention or is underway elsewhere..." (p. 9, U.S. Department of Education, 2016).

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Introduction

Instructure developed a logic model for Mastery Connect and designed the logic model to satisfy Level IV requirements (*Demonstrates a Rationale*) according to the Every Student Succeeds Act (ESSA).

Administrators want to ensure educators are able to assess student learning of standards-aligned content to inform instruction, but creating, delivering, and analyzing high-quality assessments can be time- and labor-intensive. As a result, educators may not be able to readily implement regular, formative and predictive assessments and use data to influence classroom decisions and personalize learning. In response to these challenges, Instructure provides the Mastery Connect assessment management system to K-12 audiences.

The study had the following objectives:

1. Define the Mastery Connect logic model and foundational research base.
2. Document ESSA Level II and III study designs.

Previous Research

Researchers based logic model development on previous literature addressing opportunities and challenges of using assessment to support student learning. Assessment offers three complementary opportunities:

- 1) *Assessment as learning*. Assessment can serve as a learning activity for students because it enables them to monitor and self-regulate their learning.
- 2) *Assessment for learning*. Assessment can provide educators with formative evidence to inform their teaching.
- 3) *Assessment of learning*. Assessment can be used to summatively evaluate whether students have learned what they need to (Black & William, 2018).

Given the benefits of infusing assessment into the learning process (Lee et al., 2020), it is essential to provide educators with reliable and valid assessments as part of their instructional toolkit. However, many educators face challenges in implementing assessments effectively, often due to misalignment between formative and summative assessments, using invalid measures, and making inaccurate inferences from results (Bennett, 2011). Recognizing these challenges, Mastery Connect provides a validated and embedded assessment system that addresses the three key benefits previously described (Black & William, 2018).

Assessment as learning. Assessments can provide students with feedback to self-assess their learning, which instigates self-regulated learning processes (Zimmerman & Schunk, 2011). Providing students with feedback on their learning allows them to better monitor and control their learning and, consequently, have higher self-regulated learning (Andrade et al., 2019; Panadero et al., 2017), which equips them with skills to become lifelong learners (Clark, 2012). Additionally, when students are able to monitor their learning and work to increase their success, they will have increased self-efficacy (Panadero et al., 2018), decreased test anxiety (Blondeel et al., 2023) and

increased value for learning (Rakoczy et al., 2019). Given the relationship between assessment, self-regulated learning, and adaptive motivational beliefs (i.e., self-efficacy, decreased anxiety, and value), it is not surprising that regular formative assessment also increases achievement (Graham et al., 2015; Sanchez et al., 2017).

Mastery Connect provides students with access to their level of mastery on learning standards, promoting self-assessment and self-regulated learning strategies, and the opportunity to complete multiple assessments throughout the year.

Assessment for learning. Assessment also provides educators with critical information for making instructional decisions. Well-designed assessments provide educators with data to identify and proactively address student misconceptions and provide students with additional time to learn material (Carless, 2007). To ensure assessments are well-designed, educators must incorporate evidence-based assessment practices including, providing clear learning targets, a commitment to standards-based instruction, and high-quality assessment (Brink & Bartz, 2017; Dolin et al., 2018; Stiggins & DuFour, 2009). Mastery Connect provides well-designed, valid and reliable standards-based assessments (e.g., Formative Assessments, Predictive Assessments) that educators and administrators align to curriculum maps, increasing the likelihood that assessments will improve student learning. Educators can also create their own well-designed assessments using standards-aligned items from Mastery Item Banks.

In addition to ensuring structurally sound assessments, there are several school-level practices supporting assessment effectiveness. Specifically, collegial environments that promote the use of assessments in instructional decision-making see increased assessment benefits (Box et al., 2015). Additionally, schools that use assessment information to provide instructional support to educators for continuous, iterative improvement—versus making a summative judgment on teaching ability (Dweck, 2006)—are more likely to reap the benefits of assessment (Dolin et al., 2018). Furthermore, when schools embrace assessment as a way to improve teaching practice over time, educators have increased self-efficacy and formative assessment use (Xiang et al., 2020). Finally, when schools promote a positive assessment culture wherein educators collaborate to interpret assessments and make instructional changes—such as reteaching a topic or adjusting pacing—student learning benefits (Bergeron, 2020). As Mastery Connect provides trackers that educators can use to examine assessment data collaboratively, it can promote a positive assessment culture in schools and districts.

Assessment of learning. Assessments also provide information that can guide longer term school-level decision-making. Specifically, schools often use summative assessments to make decisions about changes to learning environments to better address students' needs (Madinach & Schildkamp, 2021), particularly in schools seeking continuous improvement. These summative assessment practices have increased over time as policymakers encouraged data use for evidence-based decision-making (Madinach & Schildkamp, 2020).

Even though the focus of summative assessments has largely been on gauging student, classroom, and school performance, these types of assessments may have additional benefits. Summative assessments often guide the content and skills that are taught (Baird et al., 2017), so it is important to use assessments that are aligned with learning standards. Due to the relationship between assessments and content, it is imperative to use assessments informed by curriculum maps and standards. Summative assessments may also be motivating for students because these provide clear goals to work toward (Biggs, 1998; Kennedy et al., 2008).

Mastery Connect offers assessments that are the same rigor as end-of-year summative assessments (via Mastery View Predictive Assessments, available in nine states), allowing educators to gain insight into content that should be taught and helping students set learning goals.

Logic Model

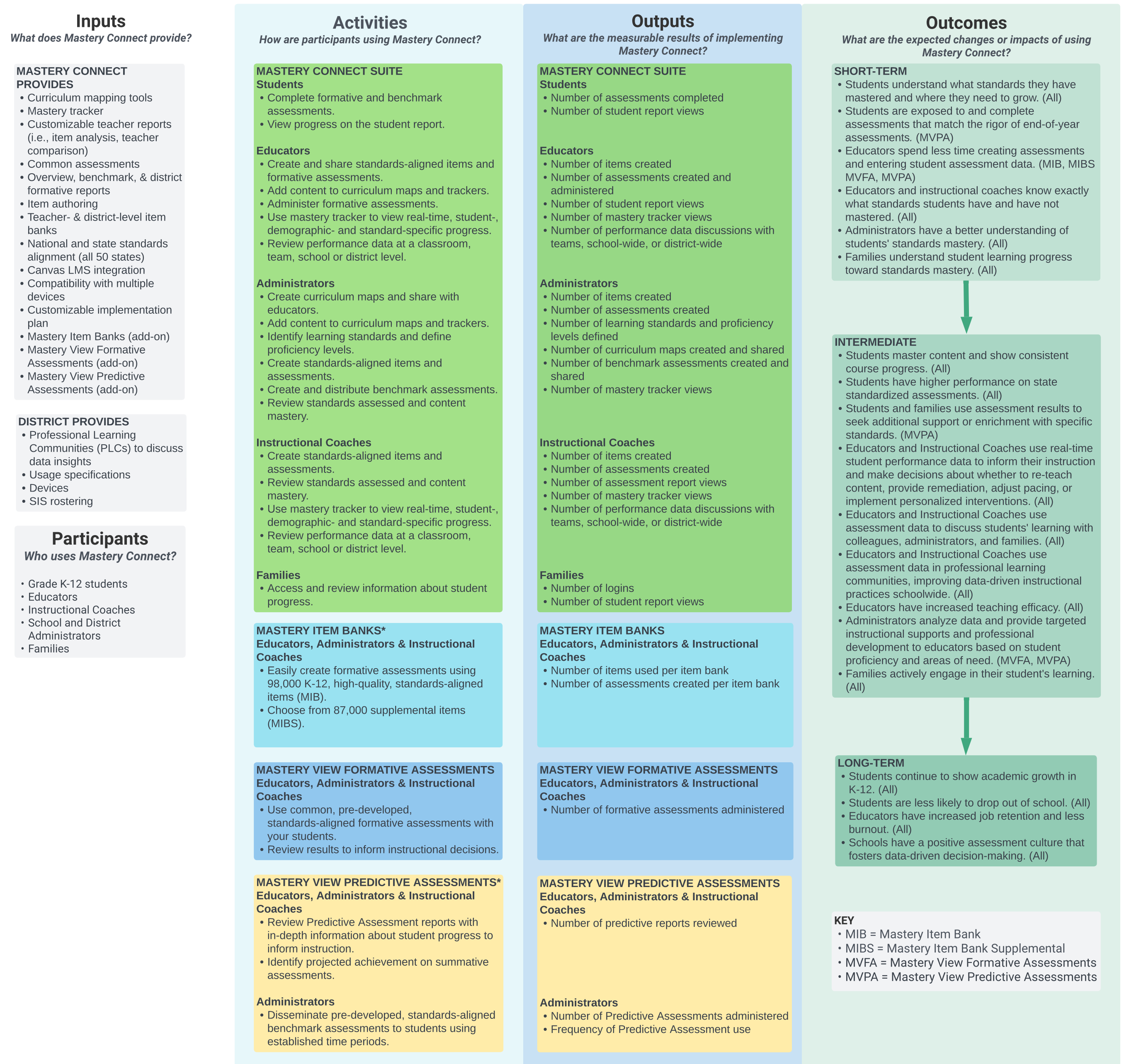
A logic model is a program or product roadmap. It identifies how a program aims to impact learners, translating inputs into measurable activities that lead to expected results. A logic model has five core components: inputs, participants, activities, outputs, and outcomes (see Table 1).

Table 1. Logic model core components

Component	Description	More information
Inputs	What Mastery Connect and districts invest	What resources are invested and/or required for the learning solution to function effectively in real schools?
Participants	Who Mastery Connect reaches	Who receives the learning solution or intervention? Who are the key users?
Activities	What participants do	What do participants do with the resources identified in Inputs? What are the core/essential components of the learning solution? What is being delivered to help students/teachers achieve the program outcomes identified?
Outputs	Products of activities	What are numeric indicators of activities? (e.g., key performance indicators; allows for examining program implementation)
Outcomes	Short-term, intermediate, long-term	<p>Short-term outcomes are changes in awareness, knowledge, skills, attitudes, and aspirations.</p> <p>Intermediate outcomes are changes in behaviors or actions.</p> <p>Long-term outcomes are ultimate impacts or changes in social, economic, civil or environmental conditions.</p>

The LearnPlatform by Instructure research team reviewed Mastery Connect resources, artifacts, and program materials to develop a draft logic model. The Mastery Connect team reviewed the draft and provided revisions during virtual meetings. The final logic model depicted below (Figure 1) reflects these conversations and revisions.

Problem Statement: Administrators want to ensure that educators are able to assess student learning of standards-aligned content to inform instruction, but creating, delivering, and analyzing high-quality assessments can be time- and labor-intensive. As a result, educators may not be able to readily implement regular, formative and predictive assessments and use data to influence classroom decisions and personalize learning. In response to these challenges, Instructure provides the Mastery Connect assessment management system to K-12 audiences.



Note. Mastery Item Bank Supplemental (MIBS) and Mastery View Predictive Assessments (MVPA) are currently available in nine states.
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Mastery Connect Logic Model Components

Mastery Connect provides several resources, including:

- curriculum mapping tools;
- mastery tracker;
- customizable teacher reports (i.e., item analysis, teacher comparison);
- common assessments;
- overview, benchmark, and district formative reports;
- item authoring;
- teacher- and district-level item banks;
- National and state standards alignment (all 50 states);
- Canvas LMS integration;
- Compatibility with multiple devices;
- Customizable implementation plan;
- Mastery Item Banks (add-on);
- Mastery View Formative Assessments (add-on); and
- Mastery View Predictive Assessments (add-on).

K-12 institutions who use Mastery Connect should offer Professional Learning Communities (PLCs) to discuss data insights, specify usage, and provide devices and SIS rostering.

Ultimately, Instructure's Mastery Connect aims to reach grade K-12 students, educators, instructional coaches, school and district administrators and families.

Using these program resources, students, educators, instructional coaches, school and district administrators and families can engage with the core Mastery Connect Suite through the following activities:

Students:

- Complete formative and benchmark assessments.
- View progress on the student report.

Educators:

- Create and share standards-aligned items and formative assessments.
- Add content to curriculum maps and trackers.
- Administer formative assessments.
- Use mastery tracker to view real-time, student-, demographic- and standard-specific progress.
- Review performance data at a classroom, team, school or district level.

Administrators:

- Create curriculum maps and share with educators.
- Add content to curriculum maps and trackers.
- Identify learning standards and define proficiency levels.
- Create standards-aligned items and assessments.

- Create and distribute benchmark assessments.
- Review standards assessed and content mastery.

Instructional Coaches:

- Create standard-aligned items and assessments.
- Review standards assessed and content mastery.
- Use mastery tracker to view real-time, student-, demographic- and standard-specific progress.
- Review performance data at a classroom, team, school or district level.

Families:

- Access and review information about student progress.

Mastery Connect also offers several add-on features that allow users to engage with the platform in the following ways:

- *Mastery Item Banks.* Educators, administrators, and instructional coaches can easily create formative assessments using 98,000 high-quality, standards-aligned items using the Mastery Item Bank. In seven states, users can choose from 87,000 additional items in the Mastery Item Bank Supplemental (available in nine states).
- *Mastery View Formative Assessments.* Educators, administrators, and instructional coaches can use common, pre-developed, standards-aligned formative assessments with their students and review results to inform instructional decisions.
- *Mastery View Predictive Assessments.* Educators, administrators and instructional coaches can review Predictive Assessment reports with in-depth information about student progress to inform instruction and identify projected achievement on summative assessments.. Additionally, administrators can disseminate pre-developed, standards-aligned benchmark assessments to students using established time periods. Mastery View Predictive Assessments are available in nine states.

Instructure can examine the extent to which core activities were delivered and participants were reached by examining the following quantifiable outputs for the core Mastery Connect Suite:

Students:

- Number of assessments completed
- Number of student report views

Educators:

- Number of items created
- Number of assessments created and administered
- Number of student report views
- Number of mastery tracker views
- Number of performance data discussions with teams, school-wide or district-wide

Administrators:

- Number of items created
- Number of assessments created
- Number of learning standards and proficiency levels defined
- Number of curriculum maps created and shared
- Number of benchmark assessments created and shared
- Number of mastery tracker views

Instructional Coaches:

- Number of items created
- Number of assessments created
- Number of assessment report views
- Number of mastery tracker views
- Number of performance data discussions with teams, school-wide or district-wide

Families:

- Number of logins
- Number of student report views

Instructure can also examine the extent to which core activities were delivered and participants were reached by examining the following quantifiable outputs for Mastery Item Bank, Mastery View Formative Assessments, and Mastery View Predictive Assessments.

- Mastery Item Banks
 - Number of items used per item bank (Educators, Administrators & Instructional Coaches)
 - Number of assessments created per item bank (Educators, Administrators & Instructional Coaches)
- Mastery View Formative Assessments
 - Number of formative assessments administered (Educators, Administrators & Instructional Coaches)
- Mastery View Predictive Assessments
 - Number of predictive reports reviewed (Educators, Administrators & Instructional Coaches)
 - Number of Predictive Assessments administered (Administrators)
 - Frequency of Predictive Assessment use (Administrators)

If implementation is successful, based on a review of program outputs, Instructure can expect the several short-term student, educator, and family outcomes for Mastery Connect. Students will understand what standards they have mastered and where they need to grow and be exposed to and complete assessments that match the rigor of end-of-year assessments. Educators will spend less time creating assessments and entering student data (add-on components). Additionally, educators and instructional coaches will know exactly what standards students have

and have not mastered. Finally, administrators will have a better understanding of students' standards mastery and families will understand student learning progress as well.

In the intermediate term, students, educators, instructional coaches, administrators and families can expect several outcomes. Students will master content and show consistent course progress, and use assessment results (with their families) to seek additional support or enrichment (Predictive Assessments). Students will also have higher performance on state standardized assessments. Educators and Instructional coaches will use real-time student performance data to inform instructional decisions—such as whether to re-teach content, provide remediation, adjust pacing, or implement personalized interventions— and when discussing students' learning with colleagues, administrators, and families. Additionally, educators and instructional coaches will use assessment data in professional learning communities, leading to improved instructional practices schoolwide and increased teaching efficacy. Finally, administrators will analyze data and provide targeted instructional supports and professional development to educators based on student proficiency and areas of need (MVFA, MVPA) and families will actively engage in their students' learning.

In the long-term, students will continue to show academic growth in elementary, middle and high school and will be less likely to drop out of school. Educators will have increased job retention and less burnout and schools will have a positive assessment culture that fosters data-driven decision-making.

Study Design for Mastery Connect Evaluation

To continue building evidence of effectiveness and examine the proposed relationships in the logic model, Instructure plans to conduct an evaluation to determine the extent to which Mastery Connect produces the desired outcomes. Specifically, Instructure plans to begin ESSA Level II and III studies in 2023 to answer the following research questions:

- 1) Did classrooms who used Mastery Connect in 2022-23 have higher end-of-year classroom achievement compared to those who did not use Mastery Connect?
- 2) Was greater classroom usage of Mastery Connect in 2022-23 related to higher classroom achievement (i.e., end-of-year assessments)?
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Conclusions

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Specifically, this study met the following criteria for Level IV:

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