Future of Outcomes Science: Leveraging Descriptive, Diagnostic, and Predictive Outcomes Methods

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Background & Objectives

Recent educational research, both within and outside of CPD, has highlighted and emphasized critical limitations of the 2009 outcomes conceptual framework¹⁻⁴. These publications serve as a call to action for our community to leverage more holistic approaches to assess meaningful impact including: measurement of mechanisms of change, cognitive engagement, confidence/self-efficacy, reflection, and reinforcement. In support of this call to action, we have begun to explore the applicability and feasibility of outcomes methodologies that go beyond the traditional framework commonly utilized in CME/CE activities. In this poster we present novel descriptive, diagnostic, and predictive outcomes methodologies, which have enabled a far more robust and actionable understanding of the impact of accredited CME/CE interventions.



Pri-Med, ArcheMedX, and Miller Medical Communications have collaborated for several years to plan, design, deliver, and assess opioid-related Risk Evaluation and Mitigation Strategy (REMS) education. Based on 4 curricula and 12 CME/CE activities from 2021-2024, we have generated data from more than 150,000 learning sessions, more than 130,000 paired assessments, and more than 6,000,000 learning-related actions. This robust data set enabled the following outcomes methodologies and analyses to be leveraged:

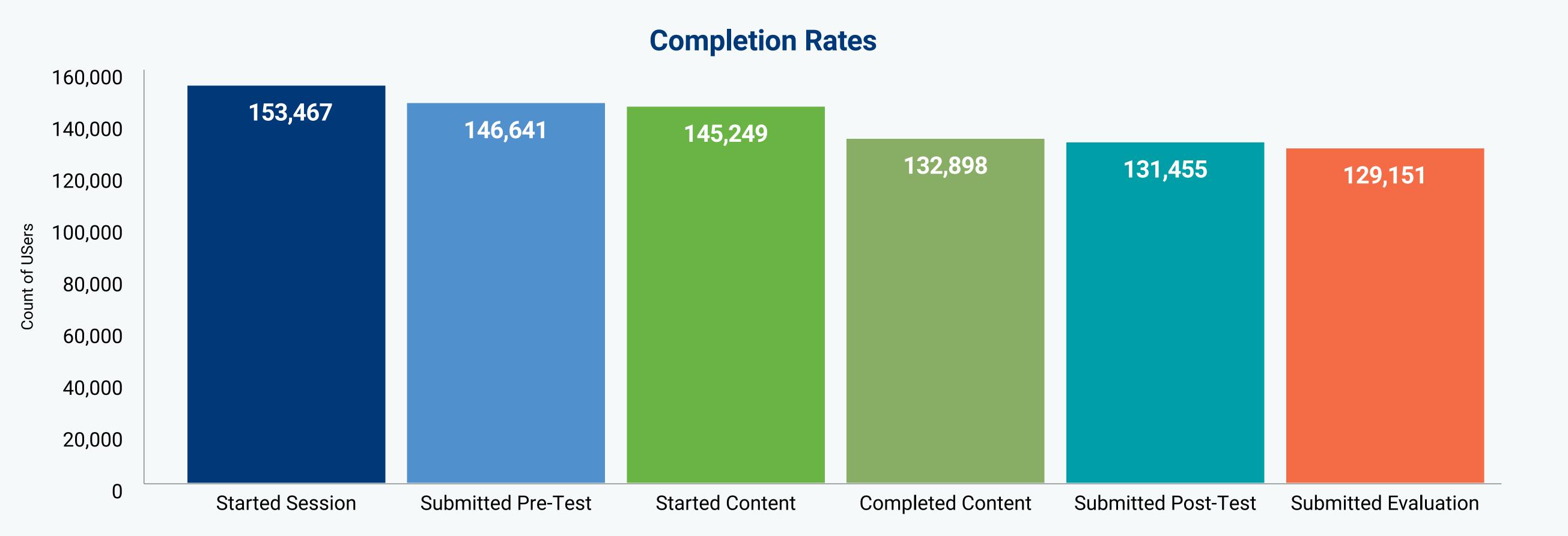
Confidence-based Assessment (CBA) measures learners' confidence in specific knowledge and competence related to an educational activity's objectives. Research in confidence-based assessment reveals a strong correlation between learners' self-reported confidence in the correctness of their responses and long-term retention of those responses.⁵

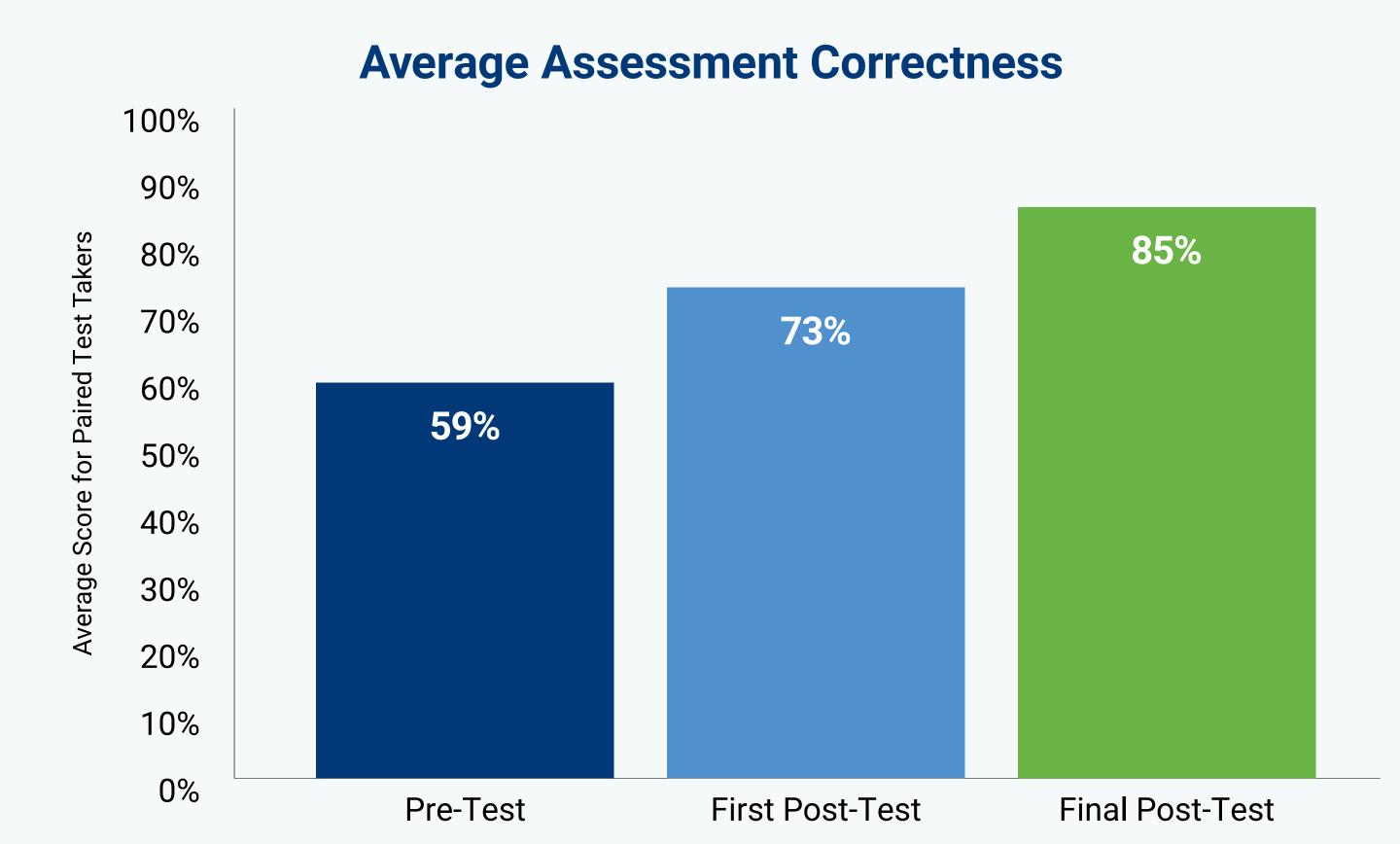
Learner Engagement Analyses is used to illustrate and understand learner reflection, self-direction, grit, exploration, and intention demonstrated by when, where, and how learners engaged in the online learning experiences. These data highlight the parts of the content that learners found most interesting, and what parts of the content require additional support and follow-up, informing both the impact of the learning experience and identifying areas of outstanding need. Additionally, various Segmentation Analyses were applied to explore outcomes across these various subpopulations.

An algorithmic measure of **Readiness to Change** has been developed to predict learner performance change in practice. The Readiness to Change measure has been adapted from the Transtheoretical⁶, or Stages of Change model, and is informed by traditional assessment, CBA, and behavioral engagement data.

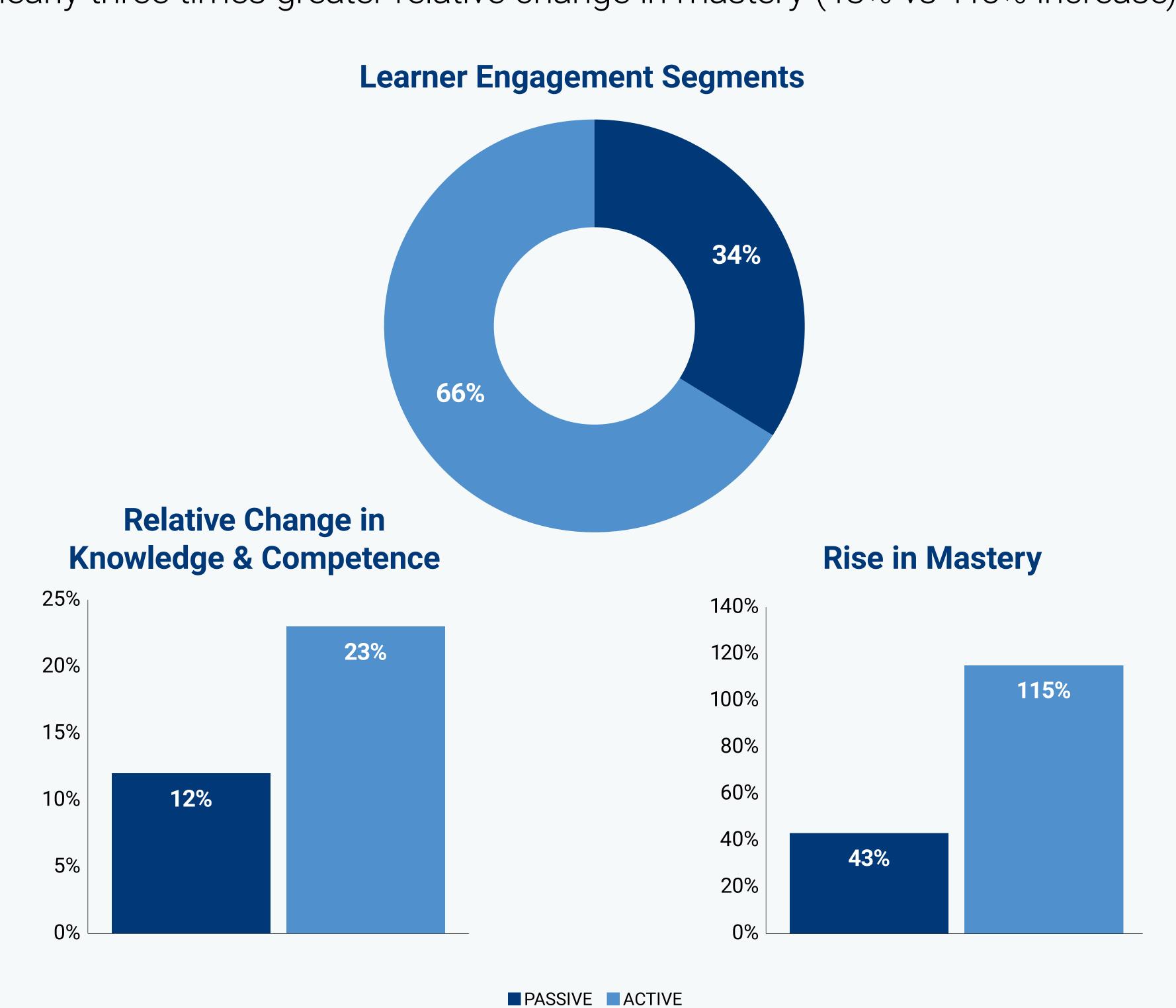
Results & Discussion

Traditional descriptive outcomes included analyses of measures of participation and changes in knowledge and competence. For participation, we found a completion rate of 91.5%, using the Outcomes Standardization Project definition. For changes in knowledge and competence, we found a 23% relative increase comparing pre-test and first post-test assessment performance.

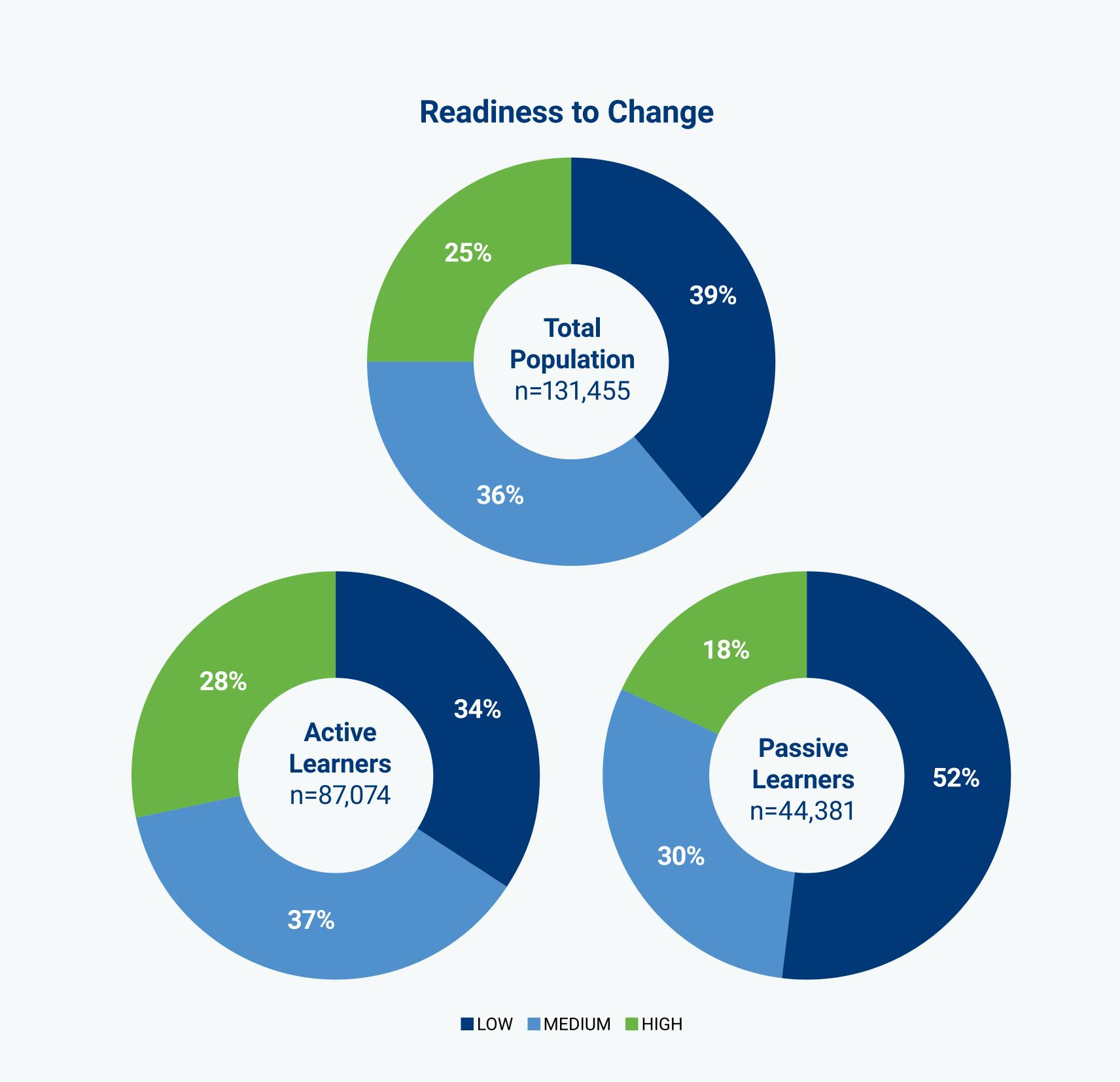




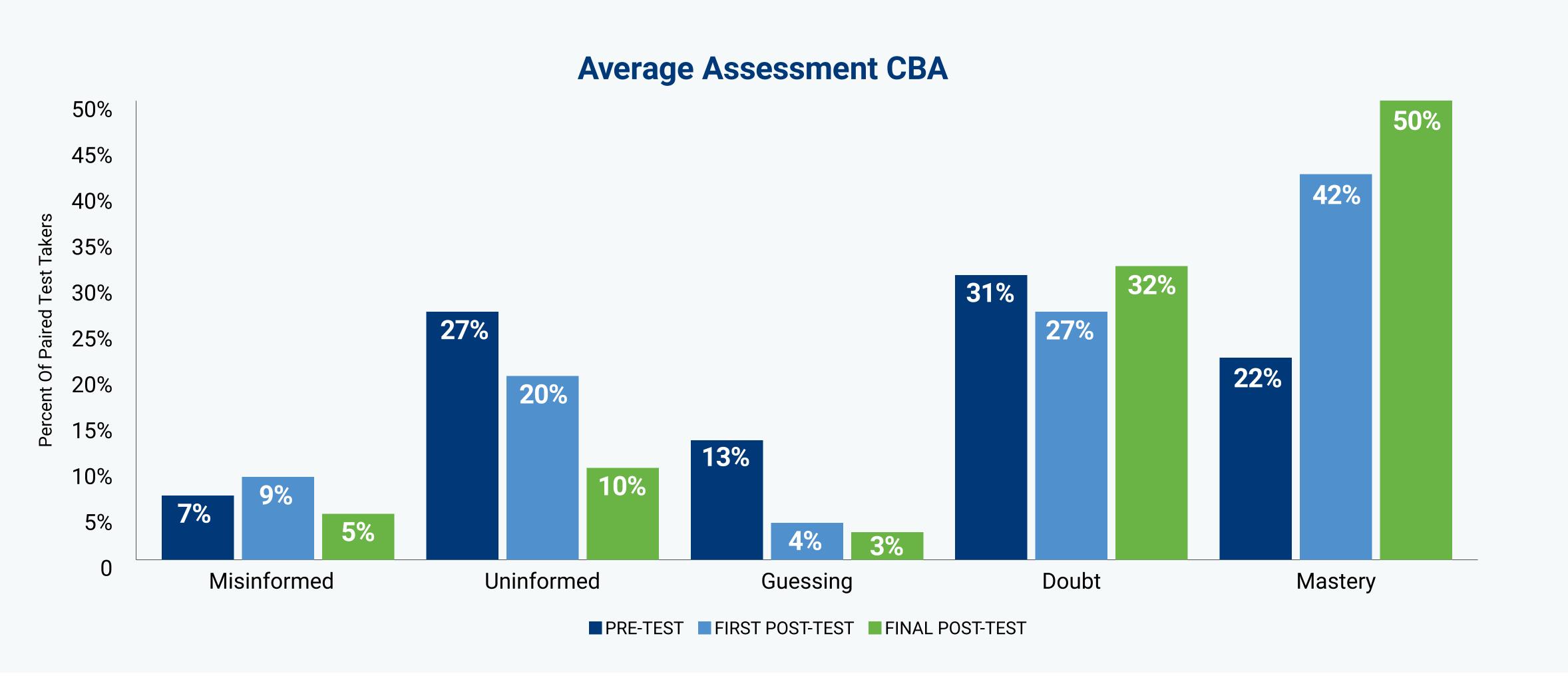
Learner Engagement Analyses identified sizable segments of learners with largely active (66%) or largely passive (34%) approaches to learning. These varying levels of engagement significantly affect the impact of the educational interventions. For example, Segmentation Analysis demonstrated that active learners had nearly two times greater relative change in knowledge and competence (12% vs 23% increase) and nearly three times greater relative change in mastery (43% vs 115% increase).



Finally, while **Readiness to Change** modeling demonstrated that 25% of total learners have a high readiness to apply what they learned into practice, additional Segmentation Analysis demonstrated that 28% of active learners and only 18% of passive learners have a high readiness to apply what they learned into practice.



Confidence-based Assessment (CBA) demonstrated a 69% relative reduction in guessing and 91% relative increase in mastery across more than 460,000 paired assessment questions.





Conclusion

We leveraged novel descriptive, diagnostic, and predictive outcomes methodologies to measure the impact of CME/CPD. These methodologies are broadly applied in closely related fields of adult education and education research, but rarely leveraged in CME/CPD. We conclude that not only can these methodologies be effectively applied in CME/CPD, but that they lead to more robust, granular, and actionable insights for CME/CPD educators.

¹Sachidanandan G, Sud A. *J Contin Educ Health Prof.* 2024;44(4):260-272. ²Lucero KS, Moore DE Jr. *J CME.* 2024;13(1); <u>https://doi.org/10.1080/28338073.2024.2420373</u> ³Wong R, Kitto S. *J Contin Educ Health Prof.* 2023;43(4S):S9-S17. ⁴Moore DE, et al. J Contin Educ Health Prof. 2009;29(1):1-15. ⁵Hunt DP. *J Intell Capital*. 2003;4(1):100-113.

⁶Prochaska JO, et al. In: Glanz K, et al, eds. Health Behavior and Health Education: Theory, Research, and Practice. 4th ed. Jossey-Bass; 2008:97-121. ⁷McGowan BS, et al. J Euro CME. 2020;9(1); https://doi.org/10.1080/21614083.2020.1717187

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