DRC BEACON and Giftedness

In 2022-2023, a research study was conducted to model and update the previously-established predictive relationship between DRC BEACON and gifted eligibility in Georgia.

- **DRC BEACON:** As an optional interim assessment aligned to the Georgia Standards of Excellence, BEACON was designed to be administered throughout the academic year to provide on-demand formative information to support data-driven instruction.
- **Purpose:** The purpose of this study was to monitor the strength (sensitivity and specificity) of the relationship between BEACON achievement and gifted eligibility, and to identify the updated optimal range of achievement which may be used to recommend students for further giftedness screening.
- **Results:** The results of this study indicate a continued close logistic relationship between BEACON achievement and gifted eligibility; specifically, that performance on BEACON mathematics and reading assessments throughout the year may provide one meaningful piece of information in distinguishing potential gifted students.
- **Recommendations:** Based on these outcomes and the recommendations from the College Readiness and Talent Development team, GaDOE supports the continued use of BEACON mathematics and reading achievement in recommending further giftedness screening.

Methodology

This study uses 2022-2023 BEACON scores and 2022-2023 gifted eligibility to model the existing relation between BEACON and giftedness. BEACON scores come from three seasons as specified for this interim assessment: 1) Beacon Fall 2022 (August – November), 2) Beacon Winter 2022 (December – February), 3) Beacon Spring 2023, (March – May). The BEACON total mathematics achievement and the BEACON reading domain achievement were used in this study, as mathematics and reading achievement are a focus within giftedness identification processes. Gifted eligibility included students previously identified for gifted services as well as those identified during the 2022-2023 school year. Logistic regression was implemented to predict a student's probability of being identified as gifted from their BEACON mathematics and reading score. The BEACON data were resampled to ensure representativeness of the state in terms of achievement, gender, ethnicity, SWD, locale and giftedness. An ROC curve (receiver operating characteristic curve) was produced for each grade/subject/season. The corresponding "Area Under the ROC Curve" (AUC) was calculated. The AUC ranges in value from 0 to 1. A model whose predictions are 100% wrong has an AUC of 0.0; one whose predictions are 100% correct has an AUC of 1.0. An AUC of 0.5 suggests no discrimination, 0.7 to 0.8 is considered acceptable, 0.8 to 0.9 is considered excellent, and more than 0.9 is considered outstanding. An optimal cut was identified based on the location on the BEACON scale which results in the minimum amount of mis-classification.

Analysis and Outcomes

The AUC and optimal BEACON scale score cut by grade, content area (Reading and Math) and season are reported in the table below. Across grades and content areas, BEACON achievement was an excellent to outstanding predictor of being eligible for gifted services with AUC values range from 0.87 to 0.93. Further, the categorization of this model was evaluated by race/ethnicity to determine if this relation is invariant and appropriate for all Georgia students. Results indicated that for all grades and content areas, the model was equally sensitive in distinguishing Black/Hispanic gifted students as compared to White gifted students. These model results suggest a close logistic relationship between BEACON achievement and gifted eligibility; specifically, that performance on BEACON mathematics and reading assessments throughout the year may provide one meaningful piece of information in distinguishing gifted students.

BEACON Achievement and Gifted Screening

Subject	Grade	Fall		Winter		Spring	
		AUC	BEACON Cut	AUC	BEACON Cut	AUC	BEACON Cut
Math	3	0.904	**418**	0.927	**453**	0.902	**508**
Math	4	0.904	**468**	0.917	**511**	0.883	**567**
Math	5	0.891	**552**	0.912	**560**	0.887	**602**
Math	6	0.921	**552**	0.895	**579**	0.872	**640**
Math	7	0.899	**609**	0.897	**628**	0.893	**640**
Math	8	0.908	**658**	0.895	**691**	0.875	**706**
Reading	3	0.887	**510**	0.910	**554**	0.894	**564**
Reading	4	0.905	**553**	0.906	**566**	0.897	**597**
Reading	5	0.903	**582**	0.892	**615**	0.902	**615**
Reading	6	0.888	**621**	0.896	**631**	0.889	**631**
Reading	7	0.890	**689**	0.885	**689**	0.868	**715**
Reading	8	0.890	**737**	0.883	**737**	0.882	**838**

Recommendations for Local Use

The results of this study support the continued use of BEACON mathematics and reading achievement in recommending further giftedness screening. It is important to note that just as the use of BEACON is a local decision, the use of BEACON achievement as one piece of information to support recommendation for further giftedness screening is also a local decision. While the outcomes of this research indicate a BEACON achievement range which may be optimal for sensitivity and specificity, this is a policy decision which may be made locally in consideration with districts' current giftedness identification plan and goals. If BEACON achievement is used as one measure to identify students for further giftedness screening, the cut points on the BEACON scale referenced above may be determined locally; this research provides one reference point for the optimal cut based on the latest Georgia student data.

- If a district were to decide to raise the scale score point needed for recommendation for further screening, fewer students would be identified as recommended for further screening, resulting in more "false negatives", which here means students who may be gifted but are not recommended for further screening.
- Conversely, if a district were to decide to lower the scale score point needed for recommendation for further screening, more students would be identified as recommended for further screening, resulting in more "false positives" for students who will not be eligible for gifted services but are still recommended for further screening.

Because BEACON assessments do not produce normative information, they may not be used to determine giftedness eligibility; they may be used as one piece of information to recommend students for further giftedness screening. For more information on giftedness identification in Georgia, visit: https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Pages/Gifted-Education.aspx