

Case Study: VisionTree™ Professional applied to the resident selection process as a method for improved efficiency, group consensus and ranking validation

Introduction:

The process of selecting a medical school graduate to enter a residency program spans across all subspecialties and is one that carries a high level of importance as the decision not only impacts the specific program, but also for candidates themselves in maximizing their growth and development potential as future leaders in their fields.

The current resident selection process is comprised of a series of interviews and group deliberation on individual candidates. While having been effective in making a final decision, the approach has often been lengthy and arduous, and lacking a consistent methodology for evaluation, group input and ranking validation.

Therefore, a continued desire exists to explore new techniques and applications that have the potential to save time, cost and support a conclusive and documented decision by group consensus.

Materials and Methods:

Since the resident selection process spans across all subspecialties, the National Residency Matching Program (NRMP) has provided the starting point for beginning the match between a resident and the optimal program for them. Specifically in the field of neurosurgery, entering the Neurosurgery Residency Matching Program (NSMP) established by the Society for Neurological Surgeons (SNS) is a requirement for the UCLA Neurosurgery Resident Program application.

Once matched, the process of selecting residents for the program is underway with personal interviews and an evaluation of each candidate's academic record, national board scores, publications and letters of recommendation. Upon thorough review, discussion and evaluation of each candidate, the faculty and staff ranked the candidates in the selection process. In an effort to compliment the validation of the process, The UCLA Division of Neurosurgery introduced a new and innovative software tool called VisionTree Professional to weigh each candidate against the selection criteria.*

The VisionTree program was projected on a screen in the front of the room and a total of 22 faculty and staff members were given a wireless handheld device to access each step of the software. This allowed for input of individual ratings utilizing the program's web-based thin client application. With sliding scales (from 0 to 10) each group member anonymously rated the importance of each criteria on their handheld device. In a step-by-step wizard driven approach, each candidate was then individually weighed against this criteria with the software calculating a collective average based on input from all participants in real-time. An overall score (normalized between 0-100) was calculated by the software for each candidate (as a percentage), representing how they well met the given criteria. Additionally, the software generated a graphical view (bar graph, pie chart and scatter plot) to evaluate the statistical data and trends. The entire process including generation of graphical data output took approximately one hour.

Results:

The top 20 candidate scores generated using the software ranged from 80 to 100 and were presented in order of statistical preference. Since a ranking of the candidates was also conducted by the group using a white board, the two ranking techniques have been compared through a correlation and regression analysis (See Page 2).

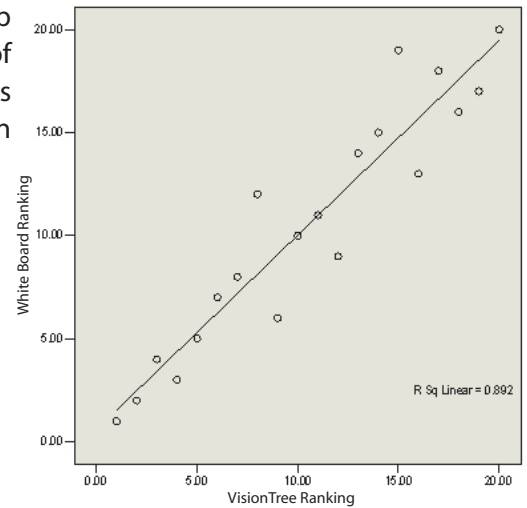


Dr. Neil Martin, Chief of UCLA Neurosurgery, using VisionTree wi-fi enabled handheld device to input ratings.

* Courtesy of UCLA Division of Neurosurgery

Correlation Analysis

In obtaining the White Board Ranking and VisionTree Ranking of the top 20 candidates, a correlation was derived between the relationships of the two rankings. A Spearman rank-order correlation coefficient (r_s) was used as it is specifically geared to correlating ranked data measured on an ordinal level (Siegel & Castellan, 1988). The value range of this correlation is from -1 to +1. A scatter plot is also provided to graphically illustrate the extent of the correlation. Another measure of association to rank order data is the Kendall rank-order correlation (also referred to as Kendall's τ) which calculates "the difference between the probability that, in the observed data, X and Y are in the same order and the probability that the X and Y are in different orders" (Siegel & Castellan, 1988, p. 251). Thus, this statistic takes into account agreement/disagreement. The following scatter plot and table present a graphical interpretation of both Spearman and Kendall rank-order correlations.



As we can see from the scatter plot, there is a strong, linear and positive association between the VisionTree ranking (X) and the White Board Ranking (Y). No outliers were detected. The correlation matrix shows that for the Spearman rank-order correlation coefficient (r_s) there is a strong association (.944), whereas Kendall's rank-order correlation is slightly lower (.821), but still a strong association.

Correlations

			WB_Rank White Board Ranking	VT_Rank VisionTree Ranking
Kendall's tau_b	WB_Rank White Board Ranking	Correlation Coefficient	1.000	.821**
		Sig. (2-tailed)	.	.000
		N	20	20
VT_Rank VisionTree Ranking		Correlation Coefficient	.821**	1.000
		Sig. (2-tailed)	.000	.
		N	20	20
Spearman's rho	WB_Rank White Board Ranking	Correlation Coefficient	1.000	.944**
		Sig. (2-tailed)	.	.000
		N	20	20
VT_Rank VisionTree Ranking		Correlation Coefficient	.944**	1.000
		Sig. (2-tailed)	.000	.
		N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

In an effort to assess the predictive validity of the VisionTree Ranking methodology, a regression analysis was also conducted. For this analysis, the VisionTree Ranking was evaluated as the predictor of the White Board Ranking criterion. This analysis, as with the correlation above, reveals the magnitude of the predictor/criterion relationship (r^2), with the index expressed as a percentage from 0-100%.

Model Summary

		Adjusted	Std. Error of	R Square					
1	.944 ^a	.892	1.99919	.892	148.386	1	18	.000	

a. Predictors: (Constant), VT_Rank VisionTree Ranking

From the above analysis, we see that based on the correlation of .944, 89.2% of the variation is accounted for, which indicates a very strong overlap, bordering on redundancy, of the two measures. Thus, from this output, the VisionTree ranking represents a significant predictor ($b = .944$, $t = 12.18$, $p < .05$, 95% Confidence Interval = [.781, 1.107]) to the White Board ranking.

Conclusions:

VisionTree Professional used as part of the resident selection process provides a valuable means of logically evaluating candidates by generating statistical preferences that demonstrate a high level of correlation with traditional ranking methods. VisionTree offers an innovative new approach that saves time and cost over traditional methods alone, while adding confidence and validation to the overall resident selection process through effective and well documented group consensus.

References:

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum.
 Netmeyer, R. G., Bearden, W. O., & Sharma, S. (2003). Scaling procedures. Thousand Oaks, CA: Sage.
 Siegel, S., & Castellan, N. J., Jr. (1988). Nonparametric statistics for the behavioral sciences. (2nd Ed.). NY: McGraw-Hill.