# What Are The Odds?

## Measuring College Basketball



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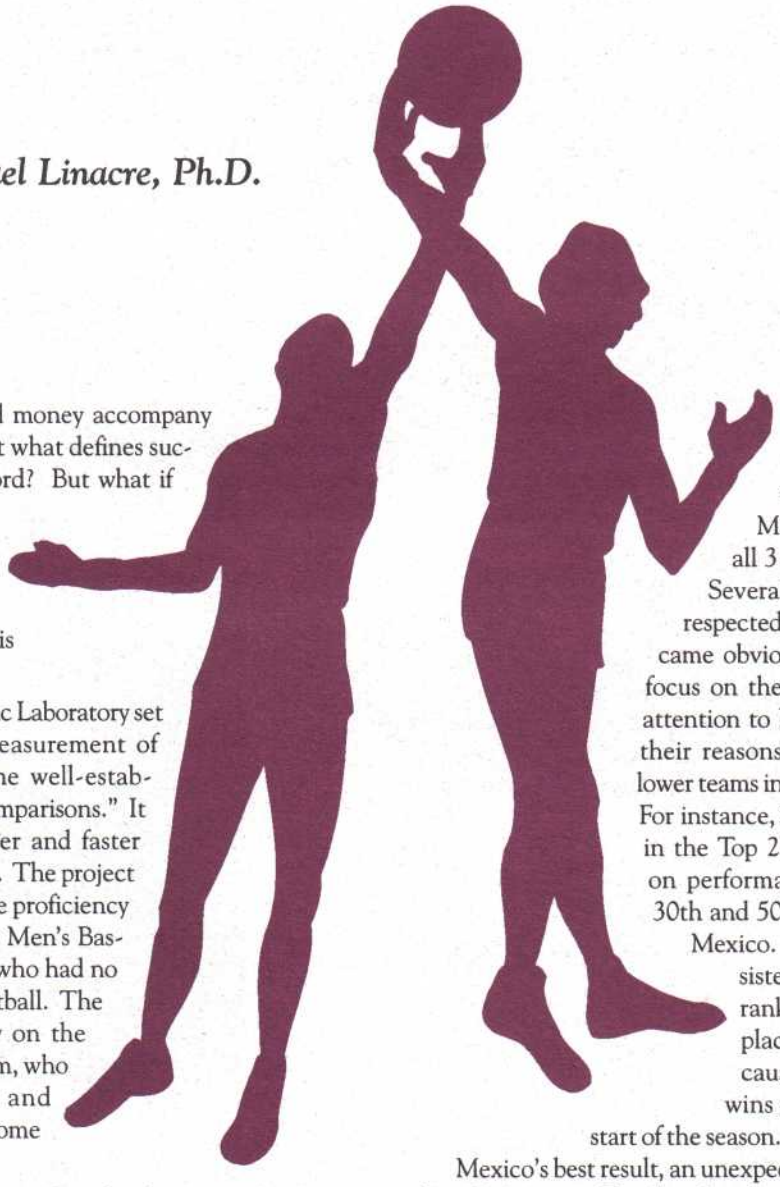

Pride, prestige, and money accompany a successful sports team. But what defines success? A good won-loss record? But what if only weak opponents are played? Experts' opinions? But what if they fail to notice you? A simple, fair, objective measurement system is needed.

MESA Psychometric Laboratory set out to demonstrate the measurement of team performance using the well-established method of "paired comparisons." It turned out to be even easier and faster than was initially envisioned. The project involved measurement of the proficiency of 1998-9 NCAA Division I Men's Basketball Teams by an analyst who had no experience in College Basketball. The measures were based solely on the won-loss records of each team, who their opponents were, and whether the games were at home or on the road.

The results were astounding for their immediacy, simplicity, and face validity! Basketball games are played almost every day from November to March. MESA published team measures, updated daily, for the entire basketball season. MESA's top 20 teams were generally the same as those of the Associated Press weekly poll of 70 basketball experts — though with minor differences in ordering. AP, however, only lists the Top 25 teams. MESA measured and ranked all 315 Division I teams.

Several idiosyncracies in the widely respected and reported AP system became obvious. The basketball experts focus on the top teams. They pay less attention to lower teams. Consequently their reasons for choosing some of the lower teams in the Top 25 are idiosyncratic. For instance, Syracuse was always ranked in the Top 25, yet MESA ranked them, on performance, consistently between 30th and 50th. Even stranger was New Mexico. AP ranked this team consistently in the Top 25, MESA ranked them around 75th. AP placed them in the Top 25 because they had a run of home wins against weak teams at the start of the season. This was reinforced by New Mexico's best result, an unexpected home win against Number 13, Arizona. The fact that they were beaten on the road by Number 242, Hawaii, seems to have been ignored. It seemed that AP experts were reluctant to drop teams from the top 25 or introduce new teams. It was not until Florida was the 10th best team (according to MESA), that the AP experts voted it into the top 25.

The real difference between AP and MESA is in terms of prediction. MESA provides every team a measure of proficiency on a linear scale. The measurement model for a win by Home Team, H, over Guest Team, G, is the Rasch paired comparison model:

log ( Probability (Win by H) / Probability (Loss by H) ) = H's Proficiency + Home Court Advantage - G's Proficiency

Each day, MESA computed a measure for each of the 315 teams and the size of the home court advantage. This made it possible to predict the outcome of each night's basketball games. 65% of basketball games were won by the home team. The home court advantage corresponded to .8 logits. The range of measures of Div. I teams covered 10 logits. Since MESA computed a measure for every team, the victor of a game was predicted to be the larger of (Home team strength + Home court advantage) and (Guest team strength). For games played on neutral courts, there was no home court advantage. MESA successfully predicted, in advance, 72% of game outcomes, i.e., about 3 out of 4 games. This performance is on a par with professional tipsters, but they only predict selected games, not the entire schedule. On 3 days, MESA correctly predicted all game results. The worst showing was one day when only 40% of outcomes were predicted correctly.

This same simple technique of paired comparisons has been applied in many contexts. Here are the steps that were followed for NCAA Basketball:

1. Download a list of teams. The definitive list of Division I teams was found on the NCAA web site a few weeks into the season. Initially a list was built up from reported results. Since some teams were found to have variants to their names, a synonym list of team names was constructed. New teams were also added to the list as Division I teams played other schools. These were added to keep the won-loss records correct, but had little influence on measures.

2. Since there are many teams which maintain perfect records for a few games at the start of the season, a win against a notional very bad team and a loss against a notional very good team were imputed for each actual team. Pre-season rankings were also incorporated, but these were found to become uninformative after each team played only a few games.

3. Download accurate results daily. Many sources provided results for the AP Top 25. Yahoo alone provided scores for all games and indicated home team. Mistakes and omissions, however, occurred. Checking the won-loss records of top teams against their own websites prevented conspicuous blunders. Since it was not always obvious who were home teams at invitational and tournament events, some detective work was required. Measures, however, proved to be robust against occasional reporting and data-entry errors.

4. Add current results to the database of cumulative results and estimate measures. A series of short BASIC programs edited, checked, and formatted the downloaded results into a data file suitable for analysis by the Facets program. Analysis was performed and another BASIC program reformatted the Facets output into HTML web pages which could be immediately uploaded onto the MESA web site. Turn-around time was less than an hour. In situations in which there is no home court advantage nor order effect in the paired comparisons, then it would be easier to use more conventional Rasch software, such as WINSTEPS. 5. Make predictions. The daily schedule of games could be downloaded and results predicted. Since all teams and the home court advantage were measured, making predictions was a "piece-of-cake."

MESA encourages others to apply these techniques to sports competitions, consumer preferences, value comparisons, or other situations in which outcomes are based on paired contrasts. Mike Linacre, MESA Psychometric Laboratory University of Chicago MESA@uchicago.edu

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