Appendix 1 Scoring system of methodology transparency

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| Assessment Dimension | Assessment Item | Scoring Criteria | Explanation |
| Selection | Clarity and Selection of Study Population | 0-1 points: Clear and adequate definition: 1 point; unclear or inadequate definition: 0 points | Whether the study population has clear definitions and selection criteria. For example, whether the study population includes language learners of a specific age group and has clear boredom measurement standards. |
|  | Representativeness of the Sample | 0-1 points: Sample representative of the target population: 1 point; sample not representative: 0 points | Whether the sample is representative of the overall target population. For example, whether the study sample covers learners of different genders, ages, and language proficiency levels. |
|  | Participation Rate | 0-1 points: High participation rate and reported: 1 point; low participation rate or not reported: 0 points | Whether the participation rate is high and reported. For example, whether more than 80% of the subjects completed all measurements and the participation rate is reported in detail. |
| Comparability | Control of Major Confounding Factors | 0-1 points: Controlled major confounding factors: 1 point; not controlled: 0 points | Whether the study controlled for major confounding factors in the design or analysis, such as age, gender etc. |
|  | Use of Multivariate Analysis | 0-1 points: Conducted multivariate analysis: 1 point; not conducted: 0 points | Whether multivariate analysis was conducted to control for additional confounding factors, such as using regression analysis to control for multiple variables. |
| Outcome | Measurement of Boredom | 0-1 points: Used reliable and validated measurement tools: 1 point; unreliable or invalid tools: 0 points | Whether the measurement tools used are validated and reliable. For example, whether a validated boredom scale was used. |
|  | Measurement of Achievement | 0-1 points: Consistent and validated assessment methods: 1 point; inconsistent or invalid methods: 0 points | Whether the assessment methods for achievement are consistent and validated. |
|  | Completeness of Data Collection | 0-1 points: Complete data collection and reasonable handling: 1 point; incomplete data collection or unreasonable handling: 0 points | Whether data collection is complete and the handling of missing data is reasonable. For example, whether the handling of missing data, such as imputation methods, is reported. |