

K-Nearest Neighbors Classification of Adolescents at Risk for Problematic Internet Use Based on Psychological and Behavioral Features

Laura. Paredes¹, Michael. Davies^{2*}

¹ Department of Educational Psychology, Autonomous University of Santo Domingo, Santo Domingo, Dominican Republic

² Department of Organizational Psychology, Carleton University, Ottawa, Canada

* Corresponding author email address: michael.davies@carleton.ca

E d i t o r	R e v i e w e r s
Trevor Archer  Professor Department of Psychology University of Gothenburg, Sweden trevorcsarcher49@gmail.com	Reviewer 1: Zahra Yousefi  Assistant Professor, Department of Psychology, Khorasgan Branch, Islamic Azad University, Isfahan, Iran. Email: yousefi1393@khuif.ac.ir Reviewer 2: Mehdi Rostami  Department of Psychology and Counseling, KMAN Research Institute, Richmond Hill, Ontario, Canada. Email: dr.mrostami@kmanresce.ca

1. Round 1

1.1. Reviewer 1

Reviewer:

In the same Methods paragraph, the sampling description states that adolescents were recruited from public secondary schools in Ontario through “a multistage cluster sampling procedure,” but the number of school districts, schools, classrooms, and students invited is not reported. Please provide the sampling frame in sufficient detail to allow assessment of representativeness. The manuscript should also indicate whether school-level clustering was accounted for analytically or whether adolescents were treated as statistically independent despite being nested within schools and classes.

The manuscript states that “the target variable entered into the KNN classifier was binary, with participants categorized as either at risk or not at risk,” but the exact Internet Addiction Test cutoff used to create these classes is not reported. This is a critical reproducibility issue. Please state the numerical threshold, explain why that threshold was selected, identify whether it corresponds to a validated clinical or screening convention, and discuss whether alternative thresholds would materially affect prevalence and classification performance.

The manuscript reports that the final model used “distance-weighted voting,” but the mathematical form of the weighting function is not specified. Please state whether the weights were inverse distance, inverse squared distance, or another function. This is not a minor implementation detail because different weighting schemes can materially influence neighborhood voting, particularly when observations are densely clustered.

In Table 3, the reported test-set metrics appear internally consistent, but the confidence intervals require methodological clarification. Please state how the 95% confidence intervals for accuracy, sensitivity, specificity, precision, negative predictive value, balanced accuracy, F1 score, and ROC-AUC were calculated. If bootstrap intervals were used, report the number of bootstrap resamples and whether resampling was stratified.

Authors uploaded the revised manuscript.

1.2. Reviewer 2

Reviewer:

In the Data Collection Tools section, the psychological predictors include depressive symptoms, anxiety, perceived stress, self-esteem, loneliness, and emotion regulation difficulties, but the manuscript does not report reliability estimates for these instruments in the current sample. Please provide internal-consistency coefficients, preferably omega and/or Cronbach’s alpha, for each scale. Because machine-learning performance depends on the quality of predictor measurement, reporting psychometric properties in the actual study sample is necessary rather than relying only on prior validation literature.

The paragraph describing the behavioral questionnaire states that it was “developed for the present study based on behaviors theoretically and empirically associated with excessive Internet engagement among adolescents.” This instrument appears to contain several custom indicators, yet no information is given regarding content validation, pilot testing, test–retest reliability, or item wording. Please describe the development process in greater methodological detail and indicate whether experts reviewed the items, whether adolescents pilot-tested them, and how response scales were constructed.

In the Data Analysis section, the manuscript states that numerical missing values were imputed using the median and categorical variables using the most frequent category, but the extent and pattern of missing data are not reported. Please report the percentage of missingness by variable and justify the use of simple imputation. If missingness was nontrivial, the authors should consider whether multiple imputation or model-based approaches would provide less biased estimates. At minimum, sensitivity analyses should be discussed.

The sentence “Continuous predictors were standardized using z-score transformation so that each standardized feature had a mean of zero and a standard deviation of one within the training data” is appropriate for KNN, but the preprocessing pipeline should be described more rigorously. Please clarify whether imputation, encoding, and scaling were all performed within each cross-validation fold rather than once before cross-validation. If preprocessing occurred before resampling, information leakage could inflate cross-validated performance.

The training-test split of 75%/25% is stated clearly, but the manuscript should justify why a single holdout split was chosen rather than repeated nested cross-validation or repeated train-test resampling. Because the total sample is only 704 participants and the at-risk group is smaller, the performance estimates may depend on a particular split. Please report the random seed and consider supplementing the main analysis with repeated resampling or bootstrap confidence intervals for key metrics.

In Table 2, candidate values of k are limited to 3, 5, 7, 9, 11, and 13. Please explain why this hyperparameter range was selected and whether a broader search was conducted. It would be methodologically stronger to describe the entire search space, including distance metric, weighting scheme, and any additional KNN parameters. Please also state the model-selection criterion explicitly, because the text indicates emphasis on balanced performance, sensitivity, and F1 score, while the table reports several competing metrics.

Authors uploaded the revised manuscript.

2. Revised

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.