Cyberbullying Cost Estimate Technical Appendix

Prepared by Rebecca Davis, University of Pennsylvania & Joshua R. Polanin, American Institutes for Research

Identifying Evidence-Based Cyberbullying Programs

Purpose:

To identify high-quality, evidence-based programs to address cyberbullying perpetration and victimization using the findings from Polanin and colleagues (2021).

Methods:

Systematic review methods. We created a review protocol that articulated the inclusion/exclusion criteria, search strategy, screening procedures, data extraction codebook, and preanalysis plan. We preregistered the protocol and preanalysis plan on the Open Science Framework (https://osf.io/dzn2p/). We also published the extracted and analytical datasets as well as the accompanying statistical R code to our OSF page.

To be included in the systematic review, studies must have met the following criteria:

1. The program was implemented within a K–12 setting.

2. The sample included K–12-age students.

3. The outcomes measured either cyberbullying perpetration or victimization.

4. The study was written in English, Spanish, or Turkish; no restrictions were placed on the location of the setting.

5. The study was published on or after 1995.

6. No restrictions were placed on the publication type.

After creating a robust search string, we conducted extensive online databases searches. We also contacted several dozen researchers, hand-searched two leading journals, conducted forward and backward reference harvesting, and queried authors when studies or data were missing. We followed systematic review best practices to conduct the screening and coding. We estimated meta-analytic models for the primary outcomes—cyberbullying perpetration and victimization—as well as for secondary outcomes like school violence perpetration and victimization. As part of the coding process, we identified the core components of each intervention program and grouped the studies accordingly.

We then attempted to explain variation among the study's effects using meta-regression modeling. A full account of the methodological processes can be found in Polanin and colleagues (2021).

The results of the systematic review revealed 50 studies and 320 effect sizes, accounting for 45,371 students. More than 80% of the programs included a skill-building core component while less than 20% of the programs included therapy or other targeted responses. Overall, the programs were effective at reducing cyberbullying perpetration (*effect size [ES]* = -0.18) and victimization (*ES* = -0.13). We posit that a selected program will have a 76% and 73% probability at reducing perpetration and victimization, respectively. We did not identify any factors, however, that contributed significantly to program success.

Identifying evidence-based programs. To help education decisionmakers identify evidence-based programs and the costs associated with them, we sought to narrow the 50 studies originally included in the review to a manageable number. To narrow the list, we used several criteria meant to identify the programs most likely to reduce cyberbullying. The following criteria were used:

1. The program had an established curriculum and included branding, and therefore was identifiable and replicable.

2. The program had been evaluated using a high-quality study design and met What Works Clearinghouse Standards without reservations (What Works Clearinghouse, 2020).

3. The evaluation authors measured both cyberbullying perpetration and victimization.

4. The results of the program evaluation revealed an average effect size of -0.15 or greater.

These criteria narrowed the list of programs to three.

1. Media Heroes (MH). Wölfer, R., Schultze-Krumbholz, A., Zagorscak, P., Jäkel, A., Göbel, K., & Scheithauer, H. (2014). Prevention 2.0: Targeting cyberbullying @ school. *Prevention Science*, *15*(6), 879–887. https://doi.org/10.1007/s11121-013-0438-y

2. KiVa Antibullying Program. Williford, A., Elledge, L. C., Boulton, A. J., DePaolis, K. J., Little, T. D., & Salmivalli, C. (2013). Effects of the KiVa antibullying program on cyberbullying and cybervictimization frequency among Finnish youth. *Journal of Clinical Child & Adolescent Psychology*, *42*(6), 820–833. https://doi.org/10.1080/15374416.2013.787623

3. Cyberprogram 2.0 (CP). Garaigordobil, M., & Martínez-Valderrey, V. (2015). Effects of Cyberprogram 2.0 on "face-to-face" bullying, cyberbullying, and empathy. *Psicothema*, *27*(1),*45*–51.

From the three programs, we identified four key program characteristics (Table 1). The first, "Targets cyberbullying directly," identified whether the curriculum specifically addressed cyberbullying. The

second characteristic represented who should implement the program, either a teacher or a school staff member. The third characteristic specified whether the curriculum included training for the implementer. Finally, the fourth characteristic identified programs that included media such as a computer game or video program.

Table 1. Program characteristics

Program	MH	KiVa	CP
Targets cyberbullying directly	Yes	Yes	Yes
Implementer	Teacher	Teacher	School staff
Includes training	Yes	Yes	No
Includes media	No	No	Yes

Estimating Cyberbullying Program Costs

Purpose:

To estimate the costs of three cyberbullying programs as the program is designed and described in research studies.

Methods:

The ingredients method (Levin et al., 2018) suggests that researchers collect a complete list of the resources, or "ingredients" required to implement an educational program and then match those ingredients to national standardized prices. To estimate the costs of a program as implemented, researchers need to collect information about program implementation, typically using original data collection, including surveys, observations, interviews, time logs, and document analysis, ideally simultaneously with program delivery. We were limited in that we could not collect any original data on these programs and because the programs' studies were complete, our estimates were retroactive. Instead, we focused on estimating the costs of the program as designed by compiling a list of key ingredients and matching this list with standardized U.S. prices to generate comparable measures of resource intensity.

Data:

Ingredients list data. We began with the papers used in the meta-analysis and collected additional papers cited in these papers. In addition, we reviewed any documents or resources that were specifically cited in these documents, such as program manuals, websites, and videos. We also consulted program websites and popular press articles from a similar era as the research. From these sources, a set of ingredients and quantities required were listed. When there was ambiguity, internet

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queries were used to seek greater detail, and assumptions were made when necessary. These assumptions are listed in detail in the next section. References and data sources are listed in the spreadsheet for the specific programs and ingredients.

Price data. Prices were gathered from national sources within the United States. School staff salary data was collected from the Bureau of Labor Statistics median salary ranges for appropriate positions. Technology and materials prices were collected from third-party national retailers. When a specific set of materials or resources were required by the program, such as a teacher guide, training package, or bundle of videos, the list price published by the program was used.

Research decisions and assumptions:

Amortization. Costs that were assumed to be useful in more than 1 year were amortized over the useful life of the resource at a 3.5% rate to reflect the opportunity costs of funds used to effectively "prepurchase" resources for future years. This included computers and other technology and staff training.

Inflation. All prices were adjusted to 2019 U.S. dollars.

Class size and school size. Class size was assumed to be 25 students. This figure was only relevant in estimating the costs of resources that need to be allocated on a per pupil basis, which was infrequent in this analysis. The only example of a per student resource was the costs for shared computers in KiVa and the costs for parent nights in KiVa and Media Heroes. The program was assumed to be shared across 12 classrooms per school, which was relevant in dividing the costs for whole school items, such as a response team in KiVa.

Staff qualifications. Unless specialized teacher or school staff characteristics were indicated in descriptions of the program, the median teacher salary was used. In the case of CP, the program design indicated that the person delivering instruction should have specialized training in student mental health, so the median salary for a guidance counselor was used.

School year length. The school year was assumed to be 1,260 hours long. This figure was used to adjust annual salaries to hourly wages.

Benefits rate. A standard benefits rate of 50.38% was used for all salaried staff rates.

Items shared with multiple programs. Costs for items such as computers that were logically used in non-cyberbullying programs were divided by a share proportionate to the amount logically used for the cyberbullying program.

Preparation time. It was assumed that school staff spent an additional 20% of the time spent directly administering the program on preparation and related tasks.

Technology use. If the program documentation specified the use of technology, playing a computer game in KiVa and projecting videos in CP, the appropriate equipment was included at a prorated cost proportionate to the amount of time it would reasonably be used for the cyberbullying program.

Volunteer and parent time. Media Heroes and KiVa both specified an information session that occurred for parents and families. It was assumed that these events had a minimal amount of food and occurred in the evenings. Teacher time was accounted for using the teacher rate. Parent/family time was accounted for using the U.S. minimum wage to account for the opportunity cost of their attendance.

Facilities costs. Because the programs all occurred during the school day in typical school spaces, no facility costs were applied. The facility costs for these programs would have very likely been low and a sensitivity analysis could be conducted.

Overhead. Principal/administrator overhead was included in all three programs as it was implied although not explicitly discussed in any of them, and 1 hour of principal time per classroom for all programs was assumed. No other overhead was applied.

Program design costs. Program development and design costs were assumed to be included in the purchase price for materials, training, and so on.

Training costs. Teacher time spent in training was assumed at their regular hourly rate to account for the opportunity cost of their time. Additional estimates using a typical per diem were substituted for this hourly rate in estimating the schools' budgetary contribution (see results).

Currency. Some list prices were made available only in non-U.S. currency. These were adjusted to U.S. dollars using a currency conversion calculator for the relevant year in which the prices were valid.

Limitations:

These estimates should not be considered as precise measures of exactly what a school would expect to pay for a similar program. This limitation is the result of substantial differences in settings and individual costs; for example, different teacher salary costs in different locations and settings will shift the price estimate. Nor are the estimates appropriate for combining with an effect size to estimate a cost-effectiveness ratio. To estimate the cost portion of a cost-effective ratio, the cost estimate would need to reflect what was delivered to produce the observed effects. We do not estimate the costs of the program as delivered; instead, we estimate the costs of the program as designed.

Results:

Table 2 reports the total costs described above and the costs that are actual budgetary expenditures on the part of the school. The differences in the total costs and the budgetary costs are the result of the costs of reallocated staff time. in the total costs, reallocated staff time is included to reflect the opportunity cost of that time; time spent teaching cyberbullying is time that cannot be spent teaching

something else and therefore should be accounted for. However, a school is unlikely to hire a teacher to specifically teach 10 hours of cyberbullying programming a year, so these costs are theoretical rather than budgetary; thus, the anticipated budgetary expenditures include only resources that represent new expenditures, such as the purchase price of the program, training, and materials.

Table 2. Budgetary School Expenditures

	KiVa	MH, short	MH, long	CP
Total cost per classroom	$2,890.00*	$1,470.00	$2,270.00	$2,070.00
School expenditures	$630.00*	$460.00	$460.00	$70.00

Note: All prices adjusted to 2019 U.S. dollars and rounded to the nearest 10. Total cost per classroom includes reallocated resources, such as teacher time. School expenditures include only budgetary items such as the cost of new materials and training and omits reallocated resources, such as teacher time during the school day. Actual costs may vary by region and by vendor pricing. *KiVa list prices were unavailable and actual prices may differ.

Table 3 presents the total costs of the programs broken out by cost category.

Table 3. Costs by Category

	KiVa	MH, short	MH, long	CP
Teacher time	$1,990.00	$650.00	$1,440.00	$2,000.00
Training costs	$510.00	$630.00	$630.00	$0.00
Materials & other costs	$380.00*	$190.00	$190.00	$70.00

Note: All prices adjusted to 2019 U.S. dollars and rounded to the nearest 10. Total cost per classroom includes reallocated resources, such as teacher time. Actual costs may vary by region and by vendor pricing. *KiVa list prices were unavailable and actual prices may differ.

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Reference List

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