Usability Testing of a Bystander Bullying Intervention App (STAC-T) for Rural Middle Schools: A Mixed-Methods Study

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Abstract

Background: Students who are targets of bullying are at high risk for negative mental health outcomes including depression, anxiety, and suicidal ideation. Implementing school-based bullying prevention programs reduces bullying. Bullying prevention programs are particularly important in rural schools, as bullying is more prevalent in rural schools compared to urban schools. Comprehensive, school-wide bullying prevention programs, however, require resources that create significant barriers to implementation for rural schools. Because technology-based programs can reduce some of these implementation barriers, the development of a technology-based program to address bullying increases access to bullying prevention for students in rural settings.

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Methods: A sample of 21 participants (N = 10 school personnel; N = 11 students) recruited from two middle schools in rural, low-income communities in two states completed usability testing followed by a qualitative interview. We used descriptive statistics and independent sample t-tests to assess usability and program satisfaction. We used consensual qualitative research (CQR) as a framework to extract themes related to usefulness, relevance, needs, barriers, and feedback for intervention development.

Results: Usability testing indicated the app was easy to use, acceptable, and feasible. Both school personnel (M = 96.0, SD = 3.9) and students (M = 88.6, SD = 9.5) rated the app well above the standard cutoff score for above-average usability (i.e., 68.0) and both school personnel (M = 6.10, SD = 0.32) and students (M = 6.09, SD = 0.30) gave the app high user-friendliness ratings (0-7 scale, with 7 high user-friendliness). Overall ratings also suggested school personnel and students were satisfied with the program. Among school personnel, 100% (n = 10) said they would recommend the program to others and 10% (n = 1), 50% (n = 5), and 40% (n = 4) rated the program as 3, 4, and 5 stars, respectively. Among students, 90.9% (n = 10) said they would recommend the program to others and 27.3% (n = 3) and 72.7% (n = 8) rated the program as 4 stars and 5 stars, respectively. There were no statistically significant differences in ratings between school personnel and students. Qualitative data revealed that both school personnel and students found the STAC-T app useful, relevant, and appropriate, while providing feedback related to the importance of narration of the text and the need for teacher and parent trainings to accompany the student program. Data also showed school personnel and students would find a tracker useful, in which students could report the different types of bullying they witnessed and strategies they used to intervene. Data from school personnel also indicated the program was perceived as practical and very likely to be adopted by schools, with time, cost, and accessibility being noted as potential barriers for schools in rural communities.

Conclusions: Results from this study demonstrate high usability and acceptability of the STAC-T app and provide support for implementing a full-scale randomized controlled trial to test the efficacy of STAC-T. Clinical Trial: Clinicaltrials.gov NCT05572398

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Keywords: technology-based bullying intervention; STAC-T; usability testing; middle school; rural

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Introduction

Bullying is a national public health issue in the United States (U.S.), with 19.2% of students ages 12-18 reporting being bullied at school in the past year [1]. Bullying peaks in middle school, with 26.5% of sixth grader students reporting being a target of school bullying, followed by 26.3% of

seventh graders and 25.1% of eighth graders [1]. Among students who report being bullied, 21.6% report being bullied online. Findings from a meta-analysis examining consequences of bullying indicated that students who are targets of bullying report a wide range of negative mental health outcomes, including symptoms of anxiety, post-traumatic stress, depressive symptoms, non-suicidal self-injury, suicidal ideation, and suicide attempts [2]. Similarly, being a target of cyberbullying is associated with internalizing symptoms and suicidal ideation [3-5]. Thus, it is imperative to develop effective interventions for middle school students that are accessible and easy to implement to reduce bullying and the associated negative consequences.

Youth in Rural Schools

Youth attending school in rural communities are at high risk for experiencing both school bullying and cyberbullying [6-8]. According to the most recent U.S. national statistics, the prevalence of school bullying victimization is higher among students in rural areas (23.8%) relative to students in urban areas (19.0%) [1]. Among targets of bullying, students attending rural schools are also more likely to report being bullied online (23.0%) compared to students attending urban schools (19.5%) [1]. Rural students also report a higher rate of being bullied with repetition (18.8%) compared to urban students (14.4%). Among middle school students attending schools in rural communities, bullying victimization is associated with poor school relationships, negative school experiences [9], as well as depression and anxiety [9,10]. These data suggest the importance of developing school-based bullying prevention programs specifically for students in rural communities.

School-Based Bullying Interventions

Comprehensive, school-wide interventions are effective in reducing bullying and the associated negative mental health outcomes [11]. Further, bystander training (e.g., teaching students who witness bullying to intervene in bullying situations) is an important intervention component [11]. Although up to 80% of students report witnessing bullying [12], only 20% intervene [13].

Because students report they do not know how to intervene when they witness bullying [14], bystander training is a promising approach to bullying prevention. Yet, few comprehensive, school-based programs incorporate bystander training. Additionally, comprehensive, school-wide bullying prevention programs are expensive, complex, time intensive, and require extensive training [15]. Because these interventions require substantial resources, many schools face implementation barriers. Schools in rural communities may also face economic disparities, creating further implementation challenges [16], including a lower tax base, increased training costs due to bringing in expert trainers, frequent staff turnover, school closures, staff overload, and lack of program advocates in bullying prevention [17]. Challenges related to logistical problems, training requirements, and limited funding can negatively impact program adoption and sustainability [17].

Shifting to a Technology-Based Bullying Intervention

Technology-based interventions have the potential to improve access to programming and decrease implementation barriers experienced in rural communities [17]. Although some rural areas have higher rates of poor internet connectivity, eligible schools in rural communities can receive discounts for internet and broadband services [18]. Federal grants to build broadband infrastructure in rural areas are also available [19]. Additionally, research conducted with key middle school personnel (i.e., administrators, teachers, and school counselors) in rural communities indicates both a strong interest in technology-based bullying intervention programs and positive implementation conditions (e.g., administrative support and technology-readiness) [20]. Thus, the majority of students in rural communities have access to the necessary infrastructure to support technology-based programs and key personnel in rural middle schools indicate schools are interested and ready for technology-based bullying interventions.

The STAC Intervention

STAC [21] is a brief, stand-alone bystander intervention that includes didactic and experiential training, followed by two booster sessions. The 75-minute didactic training includes

education about bullying and cyberbullying, consequences of bullying, bystander roles, and a description of the four STAC strategies: 1) "Stealing the show" – using humor or distraction to interrupt the bullying situation removing the attention away from the target, 2) "Turning it over" – informing an adult about the bullying and asking for help, 3) "Accompanying others" – befriending or providing supporting the targeted student, and 4) "Coaching compassion" – gently confronting the perpetrator to increase empathy for target. The experiential training is comprised of a series of role-plays during which students practice using the STAC strategies through bullying scenarios. The STAC training is followed by two 15-minute booster sessions to reinforce learning. The STAC intervention is effective in reducing bullying [22,23], as well as mental health risks for bystanders [24-28]. STAC has also been adapted to be culturally appropriate for middle school students in rural communities [29-31]. Research on the adapted STAC intervention demonstrates both bullying reduction [29,32] and improved mental health [29,33] among students trained in the program.

Technology-Based STAC Intervention (STAC-T)

STAC-T is a web-based app developed to shift intervention delivery from in-person implementation to a technology-based format, thereby increasing accessibility and reducing barriers to intervention implementation. STAC-T is designed to be easily disseminated to large groups of students who can access the intervention from a computer, tablet, or smartphone. Additionally, the 40-minute STAC-T app is designed to be modular, increasing implementation flexibility. The initial training is followed by one 15-minute booster session designed to reinforce skill acquisition through virtual role-plays. The program is interactive, including knowledge checks, personalized feedback, and the selection of avatars to respond to bullying scenarios. Initial development included the design and testing of a STAC-T prototype. The design of STAC-T was developed based on the content of the in-person STAC intervention for rural middle schools, as well as feedback from an Expert Advisory Board and key middle school personnel in rural communities. Additionally, students attending rural middle schools participated in three iterative focus groups, providing feedback on

program usefulness, content, and functionality [34]. Once developed, the STAC-T prototype was evaluated through usability testing, which provided feedback from end-users on program functioning [35]. Results from usability testing with key personnel and students from two rural middle schools indicated that the STAC-T prototype was easy to use, acceptable, and feasible, supporting the full-scale development of the STAC-T app [34].

The Current Study

The purpose of the current study is to evaluate the usability and acceptability of the full-scale STAC-T app to determine readiness for a large, multi-site randomized controlled trial to evaluate the efficacy of the STAC-T app for middle school students in rural communities. Usability testing is an important step in the process of intervention development as it predicts the likelihood of program adoption [36]. To achieve this aim, we implemented usability testing with key stakeholders (i.e., school personnel and students) at two middle schools in rural communities in two states (N = 21) using a mixed-methods design. The study had the following objectives: (a) to assess usability and acceptability of the STAC-T app and (b) to assess differences in usability between school personnel and students.

Methods

Participants

Participants were key school personnel (i.e., administrators, teachers, and school counselors, N = 10) and students (N = 11) recruited from two middle schools in rural, low-income communities in the Northwest region and Southern region of the U.S. The schools were selected based on prior and ongoing research partnerships. The two schools were Title 1 schools, with 95% and 99% of the student population at the two schools eligible for reduced or free lunch. Among school personnel, the age ranged from 26-55 years (M = 43.4, SD = 9.8) and the majority were female (90%; n = 9).

School personnel self-reported ethnicity/racial background as White (50.0%; *n* = 5), Hispanic or Latino (30.0%; *n* = 3), and Black or African American (20.0%; *n* = 2). For students, age ranged from 11-15 years (*M* = 12.8, *SD* = 1.3), with 36.4% (*n* = 4) in grade 6, 18.2% (*n* = 2) in grade 7, and 45.5% (*n* = 5) in grade 8. Students self-reported gender as female (54.5%; *n* = 6) and male (45.5%; *n* = 5). Students self-reported ethnicity/racial background as White (36.4%; *n* = 4), Black or African American (36.4%; *n* = 4), and Hispanic or Latino (27.3%; *n* = 3).

Development of the STAC-T App

The translation of STAC-T from the STAC in-person intervention was guided by Persuasive System Design (PSD), a theoretical guide for translating clinical aims to health-related technology frameworks [37-39]. The STAC-T app was developed using AGILE programming, a collaborative and incremental programming methodology [37-39]. The app was functional on all web browsers that support HTML5 and was built on a full stack web application using HTML/JavaScript as the main interface. React.js was used as the front-end framework. The look and feel of the program were designed with Adobe Illustrator and Photoshop, and developed using HTML elements plus SVG, PNG, JPG, WAV, MP4, and GIF images, audio, and video graphics. The system is accessible on desktop computers and iOS and Android tablets and smartphones. All design and programming elements were aligned, and stakeholders' inputs were incorporated throughout the multi-staged development. Programmers produced the STAC-T app, alpha and beta tested it in-house for stability and code errors, tested it for usability, and revised it following an iterative, agile production process.

Design elements such as space (colors, visual space), components (characters, objects), and mechanics (actions) were determined for program features. STAC strategy practice required students to select an avatar, view bullying scenarios, and select actions to operationalize the STAC strategy, view the avatar enacting the selected action, and receive feedback on its effectiveness. An artist hand-illustrated and styled six avatars The avatars with light, medium, and dark colored hair in different styles, as well and light, medium, and dark skin tones for students to choose from to best

represent themselves and stimulate engagement. To reward learning and bolster adherence, “badges” (visual reward icons; e.g., “Show Stealing Badge”) were included for intermittent awards to encourage user engagement.

Figure 1. *Samples from the STAC-T App*

The STAC-T app content was comprised of three modules: (1) What is Bullying?: Users were presented with background information on bullying, including bullying definitions (i.e., physical, verbal, relationship, and cyberbullying), bullying facts and statistics, characteristics of students who bullying, and negative consequences of bullying; (2) What are Bystanders?: Users were taught what a bystander is, and how bystanders affect bullying outcomes. This module explained the four bystander roles: (a) *Assistants*: those who intentionally help the bully; (b) *Reinforcers*: those who are not directly involved in hurting another student, but encourage the bully by standing around, laughing, or watching quietly; (c) *Outsiders*: those who do not take sides while witnessing bullying; and (d) *Defenders*: those who do something to stop the bullying situation or help the target in some

way, and (3) STAC Strategies: Users were introduced to the four STAC strategies: (a) Stealing the show; (b) Turning it over; (c) Accompanying others; and (d) Coaching compassion. The module also included STAC strategy practice using avatars selected by the user. The booster session included additional practice with bullying scenarios and STAC strategy use.

Iterative interviews (N = 15; 7 females and 8 males; 6 White, 6 Black or African American, and 3 Hispanic or Latino) and two rounds of iterative focus groups (N = 20; 11 females and 9 males; 6 White, 9 Black or African American, 3 Hispanic or Latino, and 2 Other) conducted with middle school students attending schools in rural communities in two states informed program development prior to usability testing. Students participating in the interviews provided feedback on design aspects of the program including color scheme, narration, and cartoons. Students were given a sample slide in five color schemes, three narrator voice samples, and three cartoon-style character depictions. Student were asked to rank a series of questions about each program aspect and then asked to rank their preferences. Feedback and ranked choices were used to select color schemes, the narrator, and the program artist. Iterative focus groups were then conducted to gather feedback from students related to content and stylistic aspects of the program. Overall, the program was well received; students reported the content was helpful and they liked the look and feel of the teacher who appears throughout the training. Students in the first round of focus groups provided specific feedback to incorporate more cyberbullying scenarios (e.g., having bullies use their phone to record their peers without their knowledge), make the appearance of the characters more realistic (e.g., changing clothing, adding eyes to all characters, and changing hairstyles), and improve function of the program to make navigation more user friendly. Students also expressed disliking a particular activity that was removed from the program. Students' feedback was incorporated into the program prior to conducting the second round of focus groups. The students in the second round of focus groups provided additional feedback about how to make the appearance of characters more realistic (e.g., adding emotion to characters), as well as adding background images to make the scenarios look

more like what they are used to seeing at school and school-related activities such as sporting events (e.g., add teachers, lockers, wall hangings and bulletin boards). They also provided specific feedback about how to make student behaviors more realistic (e.g., instead of crying have target look sad, change type of bullying from physical to verbal in front of adults). Input from the focus groups informed the development of the final STAC-T app used in the current study.

Procedures

Participant recruitment and usability testing occurred during the spring of 2024. All research procedures were approved by the University Institutional Review Board and by the School Districts or Administration. The researchers provided the liasions (e.g., school counselor, principal) from each school with an email script describing the pupose and procedures of the study. School liaisons were also provided with rubrics developed by the research team to identify key school personnel and students who demonstrated the following characteristics assessed by the rubric: school personnel - (a) caring for students, (b) desire to be a positive influence on school climate, (c) approachable to students, (d) caring about addressing the problem of bullying, and (e) leadership qualities; students - a) leadership, (b) maturity, (c) responsibility, (d) caring toward others, (e) influence, and (f) a desire to be a positive influence on peers. For each item, school personnel and students were assessed on a 3-point scale, which included the ratings of "*yes*," "*somewhat*," to "*no*" for each item described above. School personnel and students who scored "yes" or "somewhat" on all inclusion criteria were eligible to participate. The school liaison used the rubric to identify and contact key school personnel and students and then used the script to invite them to participate in the study. Usability testing and interviews were conducted remotely. Researchers conducted informed consent for school personnel and parental consent and student assent for students.

Participants were asked to review the entire STAC-T app, including the booster session. Participants were asked to talk aloud while completing the tasks, identifying problems and solutions attempted. Researchers and users were on videoconference and shared screens. Researchers could see

what participants were doing and they were able to communicate with each other in real time. The researchers observed the users as they worked through the tasks and asked questions to gather more data. After completing the STAC-T app, participants were asked to complete a brief usability survey followed by a semi-structured interview and then a demographic questionnaire. All participants were asked to provide information about their perceptions of (a) program utility, (b) relevance and appropriateness of program content, (c) ways they would improve the program, and (d) thoughts about using a bullying and strategy use tracker post-training. School personnel were also asked about (a) their thoughts on implementation feasibility, (b) likelihood of school program adoption, (c) thoughts about companion trainings for teachers and parents, and (d) barriers to program use. All individual interviews lasted one hour and were video recorded. School personnel received an online $50 Amazon gift card as an incentive for participation in the usability testing and individual interview. There were no incentives for student participants.

Measures

Demographics. Participants self-reported their age, ethnicity/race, and gender. Students also reported their grade level.

Program Usability. Usability was assessed using the System Usability Scale (SUS) [40]. The SUS is a widely-used 10-item validated tool that measures usability and acceptability of technology-based programs. Responses are measured on a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). Items are summed and then the total is multiplied by 2.5, creating an overall SUS score ranging from 0 to 100. A SUS score that is 68 or greater is considered above average [41].

Program User-Friendliness. One item was used to assess the user-friendliness of the program. Participants were asked to rate the user-friendliness with the question: “Overall, I would rate the user-friendliness of this program as:” with a 7-point scale ranging from 0 (*worst imaginable*) to 7 (*best imaginable*).

Program Satisfaction. Two items were used to assess program satisfaction. Participants were asked the question: "Would you tell your friends/colleagues to use the program?" with response choices *Yes, No,* and *Don't Know*. Participants were also asked how many stars they would give the program (1 star being the lowest and 5 starts being the highest).

Interview Questions. Following usability testing sessions, participants were asked a series of open-ended questions about the utility and relevance of the app prototype, as well as ways to improve the app, likelihood of program use, and potential implementation barriers. School personnel and students were asked: (1) Please talk about your perception of how useful this program could be to helping to address the problem of bullying at school, (2) Please share your thoughts on whether you think the content of this program is relevant and appropriate for students at your school and your community, (3) Can you talk about ways that you would improve the program. Students were also asked: (4) If your school asked you to continue using the tracker, would it be useful? School personnel were also asked: (5) What are your thoughts on how practical or workable you think it would be to use this program at your school? (6) What do you believe is the likelihood that your school would use this intervention? (7) Do you think an online, brief teacher training and parent training module would be a helpful addition to this program? (8) What, if anything, would keep you from using this program?, and (9) How would you envision using the tracker, if at all, after completing the training modules and the two boosters?

Data Analysis

Quantitative. Quantitative data from the questionnaires were analyzed using SPSS version 29.0. Prior to conducting statistical analyses, the data was examined for outliers and normality and all variables were within the normal range for skew and kurtosis. Descriptive statistics were used and are presented separately for school personnel and students. We examined differences between school personnel and students using independent sample *t*-tests for continuous variables and chi square analyses for categorical variables. We controlled for Type 1 error using the Bonferroni correction.

Based on the calculated Bonferroni correction, all analyses were considered significant at $P < .004$.

Qualitative. Qualitative data from open-ended questions were analyzed separately for school personnel and students. Three team members, two of which conducted the usability tests, transcribed the data verbatim. We used CQR as a framework for data analysis. We used thematic analysis [42,43] to identify, analyze, organize, describe, and report themes found within the qualitative data. A faculty member with expertise in qualitative data analysis along with two graduate students, one PhD and one MA student, with previous experience in qualitative data analysis, analyzed the data. The faculty member led the data analysis team. The team met two times via Zoom. During their first meeting, the faculty member discussed the analysis protocol with the two students, as well as expectations and biases that they needed to be aware of as they analyzed the data. Each team member analyzed the transcripts for school personnel and students separately to arrive at initial themes for each open-ended question from the interview protocol. Next, the team met one more time via Zoom and conducted additional email communications over a 4-week period to arrive at a consensus on themes and frequency categories supported by participant quotations. During their meetings, the team members shared their themes for each question and discussed agreement or disagreement about themes. Analysts relied on participants' quotes to resolve disagreements. Once team members reached consensus, an external auditor reviewed the interview transcripts and themes for school personnel and students. The auditor agreed with the team's findings. Interview data were de-identified to ensure anonymity and quotes were identified by participant type (i.e., school personnel or student).

Results

Quantitative Analysis

Program Usability. Usability scores on the SUS are presented in Table 1. Overall, scores for both school personnel and students suggested a very high level of usability, functionality, and acceptability. As seen in Table 1, there were no differences on any of the individual items or the SUS

total score between school personnel and students, with both participant groups scoring the STAC-T app at a very high level of usability.

Table 1. *Means and Standard Deviations for the System Usability Scale by School Personnel and Students*

	School Personnel (N = 10)	Students (N= 11)		
Question[a]	Mean (SD)	Mean (SD)	t(19)	P
I think that I would like to use the program frequently	4.60 (0.52)	4.18 (0.60)	-1.70	.11
I found the program to be more complex than it needed to be	1.20 (0.42)	1.64 (0.92)	1.37	.19
I thought the program was easy to use	4.90 (0.32)	4.91 (0.30)	0.07	.95
I think that I would need the support of a technical person to be able to use this program	1.10 (0.32)	1.36 (0.67)	1.13	.27
I found the various functions in the program were well put together with each other	4.40 (1.27)	4.55 (0.69)	0.33	.74
I thought there was too much inconsistency in this program	1.00 (0.00)	1.55 (1.04)	1.66	.11
I imagine that most people would learn to use this program very quickly	4.90 (0.32)	4.55 (0.82)	-1.28	.22
I found the program very awkward to use	1.00 (0.00)	1.18 (0.40)	1.42	.17
I felt very sure that I could use the program correctly	4.90 (0.32)	4.55 (0.69)	-1.49	.15
I needed to learn a lot of things before I could get going with this program	1.00 (0.00)	1.55 (0.93)	1.84	.08
System Usability Scale Total Score	96.00 (3.94)	88.64 (9.51)	-2.27	.04

[a]Responses were scored on a 5-point Likert scale ranging from 0 = strongly disagree to 4 = strongly agree.

Program User-Friendliness. School personnel and students rated the program high on user-friendliness. For school personnel, scores on user-friendliness ranged from 6.00 – 7.00 (M = 6.10, SD = 0.32). For students, scores on user-friendliness ranged from 6.00 – 7.00 (M = 6.09, SD = 0.30). There were no differences on scores between school personnel and students on user-friendliness,

$t(19) = -0.07$, $P = .95$.

Program Satisfaction. Program satisfaction ratings are presented in Table 2. Overall ratings suggested school personnel and students were satisfied with the program. There were no differences on scores between school personnel and students on program recommendation, $\chi^2(1) = 0.96$, $P = .33$, or star ratings, $\chi^2(1) = 2.79$, $P = .25$.

Table 2. *Program Satisfaction by School Personnel and Students*

	School Personnel (n = 10)	Students (n = 11)
	% Rating	% Rating
Recommend Program		
Yes	100% (n = 10)	91% (n = 10)
No	0% (n = 0)	0% (n = 0)
Unsure	0% (n = 0)	9% (n = 1)
Star Rating		
1 Star	0% (n = 0)	0% (n = 0)
2 Stars	0% (n = 0)	0% (n = 0)
3 Stars	10% (n = 1)	0% (n = 0)
4 Stars	50% (n = 5)	27% (n = 3)
5 Stars	40% (n = 4)	73% (n = 8)

Qualitative Analysis

Qualitative feedback for the STAC-T app supported the quantitative findings and was very positive overall, with both school personnel and students sharing the perception that the STAC-T app is useful, relevant and appropriate, as well as providing feedback about ways to improve the program. Additionally, school personnel shared positive thoughts about program practicality and adoption, including interest in a teacher and parent training, and discussed barriers to program adoption. Both school personnel and students talked about the benefits of tracking students' reports of different types of bullying and strategies they used to intervene both as part of the program and as stand-alone feature to be used post-training. Results are presented below, organized by the following

themes: 1) usefulness, 2) relevance and appropriateness, 3) program improvement, 4) program tracker, 5) practicality and adoption, 6) teacher and parent training, and 7) barriers

Usefulness. All school personnel (N = 10) and students (N = 11) indicated the program was useful and increased students' knowledge to intervene in bullying situations. For example, a school personnel shared, "… the program that you guys are creating, will definitely inform the students what they need to look for, how they can become an active positive person." A student also stated, "I think it'll be helpful by telling other kids that it's not right to bully other kids because you don't know how they feel, and you don't know what they go through." In terms of increasing knowledge, a school personnel indicated, "I like how it has all the different ways for the students to see how you can step in you know…that there's things they can do." Another one added, "it gives students the tools that they might feel like they lack in general when bullying happens." A student stated, "It can teach ways on how to and when bullying is happening, how do we handle it, and make it stop quicker." Another student added "… if people are making fun of a person about how they look or the way they eat, and they post a video on social media, I can like easily screenshot, show it to the principal, my teachers, to get these people to stop and like get them to stop the bullying."

Relevance and Appropriateness. All school personnel (N = 10) and students (N = 11) reported the program content was relevant and relatable and teaches students empathy and prosocial attitudes. For example, one school personnel shared, "I think the content was really relevant. It's things that you actually see at school or that you hear about or that we, that get actually reported." Another school personnel added, "Oh yeah, absolutely. I think that they [students] can relate to cafeteria situations, getting on the bus and you know posting things especially you know on social media or on Instagram or TikTok or whatever." A student shared, "I think that is really, really relevant and I think that a lot of the situations that were used in this app as examples can be used. They can be real life situations." In terms of empathy and prosocial attitudes, a school personnel spoke, "I think this program would help … teach more empathy cause when students have more

empathy, they're less likely to exhibit those bullying behaviors." A student indicated, "It basically says that bullying is not okay and if you do see it here are a few ways on how to stop it."

Program Improvement. Both school personnel (n = 9) and students (n = 6) offered feedback on how to improve the program and talked about the importance of having the program be fully narrated. School personnel talked about ways to improve student engagement and user experience. For example, a school personnel stated, "making it so that all of the pop-ups and scenes are narrated." A student also said, "Once you add that narrative it is going to be good because most middle schoolers they aren't going to want to read it." In terms of improving engagement and user experience a school personnel said, "Just there was one [activity] where you had to click the arrows to move on and I feel like just making it a little bit more simple." Another school personnel added, "Slowing down the captions on the cartoons because to allow kids to see the picture to get a frame of mind of what's going on and then read the words."

Program Tracker. All the school personnel (N = 10) and students (N = 11) indicated that they would find using a bullying and strategy use tracker useful if their school asked them to continue to use it. When asked about how they would envision using the tracker, school personnel indicated they would use it for data collection for programmatic feedback and prevention, as well as ongoing teaching and student support. For example, when asked about usefulness of using the tracker, a school personnel stated, "Yeah, you know, I think that would be good." Another one added, "You can bring that data up and say, you know, you know, we're, we're seeing this type of bullying going on." A student said, "Oh, yeah. Because it would let more people know that bullying has been going on and stuff."

Practicality and Adoption. All the school personnel (N =10) agreed that the program would be practical and workable, and almost all school personnel (n = 9) stated they would be likely to use the program at their school. For example, one school personnel said, "our students would definitely get on and be able to, you know, go through that program without any problems at all." Another

school personnel stated, “Practical. I think that it addresses the needs of our students in their day-to-day interactions.” In terms of likelihood of use, one school personnel stated, “I think it would be highly likely.” Another school personnel added, “This will be helpful and they [schools] will use it because it wouldn't take too much time away from the academics, academic goals that we have.”

Teacher and Parent Training Modules. All school personnel (*N* = 10) reported that an online, brief teacher and parent training would be useful, and almost all (*n* = 9) stated it would provide a common language and a means for future collaboration. For example, one school personnel shared, “It's teaching the parents and the teachers what that looks like, you know, conversation or tools to help our kids.” Another school personnel added, “Yes. Yes, so that you have this so that we're all working together as a team. And using that common language.”

Barriers. When asked about barriers to using the program, most school personnel (*n* = 7) reiterated they would use the program, but many of them (*n* = 8) discussed barriers. For example, one school personnel stated, “I can't think of one negative reason or one reason I wouldn't want to use it.” However, other school personnel identified potential barriers with one stating, “Not being accessible on the devices that the kids have available.” Another school personnel said, “Time. But I don't see that as a factor for us because we could fit it into our advisory class.” A third school personnel added, “Only thing I can think of is funding.”

Discussion

The purpose of this study was to examine the usability of the STAC-T app, a technology-based bystander bullying intervention designed specifically for middle schools in rural communities. We were interested in feedback from middle school personnel, as they are in the position of making decisions related to adopting and implementing bullying interventions, and students as end-users. The primary aim of the study was to test the usability of the STAC-T app, assess program utility, user-friendliness, and relevance, as well as feasibility and ways to improve the program. Overall, both quantitative survey results and qualitative interview findings indicate participants perceived the

STAC-T app to be useful, user-friendly, and appropriate for students at their schools, and reported high levels of satisfaction with the program. Findings from this study indicate the STAC-T app is relevant and feasible for implementation in middle schools in rural communities.

Findings from this study provide support for the usability of the STAC-T app. Both school personnel (M = 96.0, SD = 3.9) and students (M = 88.6, SD = 9.5) scores on the SUS demonstrate a very high level of usability, exceeding the standard cutoff score of 68 [41]. Both school personnel and students also rated the user-friendliness of the STAC-T app as very high, with all participants rating the program at 6 or above on a scale ranging from 0 – 7. We found no differences between school personnel and students on SUS scores or user-friendliness ratings, suggesting that both groups of users found the STAC-T app to be highly usable. Qualitative data supported these results, with both school personnel and students indicating that they perceived the program to be useful, as well as relevant and appropriate for middle school students in rural communities. Further, both school personnel and students reported high levels of satisfaction with the program, with 100% of school personnel and 91% of students indicating they would recommend the program to others. Further, the majority of participants (95%) gave the program 4 or 5 stars on a scale ranging from 1 – 5 stars. These findings are particularly important as usability and acceptability are associated with both program adoption and implementation [36].

In terms of practicality and adoption of the intervention, school personnel believed that their school would be likely to use the STAC-T app, and identified cost, time and access as potential barriers. Our results are aligned with previous studies that indicate rural school administrators in rural communities feel favorably about adopting and implementing online programs to address the problem of bullying [20]. Additionally, our findings are also similar to previous studies that identify cost [7,20], time [44], and access to technology [45] as notable barriers to online programming implementation in schools located in rural areas.

School personnel and students reported positive perceptions about the STAC-T program, as

well as feedback for program improvement. Results from the qualitative analyses showed that both school personnel and students thought the STACT-T content was relevant and relatable and increased students' knowledge of how to intervene in bullying situations. School personnel also stated the program taught students empathy and prosocial attitudes. Furthermore, school personnel stated the program was practical and workable, would be used at their school, and that a teacher and parent training would be useful additions to STAC-T to provide common language among stakeholders. These findings suggest a need for bystander bullying intervention programs in rural schools that teach students how to intervene when they witness bullying behaviors through conducting role-plays to practice strategies across different bullying scenarios. In terms of program improvement, both school personnel and students highlighted the importance of having the entire program narrated to students. School personnel also talked about ways to improve user engagement by simplifying and slowing down a few program activities. Both students and school personnel also saw value in the post-training tracker.

Limitations

This study supports the usability, relevance, and feasibility of the STAC-T prototype. However, certain limitations must be noted. Participants were recruited from two schools in rural, low-income areas from two states, one in the Northwestern region and one in the Southern region of the U.S. Although participants were recruited from two different states to increase generalizability, school personnel and students from different regions of the country may have a different perspective. Further, the majority of the school personnel participants in this study were female, further limiting the generalizability of the study. It is also possible that social desirability influenced participants as they were aware that the goal of the study was to translate the in-person STAC intervention to a technology-based format.

Implications

This study has important implications for the development and implementation of STAC-T

for middle schools in rural communities. First, participants provided very high usability ratings for the STAC-T app, with qualitative data supporting the usability, utility, and relevance of the program. Findings also provided valuable information about the program itself, including the need for program narration and the utility of a type of bullying and strategy tracker that could be used post-training. School personnel also provided feedback about the importance of both teacher and parent modules to foster collaboration. These modules could be developed and offered to schools as companion modules for STAC-T. Additionally, participants indicated that program implementation is feasible as long as the program is cost-effective, brief, and students can access it on their school devices. Overall, findings from this study provide valuable feedback and a strong scientific premise for moving forward with a large, multi-site randomized controlled trial to examine the efficacy of the STAC-T app.

Conclusion

Bullying and the negative associated mental health risks are a significant problem for middle schools in rural communities. Schools in these communities have limited access and resources to implement in-person comprehensive, school-wide bullying prevention programs. Technology-based interventions represent a promising approach to reducing implementation barriers for rural schools. Findings from this study demonstrate the usability, relevance, and feasibility of the STAC-T app. This study provides support for a large, multi-site randomized controlled trial assessing the efficacy of the STAC-T app for middle school students in rural communities.

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