YouROK, The Emotional Resiliency App To Address The Adolescent Mental Health Crisis

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Abstract

The K'Bro app, developed by YouROK Corp., is designed to improve emotional resilience and overall well-being in children aged 9 to 19. Emotional resilience is defined as the ability to understand and effectively deal with one's personal stressors or micro traumas in an emotionally healthy way, preventing the onset of mental health issues (Schultze-Lutter, 2016). The app uses thorough research on emotional development and positive psychology interventions to create a cohesive and therapeutic user experience. K'Bro consists of five main features; each serves a specific purpose while collectively inspiring users toward enhanced emotional resiliency.   The first feature is the "Am I OK?" game, which utilizes ipsative techniques, a person-centered scales approach designed to produce an intraindividual profile, to allow users to name their emotions. The ipsative research and sentiment analysis of what users share within the app through the remaining features work together to produce an "Am I OK?" Index score, which is used to measure the emotional well-being of users. The next is the "Deal with It!" feature that gives users the opportunity to learn how to resolve their problems. The "Speak Up" feature teaches users to advocate for themselves in situations where they may be concerned about confrontation. The fourth feature is titled "What's Up?" and it encourages users to practice gratitude. Finally, the "My Tribe!" feature enables anonymous peer support. An internal pilot was conducted where the effects of K'Bro were made visible. More than 2,800 users participated, and statistically significant results showed remarkable improvements in "Am I OK?" scores across gender identities. Text analysis was also completed based on the participants' inputs, displaying the most common and relevant pain points in users' lives.

The Importance of Emotional Resilience to Mental Health

YouROK is a prevention-focused solution that addresses the adolescent mental health crisis by building emotional resilience and emotional intelligence using evidence-informed practices. The World Health Organization (1999) defines mental health as "a state of well-being in which every individual realizes one's own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a positive contribution to one's community." More recently, clinical experts (Schultze-Lutter F. S., 2016) state that "mental health has been regarded not as a possible consequence but as 'a fundamental element' of resilience, or, alternatively, 'as a state of well-being in which every individual … can cope with the normal stresses of life', the latter making resilience a feature of mental health." (Haggerty, 1996) state that resilience has most frequently been examined as a protective resource in children who have experienced major life changes, deprivation, and stress.

In his seminal book Emotional Intelligence (EI) by Daniel Goleman, emotional intelligence is explored as a primary driver dictating a person's resilience during crises. "A person with high EI is self-aware, socially adept, and empathetic and will be able to survive and thrive on the other side of a life crisis because they have the social and relational skills to be able to handle unexpected and unfortunate circumstances. They know how to advocate for themselves, to problem solve, and to seek support when they need it the most."

While the field of positive psychology (Christopher & Hickinbottom, 2008), which focuses on positive human strengths and resources rather than deficits or psychopathology, has only formally been around since 2000, its focus is on developing personal strengths. These elements include:

- Adapting to challenges and handling setbacks and adversity

- Inspiring engagement and relating to peers in positive ways

- Encouraging optimism and a positive outlook

- Looking beyond oneself and helping others to find meaning and life satisfaction.

Since half of all lifetime mental disorders in most studies (Kessler, 2007) start by the mid-teens and three-fourths by the mid-20s, it is imperative that we begin to address mental health at a much earlier age. YouROK accomplishes this by utilizing a positive psychology framework and evidence-informed interventions in support of emotionally resiliency and emotional intelligence.

Impact to Schools

Mental health is a critical issue impacting today's student population and their ability to learn. In a CDC (Leeb RT, January 1–October 17, 2020) analysis of a subset of hospitals in 47 states representing approximately 73% of U.S. ED visit they reported that 16.5% of U.S youth ages 6-17 had experience with mental health disorders and 45% of teenagers ages 14-18 felt hopeless about the future. Sadly, there are no signs of these numbers dropping and the pandemic has exacerbated things further. Experts say (Cory Turner, January 18, 2021) that it is highly likely that students are having increased episodes to anxiety, loneliness, grief, trauma, and depression because of the pandemic. This is reflected in a poll sponsored during a 2020 Wellness Together conference on school mental health citing that 92% of wellness staff are reporting making daily calls to check in on their students' mental health.

Now more than ever, our school systems are shouldering the responsibility of nurturing the whole child (Lewallen, 2015). The academic ecosystem is tasked with juggling academics, social climate, health and mental health, and systemic inequities. Building emotional resiliency skills and the related emotional intelligence to address these challenges translates directly to the classroom. A study (Carolyn MacCann & Kit Double, 2019) found that the higher a student's emotional IQ, the higher their grades and test scores would be. This 2019 study took data ranging from elementary schools all the way up to higher education and found that grade level was not a factor. This shows that the emotional resiliency skills taught in YouROK are invaluable to students' academic performance at every grade level.

Not only does emotional resiliency improve academic achievement, according to research (Arslan, 2016) it also decreases behavioral issues that often cause increased stress on teachers and staff. Disciplinary issues cause stress for students and teachers. These largely stem from the disruptions that the behavioral issues cause along with the time and difficulties caused by the disciplinary process. YouROK targets issues that directly face schools, such as bullying, difficult relationships with teachers and peers. It is also effective in supporting the whole student. YouROK achieves this goal in part by giving students the ability to explore and seek resolution to academic challenges, social and family relationships, health and mental health, and systemic inequities especially those impacting the LGBTQ+ community. This is especially important as more than half of LGBTQ+ teenagers according to NAMI (NAMI, n.d.)feel hopeless about the future. YouROK offers an inclusive solution which includes

gender non-conforming users representing 7% of our user base. K'Bro users connect with peers in support of their emotional struggles through the anonymous peer support feature, My Tribe!.

YouROK addresses the pain points schools are facing improving, not just the emotional well-being of the student body but also the work lives of the staff. YouROK's positive psychology orientation and evidence-informed emotional self-care tools reduce the emotional struggles students face making it easier to schools to develop confident learners and achieve higher academic scores.

YouROK's Evidence-Informed Features Designed to Build Emotional Resilience

YouROK has 5 key features: the Am I OK? game, Deal With It!, Speak Up!, What's Up?, and My Tribe!. What follows is a brief description of each feature, the research it is based on and how it contributes to emotional resiliency.

Am I OK? Game

One of the most prominent and engaging features of the YouROK application K'Bro is the "Am I OK?" game. This feature, a platformer game, prompts the user to describe the way they are feeling about key parts of their life such as their school, social life, family, and other aspects, like extracurriculars, before they begin the game. The game gives users the option of six positive and six negative emotions to describe their current feelings about these aspects of their life.

A UCLA study (Matthew D. Lieberman, 2007) found a correlation between being able to identify one's emotions, either verbally or in a written format, and brain development. The research found that "affect labeling," or naming one's emotions, may diminish emotional reactivity along a pathway from the prefrontal cortex to the amygdala thereby disrupting amygdala activity in response to affective stimuli. The same study cited acquiring the skill of identifying emotions helps the developing adolescent understand themself better as well as inhibiting deregulated behavior. Naming emotions, such as in the Am I OK? game, helps users build self-awareness and mindfulness providing users a clearer perception of their personality, including strengths, weaknesses, thoughts, beliefs, motivation, and emotions which enhances social competence and effective coping skills.

Deal with It!

Another feature of K'Bro is "Deal With It!" which provides curated content for the topics of greatest importance to K'Bro users such as bullying, difficult teachers, relationships, anxiety, and

depression.   Deal With It! responses validate the pain a user may be experiencing while giving them insight into the issue and tips on how to handle things on their own. Users can get support from their peers about these topics in the anonymous peer support feature My Tribe!, another feature of K'Bro described later.

Deal With It! enables users to practice self-determination as they explore self-help options to address challenges in their life. Researchers (Deci & Ryan, 1985, 2000) who defined Self Determination Theory state: "self-determination lays out a motivational perspective of the self which is endowed with integrative capacities. Behaviors which are initiated out of inherent interest and enjoyment for their own sake (intrinsic regulation) are experienced as the most self-determined followed by reasons to act in accordance with one's deepest values (integrated regulation)."   The greater self-determination one has the more open and less defensive they are toward potentially threatening and difficult events. Another group of researchers (Perreault, 2014) found that greater general self-determination is associated with greater psychological well-being, directly and indirectly through increased global emotional intelligence. The skills practiced in Deal With It! support self-determination. This, in turn, helps build emotional intelligence.

Speak Up!

"Speak Up!", another feature of K'Bro, gives users the opportunity to practice self-advocacy. Users can extend their self-advocacy by sharing their messages in My Tribe!, another K'Bro feature, providing anonymous peer support. Peers can respond if a user's message is "helpful" or "hurtful" to guide the user in expressing their self-advocacy in emotionally productive ways.

Research (Adams, 2015) has found an overall correlation between self-advocacy skills and overall growth. Specifically, the research noted that "knowledge of self includes understanding one's own strengths, interests, preferences, goals, aspirations, best modes of learning, characteristics of the disability pertinent to the individual, necessary environmental supports, effective accommodations, and one's personal responsibilities related to reaching for one's dreams and potential." The skills taught in "Speak Up!" support the overall goal of building users' emotional resiliency by teaching prosocial skills that improve their interpersonal relationships through self-advocacy.

What's Up?

"What's Up?" gives our users the chance to express their gratitude and recognize what they did or experienced that made them proud, happy, or thankful. These skills are positively associated with adolescents' self-esteem. Research (Adams, 2015) found that when an "adolescent shows gratitude for other people's actions, they are more likely to recognize how others' actions affect their well-being; in turn, this makes them feel more secure in their relationships, consequently improving their overall self-esteem." A study (McCullough, 2001) found that showing gratitude is a prosocial behavior because it is a response that impacts other negative behaviors in a positive manner. "What's Up?" supports emotional resilience by allowing our users to recognize the positive things that they have accomplished leading to improvement of their self-image and increased optimism.

My Tribe!

"My Tribe!," the anonymous peer support feature, provides a safe place for users to express thoughts they are not ready to share with friends or family. YouROK has established an emotional healthy place for adolescents to give and receive feedback on the challenges they face. Peer support has been found (Shalaby, 2020) to help engage young people with mental health services and a greater respect for psychological distress. Since adolescents are invested in same-age relationships and are negatively affected by social exclusion (Branje, 2014) peer support is an effective program in addition to youth mental health care services. YouROK offers a virtual, anonymous peer support forum to youth who might not otherwise have physical access to peer support presenting new opportunities for recovery, self-esteem, and emotional well-being.

Efficacy of YouROK

YouROK has developed a proprietary approach to capturing a real-time assessment (Ecological Momentary Assessment) of an adolescent's emotional well-being. YouROK analyzes a user's responses and textual inputs to determine emotional state in real-time using a custom and highly advanced artificial intelligence engine that employs cutting-edge deep learning techniques. What follows is an overview of how the Am I OK? assessment is designed along with the results of a pilot study on its efficacy.

Ecological Momentary Assessment

The YouROK approach eliminates reliance on pathology-focused tools, in keeping with its positive psychology focus, that cannot be administered as frequently as the Am I OK? assessment. The Am I OK? Index score, which is produced by the YouROK algorithm, gives numerical measures to track users' mental health over time. Specifically, YouROK uses a combination of ipsative or forced choice questions and sentiment analysis to produce the Am I OK? Index score. In the Am I OK? game, an ipsative assessment is used to capture the emotions which best resonate with how the user is doing in four aspects of their life: school, family life, social life, and other. Researchers (Kreitchmann Rodrigo Schames, 2019) found that in comparison to the more traditionally used Likert scales, ipsative assessment is less susceptible to social desirability bias and acquiescent response bias. The research also found that ipsative assessment often has almost double the predictive power of Likert scales. In YouROK's application six positive and six negative emotions are available to choose from for each of the four categories: school, family life, social life, and other stuff. Each emotion is assigned a value based on the intensity of the emotion.

The other data input into the Am I OK? Index score comes from sentiment analysis of the inputs users share within the app. Our algorithm is based on deep learning with recurrent bi-directional Long Short-Term Memory (LSTM) neural networks (Sundermeyer, 2012) and we use continuous scoring from +100 to -100 to get the full range of emotions expressed by our users. The algorithm analyzes word-by-word to find correlation between words and positive or negative sentiments, giving an overview of the mood. A team of researchers (Chakriswaran P, 2019) found that AI-based sentiment analysis for emotions is extremely beneficial for scoring emotions and being able to interpret them numerically. The research goes on to state that sentiment analysis is more accurate for analyzing emotions than standard assessments are.

The Am I OK? index works as an *emotional thermometer*, aiding users in managing their emotional well-being as well as determining if they need more help than is possible through the app. Bringing together ipsative and sentiment analysis, the final Am I OK? score is a culmination of a complex algorithm met with a fully-researched design. This score is meant to represent emotional well-being, and an increase in this score is meant to imply an increased mental state. These concepts are demonstrated through the users that we have already obtained for our internal pilot.

Methods

The internal pilot of current and former K'Bro users during the period of June 2017 through March 2019 was created to highlight the ways in which K'Bro improves emotional resilience and mental well-being.

There were 2,849 participants in this study with an average age of just under 15 years old. The youngest participant was nine years old and the oldest was nineteen. It is important to note, though, that the majority of participants were in their early and mid-teens when they used the K'Bro app.

Figure 1: Age Distribution

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Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
9.00    14.00   15.00   14.84   16.00   19.00
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As shown in the table below, there are 1,516 females in this study, 474 males, and 174 people who identify as neither female nor male.

Figure 2: Gender Distribution

```
Female   Male  Other
  1516    474    174
```

When analyzing the effects of K'Bro on the mental well-being of users, the best statistical method to use is linear regression modeling. This is because it allows for predictive power, and it is able to numerically explain the improvement or lack thereof as users log into the app repeatedly. We used the linear modeling results to interpret the significance of K'Bro's methods and then we utilized text analysis to visualize the top ten most common pain points for users. We also generated visualizations to assess the ways in which users are able to grow their emotional resilience. This project uses a 0.05 significance level, as is often considered standard for research in the social sciences field.

Results

After creating a linear model that predicts users' Am I OK? scores based on how many times they have logged in, it is clear that the results are conclusive.

Looking at the output below, we see that based on average usage, users are expected to record an Am I OK? score of -16.74 when they log in for the first time. However, their Am I OK? score is predicted to increase by about 1.8 points with every additional login. This means that after only 9 uses,

they are expected to record their first positive score. After only 10 uses, their Am I OK? score is predicted to rise from an original -16.74 to a newly improved 2.74. Based on the pictured p-value, these results are statistically significant at the predetermined 0.05 significance level.

**Figure 3: Linear Regression by Unique User**

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -16.7356     1.1001 -15.213  < 2e-16 ***
login         1.8033     0.3516   5.129 3.04e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The graph below shows the moving average of the Am I OK? scores for users who logged into the app at least ten times. The moving average works by averaging the nearest two Am I OK? scores to create a more interpretable graph. We can see a clear upward trend in the data, and we can see that once their Am I OK? scores are positive, they do not seem to drop back into the negative. It is also worth noting that there are some dips and times when average Am I OK? scores seem to be lower, but over time ultimately improve. The biggest takeaway from this visualization is the clear positive linear trend.

**Figure 4: Moving Score for Unique Users**
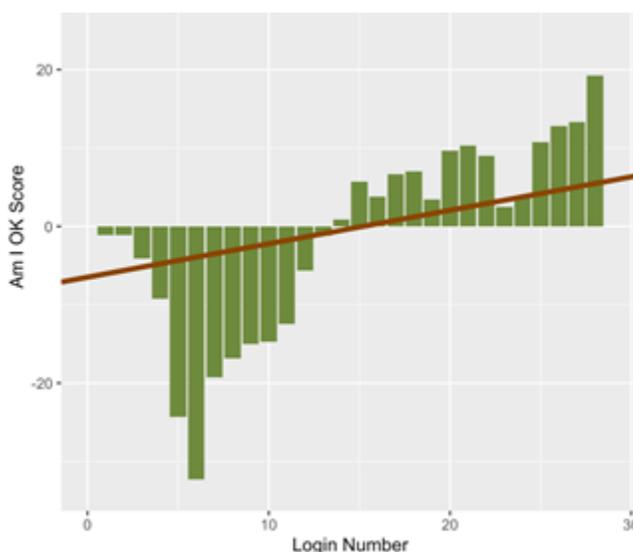
When looking at the graphs separately for males and females below, we can still see clear positive trends for both genders. Although males do not appear to log in as many times as females, both genders show to be significantly upward leaning and there is still a clear positive effect. Note that the sample size was not large enough to measure the efficacy of the non-binary users as a separate group.

Figures 5, 6: Moving Scores by Gender

The graphs below show the ten most common negative words posted by users in the "Deal With It!" feature by gender. This is the feature in which users write about what they are struggling with, so it follows that these graphs are very telling about the issues that young people are facing when they are using the app. After reviewing the graphs, we can see a few trends; the first is that all users seem to be having trouble with relationships in their lives, given that words like "friend," "boyfriend," and "family" are so common. The next noticeable trend is the relevance of depression and anxiety in users' lives. Since these are frequently used terms, it is important to place extensive emphasis into these areas for emotional support and possible treatment. The last noticeable trends are that male users mention "suicide" more than any other word and non-binary users mention "death" more than any other word.

Figures 7, 8, 9: Top 10 User Pain Points by Gender

Top 10 Pain Points for Females • Top 10 Pain Points for Males • Top 10 Pain Points for Non-Binary
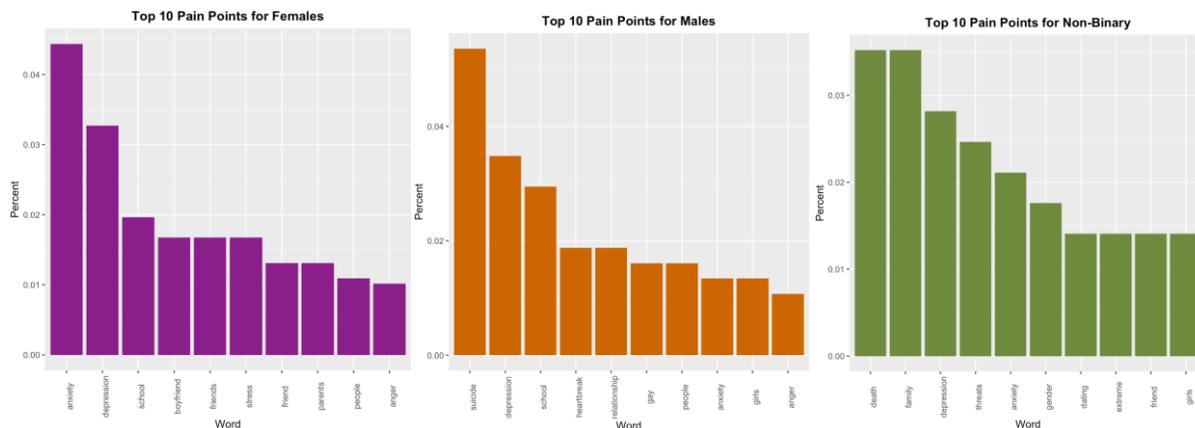
Discussion

YouROK learned through our internal pilot that our target audience enjoyed using K'Bro to help them deal with the emotional challenges of adolescence. According to feedback from one 15 year older user: "*K'Bro has made me feel so much better since downloading it and I feel every middle schooler/ high schooler could use this game!*" Our research documented that users improve their emotional well-being as a result of using the app. We learned that the aspirational messages that drive users to download the app are equally appealing to those youth who are becoming symptomatic of mental health issues such as anxiety and depression. In future research our goal would be to conduct a Randomized Control Trial (RCT) to understand YouROK's effectiveness compared to other mental health and life function assessments.

Our learnings inspired the development of additional features described in below. Our learnings also identified the importance of organically integrating with organizations that already provide mental health support to adolescents. By fitting into the continuum of care YouROK enables users to proactively engage with a pervasive, low cost solution yet still have access to behavioral health providers who can offer targeted treatment exactly at the moment it is most needed.

I Wonder…? Game

"I Wonder…?" gives our users the opportunity to reframe their negative thoughts and emotions. A study (Kraft, 1985) found that by replacing more negative vocabulary with positive words instead, there is a decrease in negative emotions. "I Wonder…?" is designed to give users this opportunity, replacing negative vocabulary with positive ones and working on improving the users attitude towards the situation at hand. The skill of reframing also supports our overarching goal of improving emotional resilience, by challenging our users to look at life in a more positive light and find the positive even in something that could appear to be extremely negative. "I Wonder…?" is another great way for putting what the users learn into practice, by supporting emotional resilience through positive reinforcement.

Happiness Coach

The "Happiness Coach," a new feature in development, is an AI-based chatbot designed to serve as a digital life coach to engage more deeply with users than current features. Research (van der Lee, 2019) has found that conversational agent-based interventions have shown to effectively reduce depression. Users identified that both for themselves and others using K'Bro some youth needed a higher level of intervention. Conversations are based on the most frequently shared issues by users. The conversation helps users by validating what they are feeling, gently encouraging them to think about what part of this issue they have control over, and providing recommendations for how to resolve their issue, to include recommending that they seek professional support when appropriate. It is an interim step before transferring users to a school wellness staff member, crisis intervention service or healthcare provider. Happiness Coach offers another level of support intended to reduce the number of users referred for interventions provided by pediatricians and mental health providers.

About YouROK

YouROK is the developer of K'Bro, an emotional resiliency app for adolescents with associated dashboards for enterprises such as health care providers, insurance providers and schools. K'Bro delivers interventions through technology-based activities and an intelligent virtual agent. YouROK uses a proprietary algorithm creating our own unique assessment capabilities through deep learning and more frequent touch points to detect the onset of mental health issues in real time. By organically integrating into the continuum of care, YouROK enables users to proactively engage with behavioral health providers who can offer targeted treatment exactly at the moment it is most needed. The platform provides a dashboard to support parents, therapists, and other relevant professionals to keep parents and professionals tuned to the child's emotional health.

The founding team members came together to address their lived experience with mental health. Each of us has experienced the best and the worst of the mental healthcare sector. Our user-centered design vantage point has enabled us to create an award winning solution by the American Psychiatry Association. Together we have applied evidence-informed research on emotional resiliency to the creation of K'Bro, a mobile app designed as both a real-time assessment tool and series of interventions to promote healthy emotional self-care and prevent the onset of more serious health issues. The data collection, processed through proprietary AI algorithms, provides a snapshot of an individual's emotional well-being as well as an overview and trend data for the population being served by schools, providers, and payers to intervene when youth need a higher level of care.

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