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ORIGINAL ARTICLE

Evaluation of an avatar-based training program to promote suicide prevention awareness in a college setting

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ABSTRACT

Objective: Training programs exist that prepare college students, faculty, and staff to identify and support students potentially at risk for suicide. *Kognito* is an online program that trains users through simulated interactions with virtual humans. This study evaluated *Kognito*'s effectiveness in preparing users to intervene with at-risk students. **Participants**: Training was completed by 2,727 university students, faculty, and staff from April, 2014 through September, 2015. **Methods**: Voluntary and mandatory participants at a land-grant university completed *Kognito* modules designed for higher education, along with pre- and post-assessments. **Results**: All modules produced significant gains in reported Preparedness, Likelihood, and Self-Efficacy in intervening with troubled students. Despite initial disparities in reported abilities, after training participants reported being similarly capable of assisting at-risk students, including LGBTQ and veteran students. **Conclusions**: *Kognito* training appears to be effective, on a large scale, in educating users to act in a facilitative role for at-risk college students.

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College students; LGBTQ; mental health; suicide prevention; veterans

Suicide is a pervasive global issue, accounting for hundreds of thousands of deaths each year.[1] In the last decade, rates of suicide deaths in the USA have shown a consistent increasing trend across age groups.[2–5] Rates for American adolescents and young adults unfortunately reflect the rising trend in the general population. Suicide is the second leading cause of death in Americans aged 15–24, accounting for 5,491 deaths in this age group in 2015 alone; this number represents a 32.6% increase since 2007.[2,5] These trends persist even when adjusted for potential increases in population; between 2000 and 2015, suicide rates in the USA rose from 10.40 deaths per 100,000 to 13.75 per 100,000, making suicide the 10th leading cause of death in the USA in 2015.[6,7] Internationally, adolescent suicide rates show similar upsurges over the past several decades. A meta-analysis of data collected from 26 countries between 1965 and 1999 revealed steadily increasing suicide rates in adolescents aged 15–19.[8] These escalating rates have generated an increased demand for effective suicide prevention strategies in the USA and abroad.

Suicidality among college students

Data from the Centers for Disease Control and Prevention reveal steadily increasing suicide rates over the past decade for Americans aged 15–24.[2, 3, 5, 9] While there are few data to explicitly show escalating suicidality trends in college students, based on typical age range, many college students would be included in the CDC data reported on Americans aged 15–24. Recent data from the Suicide Prevention Resource Center showed that over a period of one year, 7.1–7.7% of college students reported seriously considering suicide.[10] Furthermore, 2.3% of students made a plan for suicide in the previous 12 months, and 0.6–1.2% made a suicide attempt.[10]

In college and university settings, peers, student staff (e.g., resident assistants [RAs]), other staff, and faculty are ideally placed to intervene with at-risk students. These individuals who regularly come into contact with at-risk students can be trained to act as gatekeepers, and thus could be aware of risk factors for suicide, recognize signs of distress, and recommend support services.[11] Gatekeeper training programs are designed to improve users' "…knowledge, attitudes and skills to identify (those) at risk, determine levels of risk, and make referrals when necessary".[12] This approach is designed to increase the number of at-risk students who seek and obtain mental health treatment.[13] Downs and Eisenberg (2012) found that the majority (64.1%) of students who sought professional mental help reported encouragement

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from others as an important component of their decision to seek help.[14] Students also have been shown to preferentially discuss mental health issues with a peer (e.g. friend or roommate) rather than a professor.[15] Thus, it is important to offer training programs that include students.

Previous applications of in-person gatekeeper training programs in college settings have demonstrated effectiveness. One study trained college students, faculty, and staff to act as gatekeepers through an in-person program that included a PowerPoint™ presentation, a question-and-answer component, and a role-play scenario.[16] One month after training, participants reported being more knowledgeable about facts concerning suicide prevention, warning signs of suicide, how to ask someone about suicide, persuade them to get help, and actually get them help. Participants also reported being more likely to ask others about suicidality if they are concerned about them, believed that asking about suicide was more appropriate, and demonstrated greater knowledge of the local resources.[16] At three months after training, participants' scores had not decreased significantly in any category.[16] In another application of an in-person gatekeeper-training program, school personnel participated in a 1-hour training with a certified trainer. After training, participants scored significantly higher on a quiz evaluating their knowledge of warning signs, how to raise concerns, and refer at-risk individuals for help.[17] Participants also reported higher self-evaluations of their knowledge on suicide, indicated greater likelihood of questioning an individual about suicide and intervening, believed that suicide is more preventable, and thought that their efficacy in assisting a suicidal person had improved.[17] Readers are referred to a special issue of *New Directions for Student Services* which addresses the issue of college suicide, and provides a review of suicide prevention approaches used in higher education.[18]

In-person training sessions have been shown to improve faculty and students' perceived or actual preparedness, likelihood, and self-efficacy in assisting at-risk individuals. Little has been done, however, to investigate whether online training programs can similarly be effective in preparing students and university personnel to handle these difficult situations. The current study focused on this question with an evaluation of the effectiveness of the online *Kognito* training program.

The *Kognito* program is comprised of multiple, separate online training modules designed to train students, faculty, and staff through animated interactions with virtual human characters exhibiting signs of psychological distress (www.kognito.com). Users develop skills throughout training by practicing communicating about suicidality in realistic role-play scenarios with virtual avatars. Ultimately, users must identify the student character(s) who may be at risk for suicide and choose appropriate interventions. The primary training module aims to train users to recognize and assist general at-risk students, and is titled "At-Risk on Campus." Additional modules are available that are sensitive to LGBTQ issues ("LGBTQ on Campus") and student veterans ("Veterans on Campus"). Each module is available in two versions, one for training students, and another for training faculty and staff. All training modules are available via subscription online, and take about 30 minutes each to complete. Modules are designated within this paper as the At-Risk on Campus – Faculty, At-Risk on Campus – Student, LGBTQ on Campus – Faculty, LGBTQ on Campus – Student, Veterans on Campus – Faculty, or Veterans on Campus – Student module.

Kognito training modules designed for academic use have shown promising results; in one application in an American Indian community, *Kognito* training produced significant improvements in three variables gauging users' self-reported abilities to assist at-risk students, namely Preparedness, Likelihood, and Self-Efficacy.[19] Additional unpublished works by the developers of *Kognito* reveal similar improvements reported by users (available at www.kognito.com/research).

Hypotheses

In spite of these preliminary, largely unpublished results, there needs to be an evaluation of *Kognito* by independent researchers, as in the current investigation. It was hypothesized that after completing *Kognito* training, participants would report improvements in their perceived Preparedness, Likelihood, and Self-Efficacy in intervening with at-risk students. Furthermore, improvements were expected to be reported both by volunteer and mandated participants, and by both students and faculty/staff, and were anticipated to be evident across all types of training modules. This study presents an evaluation of an exclusively online gatekeeper-training program, and offers insight into whether online programs can effectively prepare users to intervene with at-risk college students in a large-scale, campus-wide initiative.

Methods

Participants

Survey data were obtained from a total of 4,428 participants across all six modules at West Virginia University, a land-grand institution with a student body of approximately 29,175 graduates and undergraduates.[20] However, only data from participants who completed both pre-

and post-training surveys were used for analyses, bringing the sample size to 2,727 participants. Participants with data missing from either pre- or post-surveys (n = 1,701) were separated from the sample and thus not used for analyses. Those who only completed pre-training surveys, however, were sorted into a separate group (n = 1,187) for comparison with those who completed surveys at both time points. The distribution of participants among training modules is presented in Table 1.

Assessment

Participants completed online assessments at two time points, immediately before and after completion of the training. The 11-item Gatekeeper Behavior Scale (GBS) has available data on its psychometric properties and is comprised of survey items from *Kognito*'s assessments.[21] The GBS contains three domains: a Preparedness domain composed of five survey items, a Likelihood domain comprised of two items, and a Self-Efficacy domain containing four items. In this study, two survey items from the GBS Self-Efficacy domain were modified by *Kognito* developers for sake of relevance in LGBTQ and Veterans on Campus module assessments. At-Risk on Campus -Student and -Faculty modules maintained all 11 original survey items comprising the GBS. To yield consistent data across modules, the two modified survey items from the GBS Self-Efficacy domain were excluded from all analyses. Therefore, this study used a modified version of the GBS Self-Efficacy domain, comprised of two of the original four items. The Preparedness and Likelihood domains matched those of the GBS. Bivariate correlational analyses were conducted to assess equivalency between values obtained from the four-item Self-Efficacy GBS domain and the modified two-item Self-Efficacy domain used in this study. The modified, two-item Self-Efficacy domain correlated significantly with the original four-item GBS Self-Efficacy domain at both pre- and post-training in At-Risk on Campus –Faculty and –Student modules (Appendix Figure 1).

Survey items comprising the Preparedness domain were scored on a 5-point Likert scale (1 = very low to 5 = very high); items on the Likelihood and Self-Efficacy domains were scored on a 4-point Likert scale (1 = very unlikely/strongly disagree to 4 = very likely/strongly agree). To establish continuity in scores among the three domains, Preparedness scores were algebraically converted from a 5-point Likert scale to match the 4-point scales used to measure Likelihood and Self-Efficacy. (Appendix Table 1 depicts the composition of the three domains).

Procedure

Kognito training modules were made available online to the West Virginia University campus community beginning in April 2014; data were collected from April of 2014 through September of 2015. *Kognito* training was made available to any WVU faculty, staff, or undergraduate, graduate or professional student. WVU's HelpWELL Suicide Prevention and Awareness program invited and encouraged participation in various ways, including flyers, workshops, and training sessions. Participants could complete any one, two, or all three modules specific to their status as either student or faculty/staff. Gift cards valued between $10–30 were offered as incentive for completion of one or more training modules to students living in university residence halls, the Student Government Association's Board of Governors, graduate level counseling and social work students, and all student veterans and students who identified as LGBTQ. Additionally, a number of classes offered either course credit or extra credit to students who completed the training modules. Students living in residence halls were further encouraged to complete training through competitions. Faculty were invited and encouraged to participate. Training was mandated by supervisory personnel for all residence hall staff, student

Table 1. Scores for three Gatekeeper Behavior Scale domains, across six modules.

Training Module	Type	*n*	Time	Preparedness Mean (SD) [Range = 1-4]	Likelihood Mean (SD) [Range = 1-4]	Self-Efficacy Mean (SD) [Range = 1-4]
At-Risk on Campus	Faculty	402	Pre	2.85 (.59)	3.27 (.57)	3.05 (.57)
			Post	3.40 (.50)	3.53 (.48)	3.41 (.51)
	Student	1,124	Pre	2.78 (.59)	2.77 (.74)	2.97 (.57)
			Post	3.45 (.52)	3.49 (.46)	3.41 (.54)
LGBTQ on Campus	Faculty	89	Pre	3.00 (.65)	3.27 (.54)	3.21 (.52)
			Post	3.42 (.53)	3.54 (.52)	3.53 (.36)
	Student	484	Pre	3.03 (.71)	3.14 (.63)	3.15 (.63)
			Post	3.48 (.60)	3.41 (.64)	3.31 (.45)
Veterans on Campus	Faculty	111	Pre	2.58 (.71)	3.02 (.61)	2.85 (.64)
			Post	3.33 (.53)	3.44 (.52)	3.32 (.52)
	Student	517	Pre	2.54 (.76)	2.88 (.69)	2.81 (.66)
			Post	3.40 (.57)	3.46 (.53)	3.39 (.58)

success coaches, graduate teaching assistants, and the University Police Department. Other participants were self-selected volunteers who responded to invitations and advertisements to complete the training. The West Virginia University Institutional Review Board approved this research (#1312153568).

Statistical analyses

Data were analyzed with a series of three-way, mixed-model analyses of variance (ANOVAs), 3 (module: At-Risk on Campus, LGBTQ on Campus, Veterans on Campus) X 2 (student versus faculty/staff) X 2 (pre versus post), with repeated measures on the third factor. Significant interactions were followed-up by Tukey's Honestly Significant Difference (HSD) tests at the .05 level.

Participants who demonstrated a lack of adherence to the survey or nonsensical responses were excluded from the sample. A total of 11 participants were excluded, yielding a total sample of 2,727.

Results

Sample descriptives

The sample was 56.2% female. Consistent with the demographics of West Virginia University, most of the sample (80.5%) was Caucasian/non-Hispanic White; 6.7% were Black/African American, 3% were Asian American/Asian, and 2.4% identified as multiracial. The majority of data (77.9%) were collected from student-training modules. Most students trained were college freshmen (54%), followed by sophomores (16.8%), juniors (13.3%), seniors (10%), and graduate/professional students (5.8%). Means and standard deviations across the three domains are presented in Table 1.

Participants completing pre-training assessment only versus both

Independent sample *t*-tests were conducted to compare participants who completed only pre-training assessments (n = 1,187) versus those who completed both pre- and post-training assessments (n = 2,727). Participants who completed only pre-training surveys reported significantly higher levels of Likelihood and Self-Efficacy, but not Preparedness. Effect sizes for all three domains were at or below .002. (These analyses are presented in Appendix Table 2).

Analyses by module, participant type, and time

Results from the 3-way ANOVA on Preparedness, Likelihood, and Self-Efficacy are described in Table 2. Results from Tukey's HSD tests on Preparedness, Likelihood, and Self-Efficacy scores are presented in Figures 1, 2, and 3, respectively.

Preparedness

There was a significant two-way interaction between Pre/Post x Faculty/Student on Preparedness scores. The two-way interaction between Pre/Post x Module was also significant. There was not a significant three-way interaction (Table 2). Preparedness scores improved from

Table 2. Within- and between-subjects ANOVAs for multiple interactions and main effects on Preparedness, Likelihood, and Self-Efficacy.

	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Preparedness						
Pre/Post	246.5	1	246.5	1270.25	.000	.381
Faculty/Student	.188	1	.188	.356	.551	.000
Module	25.18	2	12.59	23.89	.000	.017
Pre/Post x Module	11.2	2	5.6	28.86	.000	.021
Pre/Post x Faculty/Student	1.14	1	1.14	5.9	.015	.002
Module x Faculty/Student	.527	2	.263	0.5	.607	.000
Pre/Post x Module x Faculty/Student	.284	2	.142	.732	.481	.001
Likelihood						
Pre/Post	115.36	1	115.36	559.44	.000	.171
Faculty/Student	15.39	1	15.39	29.51	.000	.011
Module	6.34	2	3.17	6.07	.002	.004
Pre/Post x Module	6.45	2	3.23	15.65	.000	.011
Pre/Post x Faculty/Student	6.76	1	6.76	32.77	.000	.012
Module x Faculty/Student	7.34	2	3.67	7.03	.001	.005
Pre/Post x Module x Faculty/Student	7.68	2	3.84	18.62	.000	.014
Self-Efficacy						
Pre/Post	97.44	1	97.44	486.84	.000	.152
Faculty/Student	2.02	1	2.02	4.64	.031	.002
Module	14.67	2	7.33	16.86	.000	.012
Pre/Post x Module	7.00	2	3.50	17.49	.000	.013
Pre/Post x Faculty/Student	.008	1	.008	.04	.841	.000
Module x Faculty/Student	1.93	2	.964	2.217	.109	.002
Pre/Post x Module x Faculty/Student	1.82	2	.909	4.54	.011	.003

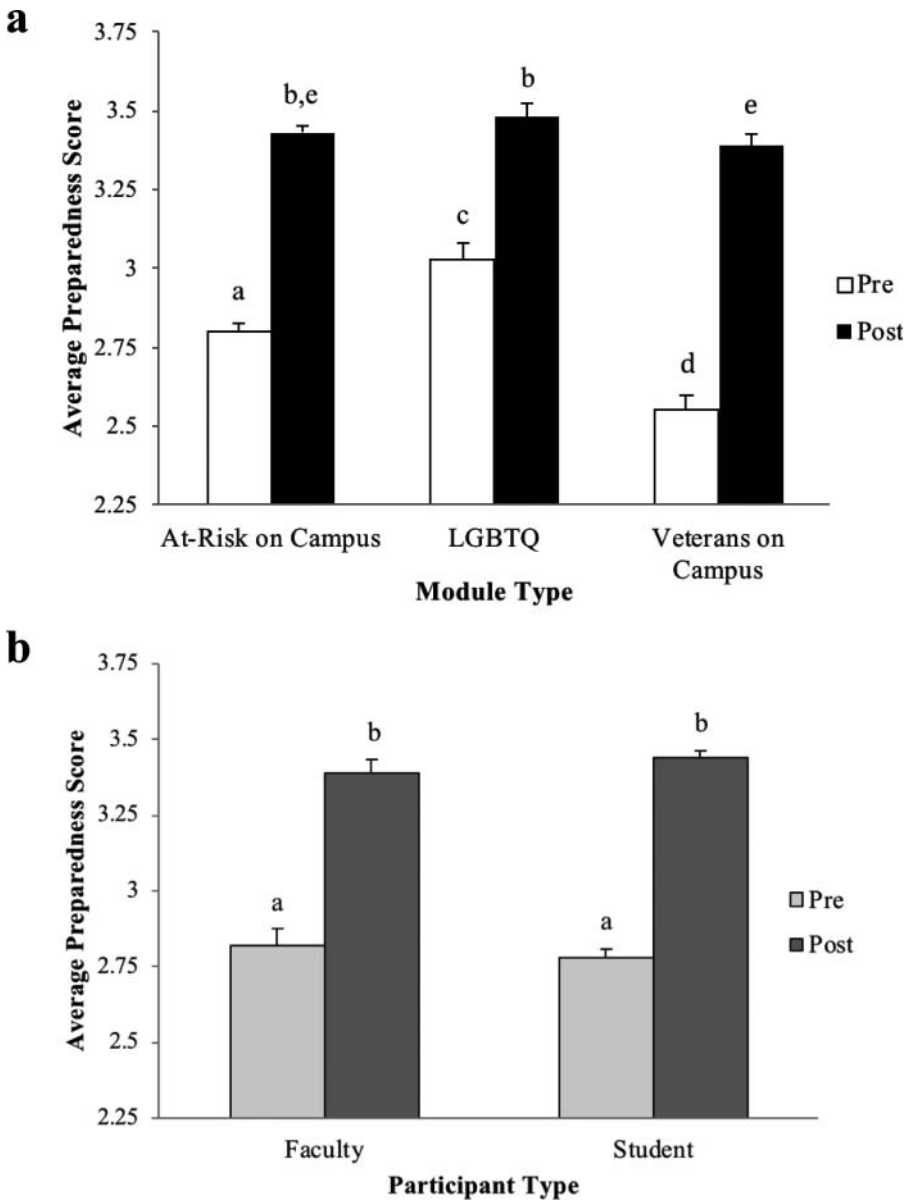

Figure 1. Mean Preparedness scores by module and participant type. Results from Tukey's HSD comparison shown for the two-way interaction between (a) Pre/Post x Module and (b) Pre/Post x Faculty/Student. Dissimilar superscripts indicate significant differences at $p < .05$. Error bars represent standard error.

pre- to post-testing across all modules. Before training, participants completing the Veterans on Campus modules reported the lowest levels of Preparedness, while those completing the LGBTQ on Campus modules reported the highest scores. After training, participants who completed Veterans on Campus training modules reported lower scores than those that completed the LGBTQ on Campus modules (Figure 1A). Students and faculty/staff did not differ in their reported levels of Preparedness at either pre- or post-training (Figure 1B).

Likelihood

The 3-way interaction on Likelihood was significant, as were all two-way interactions (Table 2). Likelihood scores improved significantly from pre- to post-testing across all modules and participant types. Before training, students completing the At-Risk on Campus module reported the lowest Likelihood scores. Likelihood scores at post-training did not differ across modules, despite significant variability at pre-training (Figure 2).

Self-Efficacy

The 3-way interaction on Self-Efficacy was significant (Table 2). Self-Efficacy scores improved from pre- to post-testing across all modules and participant types. Before training, faculty and students completing Veterans on Campus modules reported the lowest Self-Efficacy scores. Post-training Self-Efficacy scores were similar across

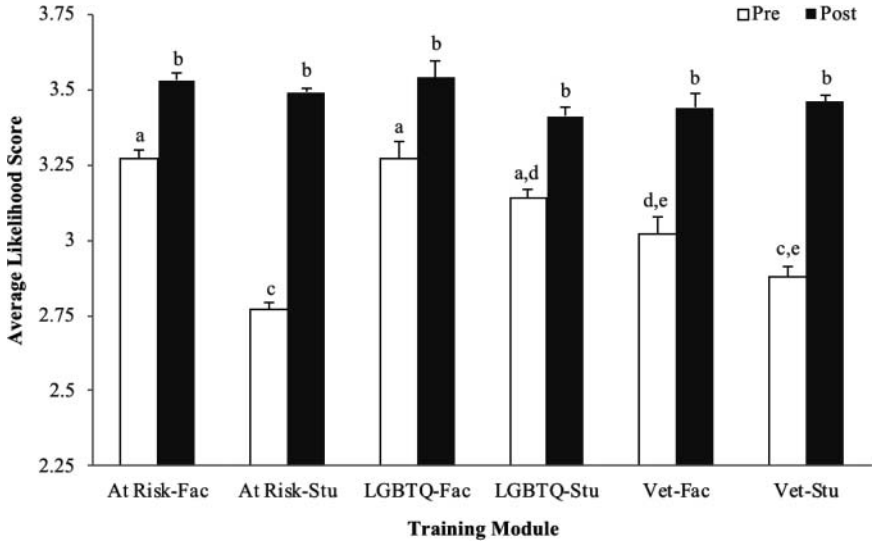

Figure 2. Mean pre- and post-training Likelihood scores by module. Dissimilar superscripts indicate significant differences at $p < .05$. Error bars represent standard error.

modules, though faculty who completed the LGBTQ on Campus module reported the highest scores (Figure 3).

Mandated versus voluntary participants

Scores were compared for those whose *Kognito* training was mandatory (n = 1,312) versus those whose were not (n = 801) using a series of two-way ANOVAs, 2 (mandatory versus voluntary X 2 (pre versus post), with repeated measures on the second factor.

The two-way interaction between Pre/Post x Mandatory Status was significant on Preparedness and Self-Efficacy, but not Likelihood. The individual main effects of Mandatory Status and Survey Time were significant on all domains. Mandated users reported scores that were, on average, 0.097 points (3.4%) higher at pre-training, and 0.02 points (0.58%) higher at post-training. Mandatory Status had small but significant effects on Preparedness (partial eta squared = .003), Likelihood (partial eta squared = .004), and Self-Efficacy (partial eta squared = .003). (See Appendix Table 3 for more details – available online.)

Post hoc analyses

Resident assistants versus other students

Scores were compared for RAs (n = 454) versus other students (n = 1,662) using a series of two-way ANOVAs,

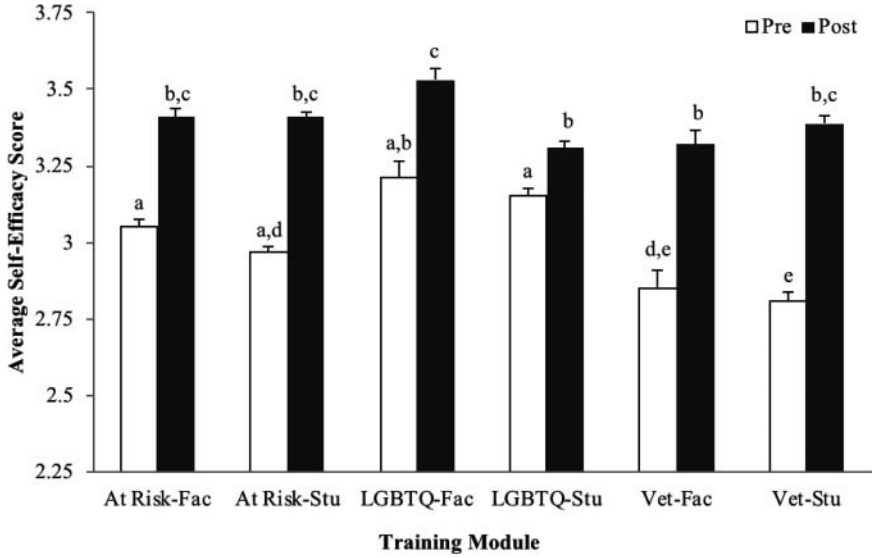

Figure 3. Mean pre- and post-training Self-Efficacy scores by module. Dissimilar superscripts indicate significant differences at $p < .05$. Error bars represent standard error.

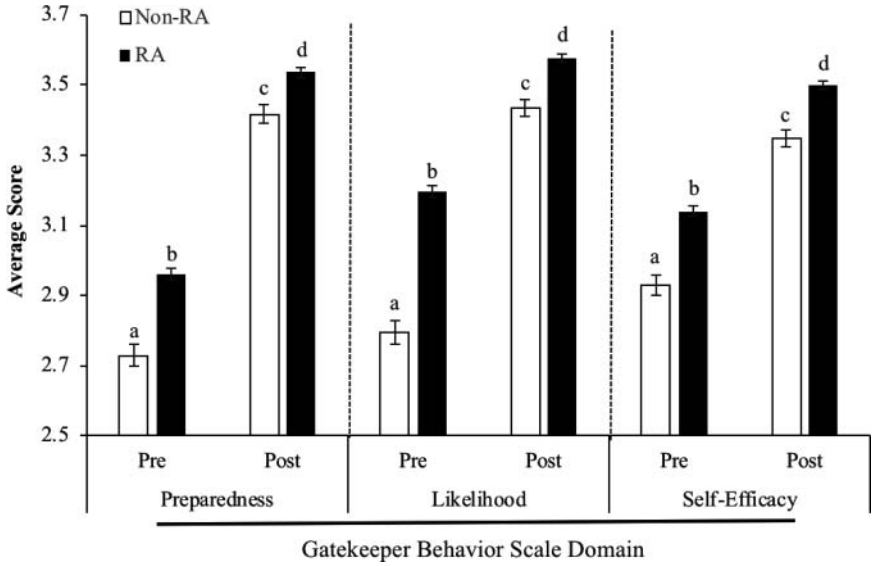

Figure 4. Mean scores for resident hall advisers versus other students at pre- and post-training. Error bars represent standard error. Within each domain (i.e., Preparedness, Likelihood, and Self-Efficacy), means that do not share a similar superscript differ at $p < .05$.

2 (RA-status: RA versus non-RA) X 2 (pre versus post), with repeated measures on the second factor. RA's reported significantly higher scores than non-RA's across all three domains at both pre- and post-training. Preparedness, Likelihood, and Self-Efficacy scores for RAs and non-RAs are illustrated in Figure 4, along with results from Tukey's Honestly Significant Different tests at $p < .05$.

The interaction of RA-Status X Time was significant on Preparedness, F (1, 2114) = 10.443, $p < .001$, partial eta squared = .005. RA-Status and Time both had significant main effects on Preparedness ($p < .001$).

The interaction of RA-Status X Time on Likelihood was significant, F (1, 2114) = 50.926, $p < .001$, partial eta squared = .024. RA-Status and Time also had significant main effects on Likelihood ($p < .001$).

The interaction of RA-Status X Time on Self-Efficacy was not significant, F (1, 2114) = 2.81, $p = .094$, partial eta squared = .001. RA-Status and Time both had significant main effects on Self-Efficacy ($p < .001$).

Differences by academic year

To examine differences among students' year level, a series of three 5 (Freshman, Sophomore, Junior, Senior, and Graduate/Professional Student) X 2 (pre versus post) ANOVAs were conducted. Significant linear trends were observed in Preparedness, F (4, 2110) = 3.35, $p < .05$, partial eta squared = .006, Likelihood, F (4, 2110) = 8.10, $p < .001$, partial eta squared = .015, and Self-Efficacy, F (4, 2110) = 2.56, $p < .05$, partial eta squared = .005. (Appendix Figure 2 illustrates the increasing trend observed in self-reported scores by academic year.)

Comment

The current study is the first independent evaluation of *Kognito* training applied in higher education. All *Kognito* training modules produced significant improvements in participants' self-reported Preparedness, Likelihood, and Self-Efficacy to help at-risk students. Differences were observed in pre-training scores across modules and participants, though training yielded more uniform scores at post-test.

Of the three measured domains, *Kognito* training yielded the greatest overall improvements in trainee's perceived Preparedness to intervene with a troubled student. The next largest effect was seen on Likelihood scores, though the effect size was less than half of that on Preparedness. The effect of training on Self-Efficacy was slightly smaller. Across all modules, training produced substantial improvements in all three domains.

LGBTQ on Campus modules yielded higher post-training Preparedness scores than Veterans on Campus modules (Figure 1A). However, the difference between these two modules was much greater at pre-training, suggesting that *Kognito* modules address differences in users' perceptions of how to help various student groups, though not enough to entirely amend this disparity. Students and faculty did not differ in their levels of perceived Preparedness at pre- or post-training, indicating that students believed themselves as well-equipped as faculty and staff to support the mental health of their peers (Figure 1B).

Students completing the LGBTQ on Campus module reported the highest pre-training Likelihood scores, suggesting that before training, students believed they were

more likely to assist LGBTQ students than student veterans and general at-risk students (Figure 2). Among faculty modules, the lowest pre-training Likelihood scores were observed in the Veterans on Campus module, indicating that faculty believed themselves to be least likely to intervene with student veterans. After training, Likelihood scores raised to an even level across all modules, an encouraging result suggesting that developing the skills of both students and faculty through *Kognito* may generate greater potential for action.

Prior to *Kognito* training, the lowest Self-Efficacy scores were reported by students and faculty completing the Veterans on Campus modules. These low pre-training Self-Efficacy scores align with poor Preparedness and Likelihood pre-training scores obtained from the Veterans on Campus modules. This pattern of low pre-training scores suggests that students and faculty believe they are least equipped to assist student veterans, relative to LGBTQ and general at-risk students. However, post-training scores obtained from Veterans on Campus modules were generally even with those from other modules, suggesting that the Veterans on Campus training modules effectively address an important issue, in emboldening students and faculty to assist student veterans.

Before training, participants reported the highest Self-Efficacy and Preparedness in helping LGBTQ students, followed by general at-risk students, and lastly student veterans. These results are likely influenced by a self-selection bias, as training was voluntary for many participants, and survey completion was optional for all. Participants who completed both pre- and post-surveys may have been more educated and prepared to help LGBTQ students prior to training. Despite pre-training differences, *Kognito* raised and evenly leveled participants' perceived Preparedness and Self-Efficacy in helping these student population groups after training.

Mandatory versus voluntary status of the training had a significant main effect on all three domains. Mandatory Status and Survey Time interacted significantly on Preparedness and Self-Efficacy scores, but not Likelihood scores. However, Mandatory Status had very small effect sizes on all three domains (.006 or below); while this variable interacted with participants' self-reported abilities, being mandated to complete training did not considerably alter users' scores.

RAs reported higher Likelihood, Preparedness, and Self-Efficacy scores than other students at both time points. RAs are self- and other-selected for this position, and so may well evidence superior skills. Additionally, RAs must be students of at least sophomore status, so this population does not contain any freshmen students. The omission of freshmen in this group may account for the higher scores observed, as freshmen reported the lowest scores on the three domains at pre- and post-training (Appendix Figure 2). RAs scores demonstrated similar improvements as those seen in non-RAs, suggesting that training can even provide meaningful benefits for more adept, informed participants.

Analyses by year revealed that students' scores on all three domains improved with greater college year levels (Appendix Figure 2). Linear trends were observed on all three domains, demonstrating that older, more experienced students believe themselves to be more capable of helping other students in distress.

Participants who only completed pre-training surveys reported higher pre-training levels of Self-Efficacy and Likelihood to help students, but not Preparedness. While these differences were statistically significant, results should be considered with caution in light of the sample sizes compared in these analyses. Partial eta squared values for all three domains were at or below .002, demonstrating the very small effect that this variable had on reported scores.

Limitations

The results of this application of *Kognito* training may be limited by several factors. All data used for analyses were self-reported, and were subject to demand characteristics. All user assessments also were completed online and unsupervised, which may have allowed distraction and nonadherence. Only 61.6% of participants completed both pre- and post-training assessments; there also may be overlap in participants across three modules.

Data were only collected from students and faculty at West Virginia University. Future studies should compare data gathered from multiple universities. This study is further limited by a lack of follow-up data; post-training scores were only obtained immediately after completion of training.

Conclusions

Kognito appears to be an effective online tool for large-scale training faculty, staff, and students to provide assistance to general at-risk, LGBTQ, and veteran college students. This real-world test of a large-scale implementation of *Kognito* revealed the training was effective in improving users' perceived abilities to help students, and shows promise for use in an academic setting as an educational resource for students and faculty. These independent findings provide an evidence basis for *Kognito* training, and suggest that online suicide prevention efforts can be scaled for use on large campuses.

Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States of America and received approval from the Institutional Review Board of West Virginia University.

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The views, opinions and content of this publication are those of the authors and contributors, and do not necessarily reflect the views, opinions, or policies of the Center for Mental Health Services, the Substance Abuse and Mental Health Services Administration, or Human & Health Services, and should not be construed as such.

This study is based on a Senior Honors Thesis by the first author, supervised by the second author. None of the authors have any relationship with the developers of Kognito, or any interest associated with the company that provides Kognito.

H. Mei Ng now is at Counseling & Psychological Services, Purdue University, West Lafayette, IN.

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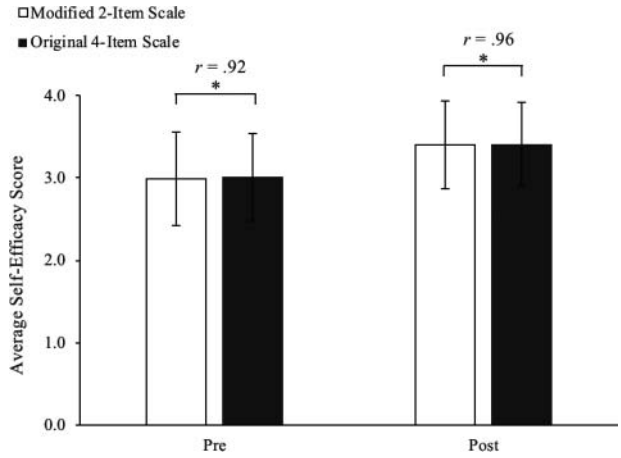
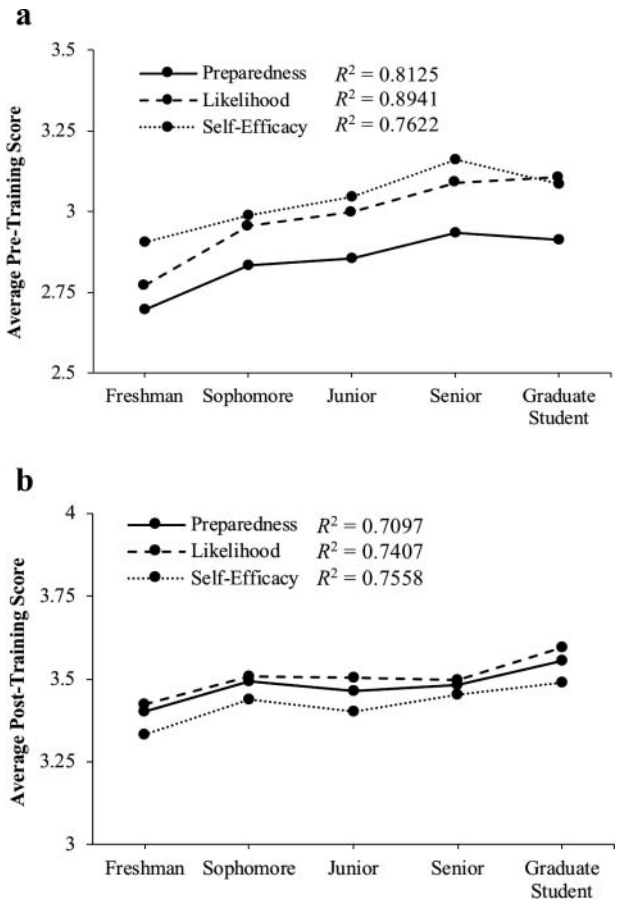
Appendix



Appendix Figure 1. Scores compared between the modified, 2-item Self-Efficacy domain used in this study and the pre-existing 4-item Self-Efficacy domain of the Gatekeeper Behavior Scale. Scores at both pre- and post-training correlated significantly (*indicates significant correlation at $p < .001$). Pearson correlation scores represented as *r*.



Appendix Figure 2. Average Preparedness, Likelihood, and Self-Efficacy scores by year at (a) pre-training and (b) post-training. R^2 values from linear regression analysis.

Appendix Table 1. Questions from pre- and post-training assessments grouped to establish Preparedness, Likelihood, and Self-Efficacy domains.

Preparedness	*How would you rate your preparedness to…*	Very low	Low	Medium	High	Very high
	Recognize when a student's behavior is a sign of psychological distress?					
	Recognize when a student's physical appearance is a sign of psychological distress?					
	Discuss with a student your concern about the signs of psychological distress they are exhibiting?					
	Motivate a student exhibiting signs of psychological distress to seek help?					
	Recommend mental health services (such as the counseling center) to a student exhibiting signs of psychological distress?					
Likelihood	*How likely are you to…*	Very unlikely		Unlikely	Likely	Very likely
	Discuss your concerns with a student exhibiting signs of psychological distress?					
	Recommend mental health support services (such as the counseling center) to a student exhibiting signs of psychological distress?					
Self-Efficacy	*Please rate how much you agree/disagree with the following statements…*	Strongly disagree		Disagree	Agree	Strongly agree
	I feel confident in my ability to discuss my concern with a student exhibiting signs of psychological distress.*					
	I feel confident in my ability to recommend mental health support services (such as the counseling center) to a student exhibiting signs of psychological distress.*					

Note. In LGBTQ modules, questions regarding confidence (marked with *) were preceded by a hypothetical setting in which a student revealed to the user LGBTQ status, and reported experiencing psychological distress.

Appendix Table 2. Score comparisons between participants who completed only pre-training surveys versus those who completed both pre- and post-training surveys.

	Preparedness [Range = 1–4]	Likelihood [Range = 1–4]	Self-Efficacy [Range = 1–4]
Pre only	2.82 (.70)	3.01 (.70)	3.04 (.65)
Pre/Post	2.79 (.67)	2.96 (.71)	2.99 (.61)
F	2.09	5.03	5.80
df	1, 3816	1, 3816	1, 3816
p	.148	.025	.016
Partial eta square	.001	.001	.002

Appendix Table 3. Score comparisons between participants who were mandated to complete training versus those who completed training voluntarily.

	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Preparedness						
Pre/Post	457.21	1	457.21	2151.04	.000	.505
Mandatory	3.51	1	3.51	6.33	.012	.003
Pre/Post x Mandatory	2.70	1	2.70	12.71	.000	.006
Likelihood						
Pre/Post	344.42	1	344.42	1451.39	.000	.407
Mandatory	4.29	1	4.29	7.74	.005	.004
Pre/Post x Mandatory	.630	1	.630	2.66	.103	.001
Self-Efficacy						
Pre/Post	172.28	1	172.28	790.09	.000	.272
Mandatory	2.50	1	2.50	5.58	.018	.003
Pre/Post x Mandatory	1.50	1	1.50	6.90	.009	.003