

Understanding the Value of an Online Alcohol Education Intervention: A Mixed Methods Analysis

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Abstract

Objective: To identify impacts of an on-line education program thus informing campus prevention initiatives.

Participants: 340 college students (including 43 higher risk) completed a follow-on survey after their use of Alcohol101+, a free on-line alcohol education program.

Methods: Participants completed eight questions on alcohol use and risk reduction behavior and reflections regarding alcohol use. Paired samples analysis examined participants' behavior and reflections from using Alcohol101+ to the follow-on assessment. Responses to five open-ended questions provided insights into students' learning.

Results: Statistically significant differences were found with risk reduction strategies. Malleability in students' self-reflection linked to the Stages of Change model are found. Qualitative findings demonstrated areas of learning and gaps in students' knowledge.

Conclusions: Implementing an on-line program affects behaviors that reduce risk and helps students challenge attitudes about personal alcohol use. Knowledge gaps about alcohol and responsible decisions provide opportunities to design needs-based interventions and conduct exploratory discussions.

Sponsoring information: Funding was provided to Drs. Anderson and Hall for an independent evaluation of Alcohol101+, a free on-line educational resource about alcohol information and responsible decision-making. This funding was provided by the Foundation for Advancing Alcohol Responsibility (www.responsibility.org). The evaluation was designed and implemented by Drs. Anderson and Hall, and included overall demographic analysis of respondents, the follow-on assessment (cited in this article), and additional analyses.

Keywords: College health, College students, Alcohol misuse prevention, On-line education, High risk drinking prevention, Mixed methods evaluation.

1. Introduction

1.1 Student Drug and Alcohol Use

Drug and alcohol misuse among college students has been an area of concern for decades. From the national perspective of student behavior and consequences, campus chief student affairs officers report that alcohol is involved with 34% of residence hall damage, 31% of violent behavior, 17% of suicide risk, 46% of rape, 16% of attrition, and 23% of physical injury (Anderson, D.S. et al, 2024). While alcohol use overall had decreased over many decades, 2023 saw an increase in past 30-day use to 55.0%; higher risk drinking shows similar results, with a 2023 rate of 21.9% for 5 or more drinks in a row, and 5.1% for 10 or more drinks in a row, at least once over the last two weeks (Patrick, M.E. et al, 2024). The National Institute on Alcohol Abuse and Alcoholism data reports 1,519 students dying every year due to alcohol-related causes (Hingson, R. et al, 2017).

1.2 Campus Strategies Using Technology

With these concerns, colleges and universities have attempted numerous strategies to address these concerns and to reduce the misuse of drugs and alcohol. Popular among these approaches, and aligned with increased technological capabilities, are packaged internet-based educational approaches. Among these are *My Student Body*, *Alcohol Edu*, *eCHECKUP TO GO*, and *Alcohol101+*. When asked about the extent to which colleges use packaged internet-based educational approaches as part of their campus prevention and education efforts, campus administrators rated this with a mean score of 3.08 on a 5-point scale, where 1 was “not at all” and 5 was “very much (Anderson, D.S., 2021). More recent data shows that, when asked what were the top five channels used to reach students regarding the prevention of drug and alcohol misuse, online learning programs were cited by 41% of respondents, and packaged internet-based educational approaches were cited by 13% (Anderson, D.S. et al, 2024).

1.3 Foundations for Evaluation Research

Since these technological approaches are quite popular, key questions focus on ways technology-focused educational interventions are effective. Specifically helpful will be an understanding of the ways in which participation with a specific technological intervention has an impact on students’ knowledge, attitudes and behavior over time. With campus administrators’ reliance on technological programs to reach students for a variety of purposes, understanding ways in which such an approach may be helpful in meeting specified campus objectives is essential. Insights about elements such as what students report learning and how the use of the program affected their decision-making and behavior can aid with the preparation of appropriate and meaningful campus strategies designed to affect students’ responsible decisions regarding alcohol. Further, gathering evidence about programmatic efficacy, including with higher risk students, helps with determining ways in which such efforts may be appropriate, as well as for whom they may be helpful.

2. Materials and Methods

2.1 Alcohol101+ as an Educational Strategy

The specific research design focused on a relatively new resource available at no cost to students or campuses. *Alcohol101+*, developed by the Foundation for Advancing Alcohol Responsibility (Responsibility.org), was designed to educate college students about responsible alcohol use, promote ways of avoiding and reducing harm, contribute to students’ intent to change drinking behaviors, and decrease binge drinking. The development of *Alcohol101+* was grounded in the transtheoretical stages of change model (Prochaska, J. and DiClemente, C.,1987), and used technological interfaces appropriate for current college and university students.

2.2 Research Design

The research is based on an independent evaluation using students who had used the resource from one to six months previous to the assessment. A blend of quantitative and qualitative approaches was deemed most helpful in gathering greater insight regarding the impact of *Alcohol101+*.

Alcohol101+ has 55 questions embedded in the program addressing students' knowledge, attitudes, perceptions, behavior and readiness to change. To keep the follow-up instrumentation brief and thus maximize the response rate, ten questions were included in this assessment, seven of which were embedded in the *Alcohol101+* program. As such, the researchers used the wording developed by the program's sponsor. The linkage between the embedded questions and the follow-up questions allowed for examining individuals' responses over time on key variables. Five of the follow-up questions incorporated opportunities for students to provide brief comments. With the ten questions, four focused on students' self-reported behavior, and the remaining six were of a reflection nature. Incorporated in this article are findings from eight of these questions.

The follow-up assessment was conducted with students who had used *Alcohol101+* during the 2022-2023 academic year. These students came from a variety of campus settings, and for a variety of reasons; some used this program as part of their freshman year experience, some were mandated to use it as part of a sanction for a conduct violation, some were involved as an academic experience, and some may have used it as part of their fraternity or sorority membership. As a relatively new and free program for college campuses, the researchers were provided access by the program sponsor to the responses of all student users. To narrow the focus of the research, two groupings of students were identified: all first-year students who used the program during Fall, 2022 (N=552) and all students who used the program during Winter/Spring, 2023 (N=1,830). The data collection took place from May 15 through June 9, 2023 with students who had provided permission for follow-up to the program sponsor. An initial invitation and three reminders were sent to the 2,382 students; an opportunity to receive a \$25 or \$50 gift card was provided for six randomly-selected respondents. A total of 340 students responded to this survey (14.3%); 111 (20.1%) of the first-year students responded, and 229 (12.5%) of the students from Winter/Spring 2023 responded.

2.3 Mixed Methods Analysis Approach

The research design included a mixed methods approach, incorporating both quantitative and qualitative findings. The rationale for this was that, all too often, data from a single focus does not provide a full set of insights that might be gleaned regarding programmatic impact. The researchers also sought to develop a methodology that could be used or adapted easily by campus personnel as they seek insights about best practices for their own students.

Data collection was conducted using Qualtrics software. For all 340 respondents, analysis of responses over time was conducted with paired samples analysis using SPSS-19 software, using responses from the questions embedded in the *Alcohol101+* program and incorporated with the follow-up assessment. This quantitative analysis with the follow-up assessment provides documentation of results that extend months after the use of the *Alcohol101+* educational intervention. Analyses of student responses included sub-analyses based on 43 students identified as higher risk students; this designation was based on self-reports, at the time of the Pre-test and/or with the follow-up assessment, of alcohol consumption during the past year and, during their most recent time drinking, consuming more than five drinks.

The qualitative aspect of this study centers around student responses to five questions. Four questions were follow-on queries based on the specific response to individual questions and one was an open-ended question. A relatively high response rate was found with these questions, with 76.4% to 87.5% of students who answered the question responding to the follow-on query after a question, and 68.8% responding to the single open-ended question.

The findings for eight questions are reported, with the results for both quantitative and qualitative approaches included. For the quantitative findings, results include the findings gathered during the students' use of *Alcohol101+* (named "Pre-test") and those gathered with the follow-up assessment (named "Post-test"). These findings are reported by the two groupings of students: First-year students from Fall, 2022, and all students from Spring, 2023. Some questions included a sub-analysis based on whether students had consumed alcohol at all. In addition, for select questions, the results for the 43 students identified as higher risk are specified separately.

3. Results

The results are organized in two broad areas: Behavior and Reflection. Behavior questions address alcohol use as well as risk reduction strategies. The Reflection area includes views related to the Stages of Change construct, self-assessment, and views or beliefs.

3.1 Results in Behavior Area

The questions in the behavior area addressed frequency of alcohol use, number of drinks, risk reduction strategies, and likelihood of involvement with risky behaviors in the future. The question on students' alcohol use had response choices of "Never", "Past 30 days", "More than 30 days ago but within the past 12 months", and "More than 12 months ago." The overall responses show that 30-day use among the First-Year students increased from 29% to 37% from Pre-test to Post-test, consistent with these students' reporting of "Never" dropping from 48% to 31%. No statistically significant changes over time were reported among the students from Spring, 2023.

A related question addressed the number of drinks during the last time that alcohol was consumed. For both the overall group of students and those who had used alcohol within the past year, no statistically significant changes ($p < 0.05$) between Pre-test and Post-test were found using the paired samples t-test.

The behavior question focusing on risk reduction strategies used when drinking had ten options cited. The key finding is that the number of risk reduction strategies used increased dramatically over time, particularly among First Year students (see Table 1). This increased significantly ($p < 0.000$) from 2.58 to 4.50 strategies. Among the Spring, 2023 students, the number of strategies increased from 4.28 to 5.39 overall, also a statistically significant finding ($p < 0.000$). The number of risk reduction strategies was also examined based on whether or not the respondent had consumed alcohol during the previous year. This was statistically significant ($p < 0.016$) among the Spring, 2023 students. While not statistically significant, the number of strategies used by First Year students who used alcohol during the past year increased from 5.41 to 6.14.

Table 1: Number of Risk Reduction Strategies Used When Drinking
(N=340)

	Pre-test	Post-test	Paired Samples T-Test Significance ($p < 0.05$)
Spring, 2023	4.28	5.39	0.000
Spring, 2023 Using Alcohol Within Past Year	5.36	5.89	0.016
Fall, 2022 (First Year students)	2.58	4.50	0.000
Fall, 2022 (First Year students) Using Alcohol Within Past Year	5.41	6.14	0.119

The final behavior-oriented question addressed students' views about the likelihood of being involved in future risky, hazardous, and/or binge drinking. The scale was "More Likely", "Less Likely", "Neither", and "Not Sure." The results demonstrated a reduced perceived likelihood of this future behavior, with the response of "Less Likely" increasing, overall, from 54% to 60%. The change is driven primarily by the First-Year students, with nearly one-half (48% stating "Less Likely" on the Post-test compared with 33%

on the Pre-test. This may be due to their new involvement in college, and thus their potential continued malleability, compared with more established students.

With this question, students were also asked to provide any comments related to their response. Response rates ranged from 83.3% to 87.5%. Responses were sorted and organized by the nature of the response. Of the 175 students providing a written comment regarding why they reported they would be less likely to engage in risky drinking behavior, the responses are classified in one of eight general categories. The largest category, with 28% of responses, was consequences; this included risks, facts and outcomes. Safety (with 23%) talked about dangers, how to drink safely, moderate drinking tactics, and pacing oneself. Perspective as a category (with 17%) addressed mindfulness, avoiding danger, priorities, and healthy decisions. Other areas were body (9%), don't drink much (9%), information (7%), drink contents (4%) and none (3%).

For the students who reported they would be more likely to engage in risky drinking (N=14), responses were varied. Some responses cited learning the effects of alcohol on the body, not knowing the consequences, being better informed about decisions surrounding alcohol. Other comments focused on increased access to alcohol, being in more situations where people are drinking, and growing up.

Another open-ended response choice with this future risky drinking behavior question resulted in 25 written responses to the "Not Sure" choice. Five categories of responses were found, with nearly one-half (48%) in the area of behavior; examples included no changes in handling drinking, already being responsible, and not being a heavy drinker. A "No" category incorporated 19% of responses, and a category of self-directed included 15% (including the course just reinforcing existing knowledge and differences in situations). Other categories were program (11%) and environment (7%).

3.2 Results in Reflection Area

For the reflection area, questions focused on students' readiness to change, responsible decision-making, challenges of views or beliefs, new learnings and other reflections. The first issue addressed readiness to change with responses to eight questions. While students were provided five choices for their responses, these were collapsed into one of three groupings: "Yes" (recoded from "100%" and "Yeah"), "Unsure", and "No" (recoded from "Not Really" and "Not at All").

Student responses are reported with two questions within each of four of the stages of change: Precontemplation, Contemplation, Determination and Action.

- Precontemplation (I don't think I drink too much; There is no need for me to think about changing my drinking)
- Contemplation (I enjoy my drinking but sometimes I drink too much; My drinking is a problem sometimes)
- Determination (Sometimes I think I should cut down on my drinking; I am at the stage where I should think about drinking less alcohol)
- Action (I am trying to drink less than I used to; I have just recently changed my drinking habits)

For each of these four change areas, the results are analyzed in two different ways, and are summarized in Tables 2, 3, 4 and 5. For each of these, the overall responses are provided, and organized to include both the First Year and Spring, 2023 students. The Pre-test and Post-test results are highlighted. Second, a paired-samples analysis was conducted for the students identified as being at higher risk. The rationale for that it is those students, in particular, for whom it is hoped that exposure to *Alcohol101+* would have some impact on their thinking and, ultimately, their behavior. Note that the number found in the tables do not add to 100%, since only "Yes" and "No" responses are used; those who reported "Unsure" were not included in this summary.

3.2.1 Precontemplation Focus Results

The results for the first Precontemplation question "*I don't think I drink too much*" (found in Table 2) shows that of the 263 reporting a "Yes" response initially, the vast majority (92%) had the same response

with the Post-test. Of 46 individuals with a “No” initial response, 71% shifted to a “Yes” response at the Post-test. The second Precontemplation question “*There is no need for me to think about changing my drinking*” had Pre-test results showing 129 with a “Yes” response; of these students, and 67% remained the same at Post-test; among the 132 “No” responses, 44% shifted to a “Yes” response at Post-test. This shift toward greater thinking about changing drinking is helpful, and may be indicative of some impact of the use of *Alcohol101+*.

Table 2: Student Reponses with Paired Samples: Pre-Contemplation

		Pre-Test Yes	Post-Test Yes		Pre-Test No	Post-Test Yes
<i>“I don’t think I drink too much”</i>	Overall Students (N=333)	263	243		46	32
	Higher Risk Students (N=42)	35	32		5	4
<i>“There is no need for me to think about changing my drinking”</i>	Overall Students (N=329)	129	87		132	58
	Higher Risk Students (N=43)	14	9		23	9

Note: For Tables 2, 3, 4, and 5, only the “Yes” and “No” responses are reported; those who cited “Unsure” as their response are not included in these summary tables.

With the 35 higher risk students who reported a “Yes” response at Pre-test for the question about not drinking too much, 32 reported a similar response at Post-test. Of the five with a “No” response at Pre-test, four reported a “Yes” response at Post-test. With the question about changing their drinking, the Pre-test results showed 14 with a “Yes” response; and 9 remained with that response at Post-test. Among the 23 “No” Pre-test students, 9 shifted to a “Yes” response at Post-test. With these Precontemplation questions, the results with the higher risk students suggest movement, which can be associated with reflection about one’s behavior.

3.2.2 Contemplation Focus Results

Table 3 illustrates the responses for the area of Contemplation, with the question “*I enjoy my drinking but sometimes I drink too much.*” This had 74 respondents overall reporting a “Yes” response with the Pre-test; of these, only 35% had a similar response at the Post-test. Of the 215 who reported a “No” response, 8% shifted to a “Yes” response with the Post-test. The second Contemplation question was “*My drinking is a problem sometimes*”; of the 19 students who reported a “Yes” response at Pre-test, 21% remained with a “Yes” response at Post-test. Of the 279 with a “No” response at Pre-test, 2% shifted to a “Yes” response at Post-test.

Table 3: Student Reponses with Paired Samples: Contemplation

		Pre-Test Yes	Post-Test Yes		Pre-Test No	Post-Test Yes
<i>“I enjoy my drinking but sometimes I drink too much”</i>	Overall Students (N=331)	74	26		215	17
	Higher Risk Students (N=43)	25	12		16	4

<i>"My drinking is a problem sometimes"</i>	Overall Students (N=328)	19	4		279	5
	Higher Risk Students (N=4)	7	2		32	1

Among the 43 higher risk drinkers, 25 (58%) responded to the first question about drinking too much with a "Yes" response at the Pre-test; the Post-test results show 12 of them retained this response. Similarly, with the 16 with a "No" response at Pre-test, 4 reported a "Yes" response at Post-test. For the second question about drinking being a problem sometimes, the Pre-test results among the high-risk drinkers showed 7 with a "Yes" response; this was 2 at Post-test. Of the 32 with a "No" response at Pre-test, only 1 shifted to a "Yes" response at Post-test. The results from the two questions suggest that many students had a different assessment of their use months later, whether their actual alcohol use had or had not changed.

3.2.3 Determination Focus Results

The next category was the Determination stage; its results are found in Table 4. The first question was *"Sometimes I think I should cut down on my drinking."* The overall findings show 22% of the 340 students reporting "Yes" at the Pre-test; of these, less than one-third (24) had a similar response at Post-test. Of the 207 students reporting "No" at Pre-test, 7% later had a "Yes" response. The second question was *"I am at the stage where I should think about drinking less alcohol."* The overall responses showed 102 (32%) with a "Yes" response at Pre-test; this was 42 at Post-test. Among the 160 with a "No" Pre-test response, 18 shifted to a "Yes" response at the Post-test.

Table 4: Student Responses with Paired Samples: Determination

		Pre-Test Yes	Post-Test Yes		Pre-Test No	Post-Test Yes
<i>"I enjoy my drinking but sometimes I drink too much"</i>	Overall Students (N=329)	75	24		207	15
	Higher Risk Students (N=43)	20	10		21	10
<i>"My drinking is a problem sometimes"</i>	Overall Students (N=326)	102	42		160	18
	Higher Risk Students (N=42)	16	7		17	2

With the higher risk students (N=43), the results are mixed, as one question showed about half of the students shifting toward greater thought about cutting down on drinking, and the other question showed limited desire to shift. A "Yes" response was reported at the time of the Pre-test by 20 students for the question about cutting down on drinking; one-half of these had the same response at Post-test. Of the 21 with a "No" response at Pre-test, ten shifted to "Yes" at Post-test. For the question about thinking about drinking less, 16 reported a "Yes" response at the Pre-test; this was 7 at Post-test. With the 17 "No" responses at Pre-test, 2 shifted to a "Yes" response at Post-test.

3.2.4 Action Focus Results

With results in Table 5, the Action phase's first question was *"I am trying to drink less than I used to."* Among the respondents, a total of 172 at Pre-test reported "Yes"; 62% maintained that response at Post-test. Among the 104 students responding "No" at Pre-test, 25 (23%) moved to a "Yes" response at Post-test. The second question was *"I have just recently changed my drinking habits."* Pre-test results have 102

students with a “Yes” response; of these, 53 (52%) had the same response at Post-test. With the 170 with a “No” response at Pre-test, 30 (18%) moved to a “Yes” response at Post-test.

Table 5: Student Responses with Paired Samples: Action

		Pre-Test Yes	Post-Test Yes		Pre-Test No	Post-Test Yes
<i>“I am trying to drink less than I used to”</i>	Overall Students (N=330)	172	107		104	25
	Higher Risk Students (N=43)	27	16		10	6
<i>“I have just recently changed my drinking habits”</i>	Overall Students (N=326)	102	53		170	30
	Higher Risk Students (N=42)	14	7		21	6

Among the higher risk students, the question about trying to drink less showed 27 of the 43 students reporting a “Yes” response at the Pre-test; among these, 16 had a similar response at Post-test. Of the 10 students who had a “No” response at Pre-test, 6 reported a “Yes” response at Post-test. For the question on recently changing drinking habits, 14 reported a Pre-test response of “Yes”; 7 maintained that response at the Post-test. With the 21 students with a “No” response at Pre-test, six had a “Yes” response at Post-test. These two questions found mixed results; nearly two-thirds changed from not “trying to drink less”, to trying to do so. However, the question about recently changing drinking habits had a less robust change, which may be due to the nature of the question (i.e., what “recently changed” means in terms of timing).

3.2.5 Related Reflection Results

Shifting to a different area of focus, students were asked whether the program challenged their *views or beliefs about drinking alcohol*; respondents had choices of “Yes”, “No” and “Unsure”. The follow-up assessment also provided opportunities for students to explain the reasoning behind their choice if they responded “Yes”.

The results from this question showed notable findings for both the first-year students and the Spring, 2023 students. Overall, at the time of Post-test, the “No” responses were reported by 41.9% of students, with “Yes” responses by 37.5% and “Unsure” by 20.6%. The students who reported “Yes” (N=127) were then asked a follow-up question: *“Can you say what part of this experience challenged your views or beliefs?”* With this, 97 of them (76.4%) provided a response. From an overall perspective, key examples are about Drink Contents (alcohol percentages, serving size, standard drink), Safety (drinking responsibly, tips), and Perspective (looking at the bigger picture, prevalence of these issues).

An open-ended question was provided, asking *“As you reflect on going through the Alcohol101+ program, what, if anything, stands out to you?”* With this question, 234 of the 340 total respondents addressed this question, resulting in a response rate of 68.8%. With nine categories of responses identified, the dominant areas were: Body (what happens, stages of being inebriated, how BAC works, male/female differences), Program (examining individual habits, entertaining and educational approaches, simulation of drinking, easy access, friendly site), Drink Contents (standard drink, refresher information, alcohol content of different drinks) and Information and Data (new information, how many are not educated about alcohol, bringing more awareness).

Students were also asked about new knowledge, with the question *“Did you learn anything new by participating in this experience with Alcohol101+?”* Overall, a “Yes” response was reported by 64% of the

First-Year students and 73% of the students who had more recently been involved with the program. A response of “Unsure” was provided by 12% the First-Year students and 10% of the Spring, 2023 respondents, with the remaining (25% and 18%) reporting “No.” For those responding “Yes” the follow-on question asked what they learned that was new. Of the 235 who responded “Yes” to this question, a total of 187 students (76.6%) provided detail. Specific examples for categories with the largest number of responses include the following: Drink Contents (alcohol percentages, standard drink measurements), Body Effects (differences with men and women, effects of different alcohol amounts, how one drink affects the body), Behavior (thinking before drinking, drinking more responsibly, use of food and water, controlling drinking), and BAC (symptoms linked to different BACs, how alcohol use affects BAC levels).

4. Discussion

This article provides helpful insights regarding the potential value of an on-line educational program for increasing awareness and behavioral intent surrounding college student decisions regarding their consumption of alcohol. As a brief educational intervention, *Alcohol101+* appears to have merit with affecting some desired change with students. Knowing that completion of the program itself may take 45 minutes, the fact that some change can occur, with some harm reducing behavior and with some thought processes, is worthy of note. The article’s methodology is also important, as it includes mixed methods and provides a framework, including specific content, that can be replicated by campus leaders to determine locally-applicable findings for their own planning and strategic implementation.

4.1 Mixed Methods

The blend of quantitative and qualitative data is a significant feature of this research. Having the quantitative data, from an overall perspective, is helpful in documenting various findings; of even greater value is the utilization of paired samples to track individuals over time. Providing both interpretative insights and illustrations of the respondents’ viewpoints was the qualitative data found with multiple questions. The blend of these complementary approaches provides some understanding helpful for “moving the needle” regarding alcohol use, alcohol misuse, and safer drinking practices.

4.2 Educational Program Limitations

At the outset, it is important to note that no single program or policy is a panacea for reducing or eliminating alcohol misuse on the college campus. Alcohol and drug problems are widespread and with notable societal contextual factors affecting their development and impact. To address these problems more effectively, campus leadership must engage in a comprehensive strategy. Such an undertaking involves a wide variety of approaches, including but not limited to policies and procedures, education and prevention, support and intervention services, needs assessment and evaluation, and curriculum and training. A comprehensive approach must also involve numerous individuals and groups, including campus leadership, health and counseling services, prevention and education personnel, faculty and staff, student groups and organizations, and community leaders. Further, comprehensive campus efforts must engage students with diverse backgrounds and experiences, and with varying levels of involvement or non-involvement with their use of alcohol. In short, implementing a meaningful and, ideally, effective alcohol misuse prevention effort is a large job that incorporates numerous strategies, ideally in a planned and organized way, to best meet the local needs and issues.

4.3 Demonstrated Impact

With a resource such as *Alcohol101+*, the aim is one of making a difference, even a modest one, on selected variables. The findings from this research demonstrate that some differences did happen. Some changes were noted with primarily with first-year students as well as with those identified as higher risk students; each of these audiences provides a focused opportunity for selective and strategic interventions with campus policies and programs. Further, the fact that questions built upon the Stages of Change model were incorporated in the *Alcohol101+* program provided helpful grounding for the resulting outcomes based on this theoretical construct.

4.4 This Evaluation Research

While the overall results from this research are helpful with the attainment of some desired outcomes, these results must be viewed cautiously. First, the initial data (the Pre-test) is based on students who completed the program based on their campus leadership's expectation that they do so; this may be based on reasons such as a conduct or judicial infraction, a fraternity/sorority requirement, a class assignment, or some other standard. Second, the nature of the students who used this program is based on campus requirements, and is thus not necessarily representative of college students in general. Even with this limitation, the processes and results are most helpful for gathering further insights for needs assessment, programming, planning, and evaluation. Third, the Post-test data includes only those students who chose to respond to the voluntary survey. Fourth, the results are based on the relatively brief intervention (participation with the *Alcohol101+* program online). Fifth, the follow-up data was gathered months after completion of the program, a factor that is helpful for examining some lasting impact of the program, yet also having some distance from direct program engagement without intervening educational reinforcements. Finally, the number of students identified as higher risk was limited (N=43) and based on a limited theoretical construct, thus reducing the possibility of further analysis based on specific demographic variables.

Quite impressive with the follow-up data results are both the response rate overall (14.3%) as well as the much higher response rate (20.1%) among First Year students at least six months after completion of the program. Also, quite noteworthy is the high level of responses (from 59% to 88%) to the open-ended questions provided with one-half of the questions. This suggests that students wanted to share their insights, and that they wanted to be heard.

4.5 Increased Use of Risk Reduction Strategies

One of the main findings from this follow-up analysis was that students were much more likely to use risk reduction strategies following use of *Alcohol101+* when compared with their earlier use of these same strategies. The most significant change with this behavioral outcome was found with First Year students, where an increase of nearly two strategies (from 2.58 to 4.50) from among the ten strategies cited, occurred.

4.6 Changes in Alcohol Use Patterns

A second main finding is that alcohol use patterns shifted in several dimensions. This included greater alcohol use among First Year students, not unexpected during their first year of college. Among the Spring, 2023 students, the average number of drinks reduced slightly, as did the 30-day use pattern. An important shift, and particularly for the use of *Alcohol101+*, is the change in drinking behavior found among those students identified by the evaluators as higher risk drinkers. Specifically, nearly one-half of those identified as high-risk drinkers at the time of using *Alcohol101+* were no longer identified as such at the time of Post-test, based on the students' self-reported behavior. The reason for this is unknown, and could be based, in part, to some of the information and insights gathered with the use of *Alcohol101+* or other interventions. A finding such as this warrants further exploration, perhaps with additional qualitative approaches, to understand better what might have affected this reduction in high-risk behavior; certainly, reducing risk and harm are key priorities of campus leaders.

4.6 Impacts on Potential Risky Behavior

A third main finding revolves around the potential for risky behavior. While reported by the students regarding their own perceived likelihood to get involved with risky behavior, the findings are suggestive of a positive impact. Respondents overall reported increases in lowered likelihood (from 54% to 60%) of getting involved with risky behavior. Further noteworthy is that this increase in "less likelihood" is much greater among First Year students. Again, further examination of why this reduction of risk may be occurring is an important initiative, with outcomes of reduced harm frequently specified by college leadership personnel.

4.7 Modifications with Stages of Change Construct

The fourth major finding was based on the Stages of Change theoretical construct and the use of paired samples. The aim is for individuals, particularly those with higher risk drinking patterns, to become more involved with changing their risky or potentially risky behavior to be less so. The data from the eight questions demonstrates that some changes did occur. The data shows that some movement did occur with each of the four constructs. With the varied questions, it appears that some malleability is present. What this suggests is an opening for further exploration with larger student samples, as well as with focused discussions with students. Such approaches will help gain greater understanding of the nature of these changes, and also to help identify the most appropriate and effective strategies for future utilization.

4.8 Value of Qualitative Responses

The fifth significant finding from this follow-up assessment revolves around the very rich information gathered from the qualitative responses, found with the open-ended follow-on questions. Overall, students cite numerous areas where they learned important information and skills. With these various question responses, it was clear that students learned about drink size and contents, effects on the body, consequences associated with over-consumption, safety and risk reduction factors, and general information about others' alcohol use. The comments about the *Alcohol101+* program itself were quite positive, with appreciation shown for the interactive nature of the program. While some students reported having learned some of the information earlier in other settings, they also appreciated the reminder and reinforcement surrounding responsible decisions.

Related to this, what is quite surprising to the authors is how much students did not previously know, particularly with their statements about learning what is often viewed as basic and vitally important information (e.g., drink contents, BAC, consequences). This suggests that students, whether First Year or in other years of school, have had very limited exposure to much of the content and many of the protective and safety strategies. For those in the collegiate setting, this is important to remember when planning student education and other strategies around alcohol, as well as with cannabis and other drugs. Further, the implications for secondary schools and other community settings include attention to programs, policies and other strategies to educate youth, parents and community leaders about the facts about alcohol, risk reduction strategies, and ways to affect a safe and healthy environment.

5. Recommendations

Based on these findings, several recommendations are made.

5.1 Use of On-Line Educational Software

The fact that results were obtained, ostensibly through the use of this on-line educational program *Alcohol101+*, with students' behavior and self-assessments, is quite noteworthy. Campus educators, as well as others in school, community, and work settings, seek results to address issues and promote responsible decision-making. The fact that *Alcohol101+* is an easy-to use, relatively brief, and – importantly - free resource, and with documented positive outcomes, makes it a valuable resource to be included as part of a comprehensive prevention initiative.

5.2 Replication of This Study

A second recommendation is to replicate a study of this nature with other on-line prevention and education programs seeking to address alcohol issues. While the specific outcome and assessment variables may be different, it will be helpful to ascertain what types of differential impacts are obtained with varying programs. A related recommendation builds upon the fact that this data had the opportunity for a paired samples analysis, thus providing rich information. With a larger sample size, particularly with the higher risk students, further analyses can occur based on demographic factors such as gender, year in school, and nature of the institution.

5.3 Follow-on Discussions with Students

The data provided here, particularly the results and shifting patterns within the construct of the changes of change model, provide rich opportunities for follow-on discussions with students. Whether with students in general, higher risk students or other groupings of individuals, targeted discussions can focus on why changes did or did not occur with each of these variables.

5.43 Addressing Information and Awareness Gaps

Finally, the qualitative data provides significant information about and insights regarding the lack of prior education (or even misinformation) surrounding the range of alcohol issues. What was taught in middle and high schools for many years appears to be lacking currently. Thus, it is incumbent upon colleges and universities to address this information and awareness gap so students are well-informed. All of this provides a helpful and important opportunity for college leaders to help shape their own campus environment. Similarly, it is incumbent upon community and school leaders to address this gap, not only for those in their purview but also to prepare better these individuals for their future lives, whether or not they will be attending college.

6. Conclusion

Central to the findings, and blending both quantitative and qualitative results, is the documentation of the role that much of the content included in *Alcohol101+* plays in the lives of students. From an information and protective strategy point of view, *Alcohol101+* appears to be filling a void among young adults. The important content contained in the program is not just appreciated, but put to good use by students (noteworthy is the increased use of risk reduction strategies). Further, the disruption in self-reflection and patterns of thinking about drinking is found among students; this is found with students whose drinking patterns and/or response to the stages of change questions had changed.

The context, however, is important – no single program, policy, or approach is sufficient for causing clear-cut changes in student attitudes or behaviors. What is found is that demonstrable change does occur over time, and attribution, in part, to *Alcohol101+* is a reasonable conclusion. The results also help document the value of targeted interventions for college campus administrators as they seek valuable and appropriate tools for their campus-based strategies.

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