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# Online Interventions for Prevention of Substance Use and Abuse



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## Introduction

Targeted intervention programs for substance use and mental health can be effective at shifting adolescent behavior and decreasing symptoms of depression and anxiety. However, due to barriers of cost and time, it can be difficult to implement in-person programs. This literature review examines the possibilities and best practices for online intervention programs. Several existing online programs were explored in this review, including REAL media (Ray et al., 2020); the Climate Schools programs in Australia (Teeson et al., 2021; Thornton, et al. 2018), and mi.spot (Reupert et al., 2019). The findings inform two broad categories of proposals for practice, specifically: (1) considerations of content and audience and (2) pedagogical and course design strategies to increase engagement.

Before constructing an online intervention, effective online programs consider best practices for their intended audience. For example, Ray and colleagues (2020) noted that participants' prior knowledge of the topic should be considered when crafting curricula. Milward and colleagues (2018) support this claim, finding that effective online programs consider the context of their participants, including participants' background knowledge, technological skill, and environmental factors which may influence how and when they interact with online curriculum. Finally, considering *who* the participants should be and *what* the participants should learn can influence the design of the curriculum. For instance, the most effective interventions occur before young people have their first exposure to alcohol and cannabis, so early adolescence is a good time to begin interventions. Further, a curriculum designed for both parents and children are more effective than a curriculum targeted only to children (Thornton et al, 2020). The content of the curriculum can also impact design. Teeson and colleagues (2021) found that curriculum which taught a combination of interrelated topics (mental health and substance use) was more effective than programs which taught these topics separately.

The other important consideration when designing online instruction are pedagogical and design strategies for increased engagement. The most effective online programs engaged users as active learners (Ray et al., 2020; Reupert et al., 2019). Learners were asked to respond to interactive questions, chat with other users and clinicians, and choose their own extension activities. Effective curriculum also employed thoughtful graphic design, including summary fact sheets, easy to read and digest texts, and multimedia presentations. Milward and colleagues (2018) found that these strategies to encourage engagement should be used in combination, as they have an additive effect on engagement. The article summaries below include a more detailed examination of these findings, as well as specific actions to implement in practice.

## **Article 1** *Combined Prevention for Substance Use, Depression, and Anxiety in Adolescence: A Cluster-Randomized Controlled Trial of a Digital Online Intervention*

### **Summary**

The combination of substance use, depression, and anxiety are the leading cause of disability in adolescents in wealthy countries. However, prevention programs traditionally target these issues in isolation, instead of teaching them as related and combined factors. **Standalone programs are generally effective in preventing the primary concern (i.e., a substance use program is effective at preventing substance use), and are somewhat effective at preventing secondary concerns (i.e. a substance use program has a moderate effect on anxiety and depression).**

This study investigates how effective a program can be if it takes a combined approach, targeting substance use *and* mental health. It compared the effectiveness of standalone interventions with combined interventions. The intervention used an on-line format in order to overcome traditional barriers to implementation, in particular time and cost. The study measured the influence of the intervention on students' knowledge and behavior at 12 months post-intervention, 24 months post-intervention, and 30 months post-intervention. **The study's results suggest that combined interventions is an effective model to increase adolescents' knowledge of alcohol, cannabis, and mental health; preventing alcohol use, including heavy episodic drinking; and reducing symptoms of anxiety and depression for up to 30 months after the intervention.**

### **Implications for Practice**

- A combined intervention -- one which teaches substance use, depression, and anxiety as related and combined -- is a superior approach as compared to standalone interventions.
- Combined approaches reduce the risk of alcohol use, reduce symptoms of anxiety and depression, and increase adolescents' knowledge of cannabis and alcohol for up to 30 months after the intervention.
- Fully online courses can be effective methods of content delivery for combined interventions.

## Citation

Teesson, M., Newton, N. C., Slade, T., Chapman, C., Birrell, L., Mewton, L., ... & Andrews, G. (2020). Combined prevention for substance use, depression, and anxiety in adolescence: a cluster-randomised controlled trial of a digital online intervention. *The Lancet Digital Health*, 2(2), e74-e84.

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## **Article 2** *Exploring Indicators of Engagement in Online Learning as Applied to Adolescent Health Prevention: A Pilot Study of REAL Media*

### Summary

The more that participants engage with online content, the more effective the learning. This is especially true when learners can actively co-create understanding, instead of passively receiving knowledge. Historically, the only way to quantify engagement was through self-reported surveys. However, given the rise of analytic data in online spaces, it is possible to use this data to measure engagement, including time spent on a program and user patterns when engaging with interactive questions. This study explores the relationship between these measurements by exploring young people's engagement with REAL media curriculum.

**REAL media is intentionally designed to engage young people through pedagogies focused on critical thinking, counterargument, reflection, and authentic application. These strategies are designed to shape young people's knowledge and behavior, including substance use behavior, by encouraging youth to critically engage with media on substance use messaging.** The assumption behind the strategies is that analysis, planning, and production activities facilitate engagement and lead to desired outcomes. This study aims to measure these related strategies for engagement.

The study found that students who wrote longer responses (word count) and more complex responses did not necessarily self-report that they found the course challenging or interesting. At first glance, this seems counterintuitive; however, it may be that students with pre-existing knowledge and understanding of the topic were able to craft more lengthy and complex answers to the questions, regardless of the degree to which they found the information to be interesting. On the other hand, student self-reported measures of engagement do correlate with "optional engagement," which allows the opportunity for students to self-explore topics in more depth. **Overall, this study suggests that interactive and thought-provoking learning strategies are an effective method to teach media literacy and substance use.** It further

suggests that a combination of self-report surveys and data analytics can help understand when and where students are engaging deeply with online course content.

### Implications for Practice

- Participants' prior knowledge of the topic should be considered when crafting curricula. Participants may self-report that the course is too simplistic if they are already familiar with the material.
- Online curriculum should not assume that users are passive recipients of knowledge. Instead, consider the characteristics of the learners (including background and prior knowledge) and offer learning strategies designed for engagement with material.
- Effective online learning strategies should allow students to critically question a topic, develop skills around a topic, and apply their new knowledge and skills to produce or create a meaningful activity. The REAL media course may provide a useful model of how to develop this type of online substance use course.
- It may be helpful to use both self-report surveys *and* data analytics to determine the level of engagement of participants in an online course.

### Citation

Ray, A. E., Greene, K., Pristavec, T., Hecht, M. L., Miller-Day, M., & Banerjee, S. C. (2020). Exploring indicators of engagement in online learning as applied to adolescent health prevention: a pilot study of REAL media. *Educational Technology Research and Development*, 68(6), 3143-3163.

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### **Article 3** *Climate Schools Plus: An Online, Combined Student and Parent, Universal Drug Prevention Program*

#### Summary

Parents play one of the earliest and most important roles in influencing their children's substance use and programs targeted to parents can be very effective. Several factors exist within parental control which can influence likelihood of children's substance use. These include parental monitoring, parent-child relationship quality, parental support and parental involvement. Most successful programs attempt to improve parental monitoring

(communication with children about where they are and with whom), set strict rules against underage substance use and improve parent-child communication.

**Thus, effective programs for parents help parents to model responsible drinking and attitudes towards alcohol, establish family rules, monitor adolescents when unsupervised, establish and maintain a good parent-child relationship and talk to adolescents about alcohol.**

The most effective interventions for children occur before exposure to alcohol and cannabis use, and the most effective interventions for parents occur when started in early adolescence. Thus, programs which address these issues, provided in early adolescence, can help prevent substance use. However, several barriers exist which prevent parental participation. These include time, costs, and childcare and transportations issues. Online prevention programs can help overcome these barriers. Online programs can also be implemented with higher fidelity and are less labor intensive for schools and other providers to implement.

The researchers polled parents in order to learn what programming and learning activities most appealed to them. In online programming, parents indicate that they desire learning modules which are: interactive, self-paced, brief (most parents want to spend under 10-minutes per week on a substance use prevention program), evidenced-based, and designed by a reputable institution. **Most parents were interested in an online program with the following features: fact sheets, on-demand webinar, cartoon vignette scenarios, automatic emails of summaries of student lessons, and short video summaries of online materials.**

The researchers designed the parent course to coincide with the student course (being delivered in schools). The parent course contained three key parts:

1. A webinar to introduce parents to key evidence-based strategies to prevent alcohol and cannabis use and harms among adolescents and to facilitate generation of a shared set of rules about alcohol and cannabis use for their children;
2. Online modules that deliver key information for parents about the prevalence and harms of adolescent alcohol and cannabis use, practical evidence-based tips for preventing use and harms;
3. Parent lesson summaries of the material covered in the Climate Schools: Alcohol and Climate Schools: Alcohol and Cannabis courses for students.

The study did not evaluate the effectiveness of the curriculum. However, they did find that fathers tended to participate far less frequently than mothers. They also found that parents appreciated the brief, engaging and interactive design of the program.

## Implications for Practice

- Programs which include content for parents and children can be more effective than children only intervention programs.
- These programs should be implemented in early adolescence.
- Online programs can help overcome barriers to parental involvement in programming, including cost and time.
- Online programs for parents should consider focusing on the following content, as these are all protective factors within parents' control:
  - How to talk with children about alcohol
  - How to set clear rules and expectations around alcohol consumption
  - How to set clear rules about monitoring behavior, especially where and with whom
  - How to model responsible behavior and attitudes toward alcohol
- Online programs for parents should consider including the following learning strategies and approaches:
  - Interactive learning modules
  - Self-paced learning modules
  - Brief (under 10 minute) learning modules
  - Evidenced based strategies
  - Easily summarized fact sheets
  - On-demand webinars
  - Cartoon vignette scenarios
  - Automatic emails summarizing student learning (from the concurrent student course)
- Programs may struggle encouraging fathers to enroll. Considering ways to increase father involvement will strengthen the program.

## Citation

Thornton, L. K., Chapman, C., Leidl, D., Conroy, C., Teesson, M., Slade, T., ... & Newton, N. (2018). Climate schools plus: an online, combined student and parent, universal drug prevention program. *Internet interventions, 12*, 36-45.

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## **Article 4** *What Makes Online Substance-Use Interventions Engaging? A Systematic Review and Narrative Synthesis*

### **Summary**

While online substance use interventions remain an effective way to implement prevention programs, engagement remains a challenge. This study synthesized the work of 15 other studies to identify factors that maintain and increase engagement in online programs. **The researchers found that participant engagement increased when the users had control over how they view content and have free choice over when they interact with it.** Further, multimedia content had higher engagement rates than simple text-based content, and content which included thoughtful graphic design (well laid out and easy to read) also scored higher on the engagement scale. The researchers concluded that social support (either through a peer or therapist) demonstrates mixed engagement. While many studies indicate that social support increases engagement, the results are inconclusive on whether social support leads to behavioral change.

There may be an additive effect to using a combination of strategies to increase engagement and lead to behavioral change. For example, sending users reminders increased engagement, but combining reminders and social support increased engagement more than reminders alone. Other factors influencing user engagement include monitoring, feedback, tailoring content to participants' characteristics, aesthetic design, novelty, and credible sources. **When tailoring content to learner characteristics, it is important to consider individual, environmental and technology level factors that may influence how much a user can and will interact with online content.** This study did not examine apps or mobile based content delivery courses. It only examined computer-based interventions.

### **Implications for Practice**

- Effective online programs consider the context of their participants, including participants' background knowledge, technological skill, and environmental factors which may influence how and when they interact with online curriculum.
- Engaging online curriculum to address substance use should include the following:
  - User control - this includes how users can view the content as well as choice in how they interact with content;



- Multimedia content;
- Graphic design considerations which make text easy to read and access (e.g. thoughtful bolding, headings, and spacing);
- Sending users reminders to engage;
- Use social learning by connect users with each other or with a therapist
- Strategies to encourage engagement should be used in combination, as they have an additive effect on engagement.

### Citation

Milward, J., Drummond, C., Fincham-Campbell, S., & Deluca, P. (2018). What makes online substance-use interventions engaging? A systematic review and narrative synthesis. *Digital Health, 4*.

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### ***Article 5 The Acceptability and Effectiveness of an Online Intervention for Youth with Parents with a Mental Illness and/or Substance Use Issue***

#### Summary

This study investigates the effectiveness of an online intervention targeting young adults who had a parent with a mental illness and/or substance use issue. The intervention was designed to incorporate passive and active methods of knowledge acquisition. It acknowledged social learning and the role of peers and clinicians in helping develop knowledge and behaviors for mental health. The goal of the intervention was to improve young adults' mental health literacy, promote adaptive coping, build positive social connections, increase resilience, encourage help seeking, and ultimately promote mental well-being.

#### *Intervention*

**The intervention consisted of six synchronous meetings which were supplemented by optional homework, videos portraying young people living with similar experiences, and easy to read information sheets.** Each module concluded with an online assessment designed to help participants gauge their own progress in learning. There were also options for one-to-one online, synchronous counseling sessions. In addition, young people could “chat” to each other on the site on topics they initiate. Participants could also record a situation that they found challenging and consider different ways of appraising and responding to that same situation.

They were given asynchronous feedback on their responses by a facilitator who were master's psychology students who participated in a two-day training and were supervised by clinicians. Finally, there were weekly mental health check-ins, where participants record their level of distress/well-being. Those recording high levels of distress were contacted for further support and/or referral.

### *Engagement*

**All of the activities were optional, and the participants all volunteered for the intervention.**

About half of the participants engaged in weekly sessions and one fourth of participants engaged in more than three activities (beyond the weekly sessions). This engagement is better than the typically low rates of online engagement; however, it might be partially explained by the voluntary nature of participation.

### *Effectiveness*

**Participants recorded a one-third reduction in depression and stress scores 6-week post-intervention.** However, participants started at relatively high levels, so following the intervention, levels were still high compared with benchmarking scores. Total well-being scores tended to improve, suggesting improvements in how participants saw and accepted themselves.

### **Implications for Practice**

- Well-designed synchronous online interventions can result in high engagement and in effectively reducing depression and stress.
- Well trained online facilitators (e.g., psychology master's students; clinicians) help encourage engagement and effectiveness.
- Students who are engaged synchronously may also follow up with asynchronous materials.
- Asynchronous materials which allow opportunity for social learning (e.g. students "chatting" with each other over a shared challenge; facilitators following up on posted challenges) can lead to an engaging and effective online intervention.
- Follow up based on posts and voluntary one-to-one online counseling sessions with clinicians can increase engagement and effectiveness of the intervention.

## Citation

Reupert, A., Maybery, D., Bartholomew, C., Cuff, R., Foster, K., Matar, J., & Pettenuzzo, L. (2020). The acceptability and effectiveness of an online intervention for youth with parents with a mental illness and/or substance use issue. *Journal of Adolescent Health, 66*(5), 551-558.

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## Conclusion

This review of literature presented information on a number of innovative, online interventions to combat the use and misuse of substances for individual users, as well as their families. These interventions aimed to address the concomitant issues of mental health issues, substance use, and the corresponding consequences on users, the families, and communities.

Teesson et al (2020) worked to address the challenges of substance use, depression, and anxiety in combination, rather than in isolation. Through an online format presented to participants, the study's results suggest that combined interventions is an effective model to increase adolescents' knowledge of alcohol, cannabis, and mental health; preventing alcohol use, including heavy episodic drinking; and reducing symptoms of anxiety and depression for up to 30 months after the intervention.

Ray and colleagues (2020) designed an initiative to teach participants to critically examine substance use messaging, finding that thought-provoking learning strategies are an effective way to teach media literacy.

Thornton et al (2018) created an online, interactive curricula for parents and students to improve communication, build trust, and become informed about the dangers of alcohol and cannabis. These authors found that parents appreciated the engaging and interactive design of the program.

In a study that examined what makes substance use interventions engaging, Milwad and colleagues (2018) analyzed 15 other studies to reach their conclusions. The authors found that the following factors were found to be engaging: multimedia content; social support; user reminders, and others.

Finally, Reupert et al (2020) designed an online intervention that aimed to promote adaptive coping, increase resilience, and promote mental well-being for young adults with a parent with mental illness and/or substance abuse issues. Through the study, it was found that participants recorded a one-third reduction in depression and stress scores 6-week post-intervention.

Looking across these five interventions suggests the promise of a range of different online interventions to improve mental health and reduce the negative consequences of substance abuse.

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## Author Biographies

Benjamin Gleason, PhD is the Director of Applied Research for the Prospectus Group. He earned a PhD in Educational Psychology & Educational Technology from Michigan State University, researching how to best support communities of learners through educational technology. An assistant professor of educational technology at Iowa State University, he has published over 20 peer-reviewed articles in research journals. Before academia, Benjamin worked in youth and adult-serving learning spaces, designing youth-initiated community service projects and teaching high school in Richmond, California, and working as a university instructor in Guatemala. Benjamin is also a co-founder of the Prospectus Group.

Dr. Marie Heath (she/her/hers) is Assistant Professor of Educational Technology at Loyola University Maryland. Prior to her work in higher education, Marie taught high school social studies in Baltimore County Public Schools. Her teaching experiences influenced her research which focuses on the intersection of education, civic engagement, and technology in order to foster social change. As an organizer and educator, Marie has run political campaigns, led collective actions for education, and organized political action groups in Baltimore City and the surrounding regions. She co-facilitates the *Civics of Technology* project.