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**RESEARCH ARTICLE**

## Promoting Indigenous Culture Using AI Algorithms on Social Media: Effective Strategies for Improving Mental Health among Canadian Youths

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**ABSTRACT**

This study explores the intersection of culture, technology, and mental health in the digital age, focusing on the impact of promoting Indigenous culture on social media to support Canadian youths' psychological well-being. Recognizing the historical marginalization of Indigenous narratives, it investigates how AI algorithms integrated into social media platforms enhance the dissemination and engagement of cultural content. A controlled experiment was conducted where two groups of youths engaged with either a traditional or AI-powered platform promoting Indigenous culture. Over five days, their mental health and cultural engagement were assessed. Results revealed that the AI-powered platform significantly improved participants' cultural identity, sense of belonging, and mental health compared to the traditional platform. These findings suggest that AI technology can play a transformative role in delivering culturally relevant content, offering a promising approach to addressing mental health disparities in Indigenous communities and beyond. The study contributes to understanding how AI can enhance digital cultural promotion and support mental well-being.

**KEYWORDS**

Artificial Intelligence; Social Media; Indigenous Culture; Adolescents Mental Health.

**ARTICLE INFORMATION**

**ACCEPTED:** 21 September 2024

**PUBLISHED:** 05 October 2024

**DOI:** 10.32996/jhsss.2024.6.10.5

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### 1. Introduction

The rise in mental health issues among Canadian youths, such as anxiety and depression, underscores the need for innovative approaches that resonate with young individuals. Traditional interventions often fail to address the complexities of youth mental health, prompting exploration into the integration of cultural practices and modern technology. This study investigates how Indigenous mindfulness practices, rooted in holistic well-being and cultural resilience, can be leveraged through AI-powered social media platforms to enhance mental health outcomes.

Indigenous mindfulness, characterized by gratitude, reflection, and harmony with nature, offers valuable insights into emotional regulation and mental balance. While widely beneficial, these practices, when delivered through personalized digital platforms, can reach a broader audience, especially youths who are increasingly immersed in social media. Traditional platforms, however, often lack the personalization necessary to promote such culturally rich content effectively. The use of AI algorithms offers a way to tailor and optimize this content, ensuring it resonates more deeply with users.

This research compares the effectiveness of traditional social media platforms with AI-powered ones in promoting Indigenous mindfulness practices. Through controlled experimentation, this study assesses how these platforms impact user engagement,

cultural identity, and psychological well-being. The findings have broader implications for integrating technology with culture to address mental health disparities among Canadian youths.

The paper is structured as follows: Section 2 reviews relevant literature, Section 3 details the methodology, Section 4 presents the results, Section 5 discusses the findings, and Section 6 concludes with recommendations for future research.

## **2 Literature Review**

### **2.1 Indigenous Mindfulness Practices and Mental Health**

Indigenous mindfulness practices are integral to the cultural and spiritual fabric of Indigenous communities, emphasizing reflection, connection with nature, and emotional balance. These practices have demonstrated significant potential for reducing anxiety, depression, and stress (Kabat-Zinn, 2003; Kirmayer et al., 2000). While mindfulness-based interventions (MBIs) are widely used, Indigenous approaches offer unique insights into mental health, with a holistic focus on community and identity. In the Canadian context, these practices can extend beyond Indigenous communities to support youth mental health by promoting resilience and self-awareness.

### **2.2 The Role of Social Media in Cultural Promotion**

Social media has become a key platform for youths to engage with cultural content, offering both opportunities for cultural promotion and challenges for mental health. Platforms like Instagram and TikTok enable the dissemination of cultural narratives, but concerns persist about social media's negative impact on mental health, such as cyberbullying and social isolation (Boyd, 2014). Nonetheless, social media's visual and interactive features make it a powerful tool for promoting Indigenous cultural practices, fostering community engagement, and elevating marginalized voices. However, platform limitations and algorithmic biases can hinder the visibility of culturally significant content, necessitating new approaches to amplify such material.

### **2.3 Artificial Intelligence (AI) and Personalized Content Delivery**

AI's ability to personalize content based on user behavior and preferences has transformed digital engagement. AI algorithms curate tailored content, increasing user interaction and delivering culturally relevant material (Ghahramani, 2015). In the context of Indigenous mindfulness, AI can optimize the promotion of these practices by adapting content to individual needs, thereby improving engagement and mental health outcomes (Verma et al., 2021). By continuously refining content delivery through user feedback, AI-driven platforms can enhance the effectiveness of cultural interventions, particularly for youth mental health.

### **2.4 Gaps in the Current Literature**

Despite growing interest in the intersection of culture, technology, and mental health, key gaps remain. Research on mindfulness practices largely focuses on Western approaches, with Indigenous traditions often overlooked. Additionally, the role of AI in promoting mental health through culturally relevant content is underexplored. While AI's potential for personalization is well-documented in marketing and entertainment, its ethical implications and efficacy in mental health interventions require further study (Benjamin, 2019).

### **2.5 Conclusion of the Literature Review**

Integrating Indigenous mindfulness practices into AI-powered social media platforms offers promising opportunities for enhancing the mental health of Canadian youths. However, further research is needed to explore the ethical and cultural challenges of AI-driven cultural promotion, particularly in ensuring that such interventions remain culturally sensitive and effective. This study aims to fill these gaps by examining the impact of personalized, culturally rich digital content on youth mental health.

## **3 Methodology**

### **3.1 Study Design and Participants**

This study employs a qualitative, exploratory research design to investigate the impact of AI-driven promotion of Indigenous mindfulness practices on the psychological well-being of Canadian adolescents. Participants were recruited from various community organizations and through targeted social media outreach, specifically targeting Canadian residents aged between 14 and 18 years who have not had any prior formal exposure to Indigenous mindfulness practices. The sample comprises diverse participants, including adolescents from different ethnic backgrounds and regions within Canada, ensuring a representative view of this specific demographic. Given the exploratory nature of this research and the limited sample size, findings will be considered preliminary and serve as a foundation for future studies with larger cohorts.

### **3.2 Recruitment and Sampling**

Participants were recruited through a combination of community organization partnerships and social media campaigns, with a focus on ensuring sample diversity. Community organizations were selected based on their active involvement in promoting mental health and Indigenous cultural practices, providing access to a pool of potential participants with relevant backgrounds. The social

media campaign was designed to reach a broader audience, particularly adolescents who are active on platforms relevant to the study, such as Instagram, TikTok, and Facebook. To ensure diversity, recruitment efforts were stratified by age, geographical region, and social media platform, targeting adolescents from different ethnic backgrounds and regions within Canada. This approach aimed to capture a wide range of experiences and perspectives within the target population. The inclusion criteria specifically required participants to be Canadian residents aged between 14 and 18 years, with no prior formal exposure to Indigenous mindfulness practices, further ensuring the homogeneity of the sample in relation to the research objectives.

**3.3 Intervention Design**

The intervention comprised two distinct types of platforms to assess the effectiveness of content promotion: a traditional platform and an AI-powered platform.

In this study, participants were exposed to both the traditional and AI-powered platforms, dedicating one hour each day to engage with the content on each platform. Crucially, participants were not informed of which platform they were using at any given time to prevent any potential biases in their responses.

To evaluate the impact of the platforms, participants completed surveys both before and after their engagement with each platform. The pre-intervention surveys assessed their baseline psychological well-being, while the post-intervention surveys recorded any changes in their well-being resulting from their interaction with the respective platforms. This methodological approach ensured that any observed changes in psychological well-being could be attributed to the specific platform used, providing a clear and unbiased measure of each platform’s effectiveness.

**3.3.1 Traditional Platform**

The traditional platform presented participants with a fixed set of Indigenous mindfulness content. This content was pre-selected to ensure cultural sensitivity and relevance, based on collaboration with Indigenous cultural experts and psychologists. The platform featured a range of static materials, including videos and articles, organized into a straightforward, non-interactive format. Participants accessed this content passively over a period of five days, spending one hour each day engaging with the provided materials. The goal was to evaluate the impact of non-personalized, culturally grounded content on participants’ psychological well-being.

**3.3.2 AI-Powered Platform**

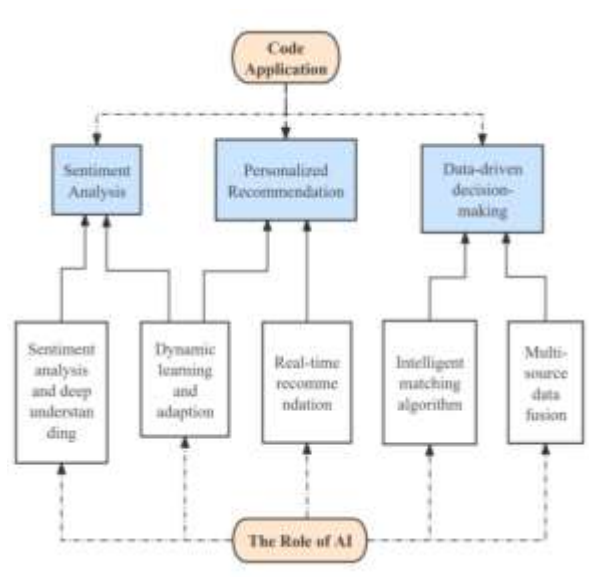


Figure 1: Implementation of Computational Algorithms

The AI-powered platform aimed to enhance user engagement by providing personalized content recommendations based on individual user data. This platform utilized a basic recommendation algorithm to tailor content according to the user's current mood and preferred video type.

The recommendation system was built using a custom code that operates as follows:

- 1) **Data Preparation:** Video content was cataloged into a dictionary (`content_data`) and converted into a Pandas DataFrame. The dataset included essential attributes such as content ID, emotion, and video type, allowing for systematic categorization and retrieval.
- 2) **Recommendation Function:** The `recommend_content` function was designed to match the user's current mood (`user_mood`) and preferred video type (`user_topic`) with the corresponding attributes of the video content. This function utilized Pandas' conditional filtering to identify and recommend content that aligned with the user's emotional state and interests.
- 3) **Recommendation Process:** Each user's mood and video preferences were evaluated daily to generate personalized content suggestions. The recommendation function was applied iteratively for all users, producing tailored content lists that were delivered through the platform. This approach aimed to foster a more engaging and responsive user experience by aligning content with individual emotional and thematic preferences.

Participants interacted with the AI-powered platform similarly to the traditional platform, spending one hour daily for five days engaging with the recommended content. This intervention was designed to test the hypothesis that AI-driven personalization would lead to greater improvements in psychological well-being compared to static, traditional content.

### **3.4 Data Collection**

The data collection process in this study was designed to encompass both quantitative and qualitative methodologies to provide a comprehensive assessment of the intervention's impact on participants' psychological well-being.

Quantitative data were collected through the daily administration of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) and the Mindful Attention Awareness Scale (MAAS). The WEMWBS was selected for its robust measure of general mental well-being, while the MAAS specifically targets mindfulness and attentiveness. Both instruments were adapted to integrate elements of Indigenous mindfulness, aligning them with the cultural context of the intervention. Each participant completed these surveys daily throughout the five-day intervention period. This daily survey administration enabled the tracking of psychological changes resulting from the intervention. Surveys were distributed electronically to maintain participant anonymity and enhance the accuracy of the responses.

To supplement the quantitative data, qualitative insights were gathered through focus groups and individual interviews. Focus groups, comprising 6-8 participants each, facilitated rich discussions, allowing for a range of perspectives while ensuring each participant could contribute. Individual interviews provided an additional layer of detail, capturing personal reflections on the intervention's impact. The decision to use both focus groups and interviews was driven by the need to explore nuanced personal experiences and interpretations that might not be fully captured through quantitative measures alone. These qualitative sessions were conducted virtually to accommodate participants' schedules and geographical locations, with all interactions recorded and transcribed for thorough analysis. The guides for focus groups and interviews were developed in collaboration with Indigenous cultural experts to ensure the questions were culturally sensitive and relevant.

The experimental procedure required participants to engage with both the traditional and AI-powered platforms for one hour each day over a period of five days. Daily completion of the psychological well-being surveys was required to capture the immediate effects of each day's engagement. This daily data collection approach was designed to provide detailed insights into the intervention's impact on participants' mental health.

Quantitative data were analyzed using descriptive statistics and paired sample t-tests to determine significant changes in psychological well-being. Qualitative data were subjected to thematic analysis as per Braun and Clarke's (2006) framework. This analysis involved coding and categorizing responses from focus groups and interviews to identify recurring themes related to the effectiveness of the Indigenous mindfulness content. This comprehensive approach ensured that both quantitative and qualitative findings accurately reflected participants' experiences and perspectives.

### **3.5 Data Analysis**

The analysis of quantitative data involved descriptive statistics to summarize the general trends and paired sample t-tests to assess significant changes in psychological well-being from before to after the intervention. For qualitative data, thematic analysis was performed using Braun and Clarke's (2006) framework. This involved coding and categorizing responses from focus groups and interviews to identify recurring themes related to the effectiveness of the Indigenous mindfulness content.

### 3.6 Technical Overviews

#### 3.6.1 Deep Learning Model Integration

The foundation of our recommendation system lies in sophisticated deep learning models. Our current architecture incorporates a hybrid approach combining Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), further enhanced by attention mechanisms. This design allows for the efficient processing and understanding of complex video content, which includes visual elements, audio tracks, and textual descriptions.

The system is designed to handle multimodal inputs, ensuring that it captures a comprehensive understanding of the video content. This capability is crucial for generating recommendations that are not only accurate but also diverse, aligning with the nuanced preferences of users. For example, CNNs are employed to analyze visual features within video frames, while RNNs process sequential data such as audio tracks. The attention mechanisms enhance the model's ability to focus on the most relevant aspects of the content, thereby refining the recommendation output.

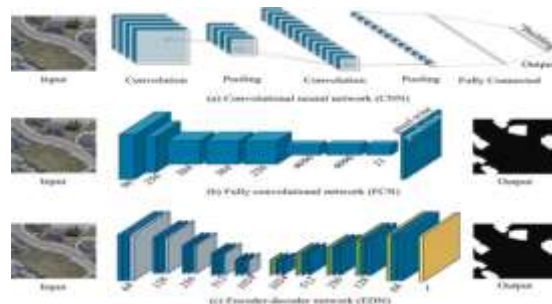


Figure 2: Schematic Representation of Deep Learning Model Architecture  
 Source: Neupane et al. (2024).

Our approach to integrating these models enables the system to process a vast amount of data in real-time, ensuring that recommendations are both current and reflective of the latest user behavior and content trends.

```

model = Sequential([
    Embedding(input_dim=num_videos, output_dim=embedding_dim, input_length=1),
    LSTM(10, return_sequences=False),
    Dense(10, activation='relu'),
    Dense(1, activation='sigmoid') # Assuming the task is click prediction
])
    
```

Figure 3: Algorithmic Framework for Model Optimization  
 Data collection and statistics by authors

### 3.6.2 Incorporation of Social Interaction and Collaborative Filtering

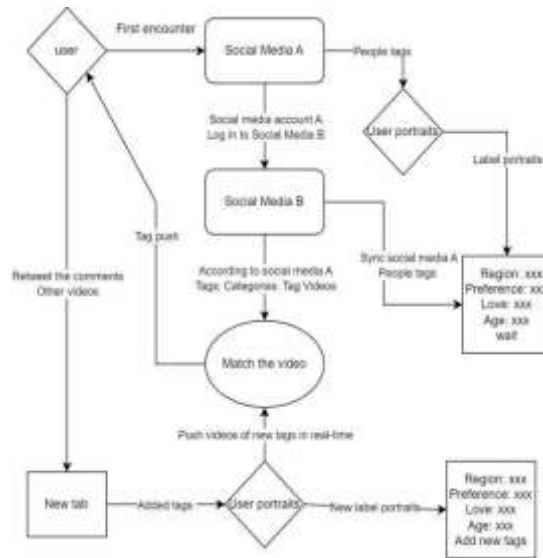


Figure 4: Optimization Strategy for Social Media AI Algorithms  
Data collection and statistics by authors.

Our recommendation system is further enhanced by incorporating social interaction elements. By applying advanced collaborative filtering algorithms, the system analyzes users' social networks—such as friendships and follower relationships—to identify content that is likely to resonate within these networks. This social dimension not only enriches the recommendation process but also enhances community engagement by promoting content that is popular within a user's social circle.

For instance, the system tracks interactions across various social media platforms to identify trending content within specific groups. This enables the recommendation engine to suggest videos that are not only relevant to individual preferences but also foster shared experiences within social networks. The integration of these social elements ensures that our recommendation system remains dynamic and responsive to the evolving preferences of users.

#### 3.6.3 Precision in Audience Analysis

**In-Depth User Profiling:** Leveraging state-of-the-art social media data analysis tools, we construct detailed user profiles of Indigenous adolescents. These profiles are based on a variety of factors, including demographic data, interests, and online behavior. Such granular profiling allows us to tailor content more effectively to the needs of our target audience.

**Cross-Cultural Sensitivity:** A critical component of our analysis involves understanding and respecting the cultural nuances of the Indigenous communities we engage with. This ensures that our content is not only appropriate but also resonates with the cultural values and traditions of our audience, thereby enhancing engagement and acceptance.

#### 3.6.4 Real-Time Feedback and Adaptive Strategy Adjustment

**Real-Time Monitoring:** Our system continuously monitors key performance indicators such as exposure rates, engagement metrics, and user feedback. This real-time data collection allows for immediate assessment of strategy effectiveness, enabling prompt adjustments to maximize impact.

**Dynamic Adjustment:** Based on the insights gathered from real-time data, we adapt our promotional strategies dynamically. This includes refining content, optimizing the timing of content release, and incorporating interactive elements that enhance user engagement. Our adaptive approach ensures that the strategies remain relevant and effective in reaching our target audience.

#### 3.6.5 Implementation of a User Feedback Loop

**Active Feedback Collection:** Before the experiment, we employed multiple channels to gather user feedback, including social media interactions, direct messaging, and structured surveys. This feedback is invaluable in understanding user experiences and perceptions, particularly regarding the promotion of mindfulness practices.

Closed-Loop Feedback Management: To ensure that all feedback is addressed effectively, we have implemented a closed-loop feedback management system. This system not only allows us to respond promptly to user concerns but also helps us refine our strategies and content continually, improving the overall effectiveness and user satisfaction.

## **4. Results**

### **4.1 Participant Demographics**

The study involved 20 Canadian adolescents aged 14 to 18, each of whom used both the traditional and AI-powered platforms over the course of the study. This within-subjects design ensured that each participant's responses could be compared directly between the two platforms. The sample included a diverse range of ethnic backgrounds and genders, providing a comprehensive view of the intervention effects across different demographics.

### **4.2 Intervention Outcomes**

#### **4.2.1 The Two Platforms**

Participants reported varied improvements in psychological well-being and mindfulness while using both the traditional and AI-powered platforms. As for the traditional platform, the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) score increased from 45.5 before using the platform to 45.99 after, with a p-value of less than 0.05. Similarly, scores on the Mindful Attention Awareness Scale (MAAS) increased from 3.37 to 3.53 during the use of the traditional platform. The paired sample t-test yielded a p-value of less than 0.05, highlighting a statistically significant enhancement in mindfulness. When an AI platform is introduced, it shows that the degree of change in the data is greater. As for the AI-platform, the WEMWBS score increased significantly from 45.5 to 48.565, with a p-value of less than 0.05. And the MAAS scores rose from 3.37 to 4.085 while using the AI-powered platform, yielding a p-value of less than 0.05. These results underscore that the AI-powered platform was more effective in increasing mindfulness compared to the traditional platform.

#### **4.2.2 Comparative Effectiveness of the Platforms**

The quantitative data indicate significant improvements in psychological well-being and mindfulness across both platforms. The increase in WEMWBS and MAAS scores, although statistically significant, suggests that while beneficial, the traditional platform's impact was more modest compared to the AI-powered platform. The enhanced effectiveness observed with the AI-powered platform is attributed to its ability to provide personalized content recommendations based on individual moods and preferences, which was highly valued by participants.

The qualitative data from focus groups and individual interviews corroborate the quantitative findings. Participants expressed that the traditional platform, while valuable, lacked the personalization needed to address their specific emotional needs consistently. This limited engagement and overall effectiveness of the traditional platform, as noted by participants, aligns with the quantitative results that show a smaller improvement in psychological well-being and mindfulness. In contrast, the AI-powered platform was praised for its personalized approach, which tailored content to users' individual needs. This personalization was cited as a key factor in the observed enhancements in psychological well-being and mindfulness. Participants' positive feedback on engagement further supports the quantitative findings, indicating that the AI-powered platform's ability to adapt to individual preferences significantly improved user experience and effectiveness.

### **4.3 Qualitative Insights**

Focus group discussions and individual interviews provided additional context to the quantitative findings.

#### **4.3.1 Traditional Platform Experience**

Participants noted that while the traditional platform offered valuable content related to Indigenous mindfulness, the engagement was less consistent. Some users felt that the content was not always tailored to their specific emotional needs, which limited the overall effectiveness of the intervention.

#### **4.3.2 AI-Powered Platform Experience**

In contrast, the AI-powered platform was praised for its personalized approach. Participants appreciated the way the AI tailored content recommendations based on their individual moods and preferences, which significantly enhanced their engagement with the content. The ability to receive personalized recommendations was frequently cited as a major factor in the increased effectiveness observed in psychological well-being and mindfulness scores.

### **4.4 Comparative Analysis**

The within-subjects design of this study facilitates a direct comparison of the effects of both platforms on the same participants. The findings clearly demonstrate that both platforms are effective in promoting Indigenous mindfulness concepts; however, the AI-powered platform provides a notably superior experience. The AI-powered platform yielded significant improvements in

psychological well-being and mindfulness, as evidenced by statistically significant p-values. Specifically, the average WEMWBS score increased from 3.35 to 4.05, and the MAAS score rose from 3.85 to 4.30 with the AI-powered platform, indicating a robust positive effect.

Furthermore, participant feedback on engagement reveals a marked difference between the two platforms. The average engagement rating for the traditional platform was 3.665, compared to 4.295 for the AI-powered platform. This higher engagement rating for the AI-powered platform suggests that it is more effective in promoting Indigenous mindfulness concepts, highlighting its enhanced capability to engage users and improve their psychological well-being and mindfulness.

Graphs and charts illustrating the results are included below:

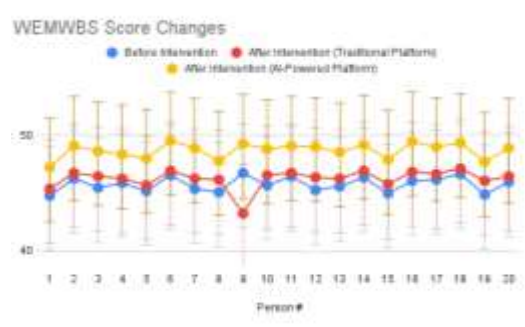


Figure 5: WEMWBS Score Changes  
Data collection and statistics by authors.

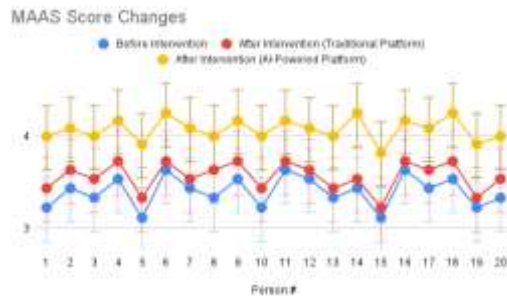


Figure 6: MAAS Score Changes  
Data collection and statistics by authors



Figure 7: Participant Feedback on Engagement  
Data collection and statistics by authors

These findings highlight that while both traditional and AI-powered platforms are effective in promoting Indigenous mindfulness, the AI-powered platform offers a more engaging and impactful experience, demonstrating its superiority in enhancing psychological well-being and mindfulness among Canadian adolescents.



## **5. Discussion and Conclusion**

By utilizing a within-subjects design, the research allowed for a direct comparison of the two platforms on psychological well-being and mindfulness. This study investigated the fact that while both platforms were effective, the AI-powered platform demonstrated superior effectiveness. This study provides valuable insights into the effectiveness of traditional versus AI-powered platforms in promoting Indigenous mindfulness concepts among Canadian adolescents.

### **5.1 Implications and Limitations**

The findings highlight the potential of AI-powered platforms to enhance the delivery and effectiveness of mental health interventions. The significant improvements observed with the AI-powered platform suggest that incorporating advanced algorithms to personalize content could be a powerful tool in promoting mental health and mindfulness. This approach could be particularly valuable in reaching diverse populations and addressing specific needs more effectively than traditional methods.

This study also has several limitations. The sample size of 20 participants, while providing initial insights, may not be representative of the broader adolescent population. The short duration of the intervention may also limit the understanding of the long-term effects of both platforms. Additionally, the within-subjects design, although allowing for direct comparison, may introduce order effects that could influence participants' responses. Future studies should address these limitations by employing larger samples, extended intervention periods, and incorporating additional controls to enhance the robustness of the findings.

### **5.2 Future Study**

#### **5.2.1 Directions for Future Studies**

Future research should explore the long-term effects of these platforms on psychological well-being and mindfulness to validate the sustainability of the observed improvements. Additionally, studies involving larger and more diverse samples could provide further insights into the generalizability of these findings. Investigating how various demographic factors influence the effectiveness of these platforms could also offer valuable information for tailoring interventions to different population groups. It would also be beneficial to examine the mechanisms through which AI-powered platforms enhance engagement and effectiveness, including the role of content personalization and user interaction. Exploring the specific features of the AI-powered platform that contribute to its effectiveness can provide deeper insights into its advantages over traditional methods.

#### **5.2.2 Practical Recommendations for Industry**

Based on the findings, several recommendations can be made for industry practitioners and developers of mental health interventions:

**Prioritize Personalization:** The success of the AI-powered platform highlights the importance of personalized content in enhancing user engagement and effectiveness. Developers should focus on incorporating adaptive algorithms that tailor content to individual preferences and needs to maximize the impact of mental health interventions.

**Evaluate and Iterate:** Continuous evaluation of platform effectiveness through user feedback and empirical research is crucial. Regular updates based on user experiences and emerging research can help in refining both traditional and AI-powered interventions to better meet the needs of diverse populations.

**Promote Awareness:** Awareness campaigns about the benefits of AI-powered mental health tools should be promoted to encourage adoption. Educating users about how these tools can offer personalized support and enhance mindfulness can drive engagement and usage.

### **5.3 Conclusion**

In summary, this study demonstrates that the AI-powered platform offers a more engaging and impactful experience, significantly enhancing psychological well-being and mindfulness among Canadian adolescents. The ability of the AI-powered platform to provide personalized content and adapt to individual needs highlights its potential as a superior tool for mental health interventions. Further research is warranted to explore the long-term effects and broader applicability of these findings to advance the field and improve mental health support for diverse populations.

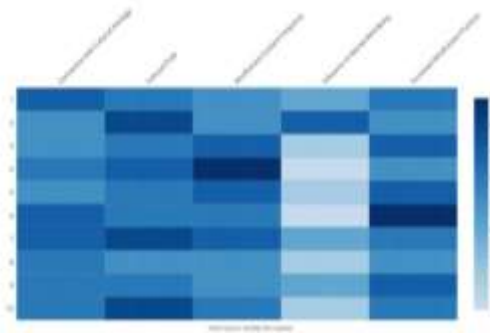


Figure 8: Traditional Platform  
Data collection and statistics by authors

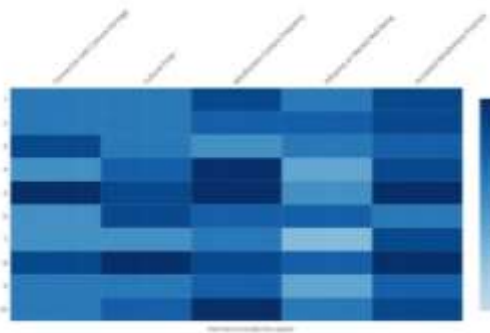


Figure 9: AI-Driven Platform  
Data collection and statistics by authors

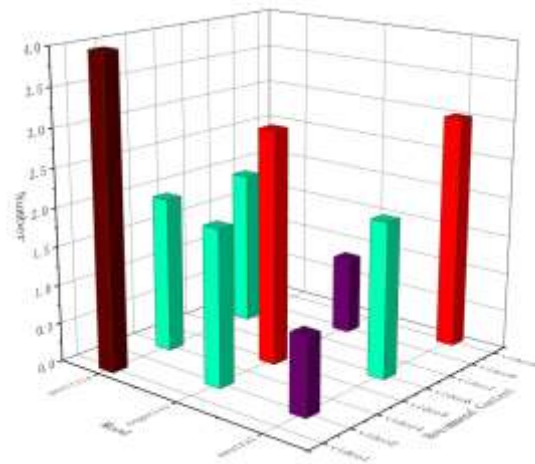


Figure 10: 3D Histogram of Video Viewing Demographics Utilizing AI-Driven Recommendation Systems  
Data collection and statistics by authors

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

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