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Using Mentimeter in Online Book Clubs to Engage and Educate Extension Audiences

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During the COVID-19 pandemic, Cooperative Extension professionals, like many others, were tasked with quickly adapting to accommodate limited face-to-face interactions. The pandemic necessitated that Extension educators leverage online resources to deliver tailored programming in informative and innovative ways while providing engaging, hands-on learning experiences. This article highlights two studies using Mentimeter as a tool to educate and engage Extension audiences through subsequent installments of an online book club. The presented case studies examine the processes and outcomes of a unique educational approach to Family and Consumer Sciences (FCS) in a non-traditional setting. The studies represent two distinct FCS disciplines: Family Finance & Resource Management and Food & Nutrition and demonstrate how audience response systems (ARS) like Mentimeter can be used to promote learner engagement.

Keywords: technology, Extension education, virtual programming, nutrition education, financial education, webinars, audience response systems, Mentimeter

Introduction

The COVID-19 pandemic fundamentally impacted how we use technology. Notably, 90% of Americans felt the internet became essential during the pandemic (McClain et al., 2021). The surge in technology use, and subsequent dependency on internet modalities as a primary mode of communication, were especially prevalent in the workplace (De' et al., 2020). To comply with social distancing guidelines, many professionals were tasked with quickly adapting standard operating procedures to accommodate limited and/or prohibited face-to-face interactions. Cooperative Extension professionals were no exception. Reaching 3,000+ counties across the United States through local educators with social and cultural context (USDA NIFA, 2023), the pandemic necessitated that Extension educators leverage online resources to deliver tailored programming in a way that was informative and innovative, while remaining engaging and hands-on. Extension professionals adapted existing programs to fit online formats and developed new pedagogical practices that brought the spirit of face-to-face learning to virtual platforms. To illustrate this, the present article highlights two case studies using Mentimeter as an audience

response tool to educate and engage Extension audiences through subsequent installments of an online book club. The case studies represent two distinct Family and Consumer Sciences (FCS) disciplines (*Family Finance & Resource Management* and *Food & Nutrition*) and demonstrate how audience response systems (ARS) can be used to promote learner engagement.

Literature Review

Technology Use in Extension

Even before the COVID-19 pandemic, Extension professionals used technology-based programmatic delivery formats to engage audiences in various settings. For example, in Kentucky, Facebook Live has been used as a real-time delivery modality to expand the reach of nutrition education programming beyond traditional audiences (Adedokun et al., 2020). Similarly, Extension professionals have used webinars to deliver financial literacy materials to participants throughout Montana and South Dakota (Johnson & Schumacher, 2016). Virtual programs like these have increased since the pandemic, with noted benefits that resulted from the rapid shift to online programming. For instance, Extension professionals in Nevada reported higher attendance rates, with some programs reaching 400 attendees per class, compared to an average of 60-80 attendees per class pre-pandemic (Chichester et al., 2020).

Despite the ability to reach a wider audience, challenges to online Extension programming have been identified. Among the most reported challenges, both pre- and post-pandemic, were lack of knowledge and/or confidence using technology effectively for Extension work. Some Extension personnel found it difficult to effectively integrate technology into educational experiences and/or lacked the technological skills necessary to stay relevant to their clientele (Jernigan et al., 2015; Lubell & McRoberts, 2018). Others noted a lack of confidence in their ability to develop new online programs or adapt in-person programs to an online space (Narine & Meier, 2020). Because educators rely on technology they are familiar with and have access to (Walker & Kim, 2015), there is a need for expanded use of virtual tools and platforms to deliver Extension programming to an array of audiences while maintaining levels of engagement that face-to-face instruction offers.

Audience Response Systems

Webinars, like other online modalities, provide a low-cost alternative to traveling and hosting in-person programs while allowing programs to reach a wider audience, including those unable to attend an in-person program (Zoumenou et al., 2015a). Webinars proved helpful for Extension professionals during the COVID-19 pandemic, providing a mechanism for continued engagement with local clientele and community partners (Bamka et al., 2020). However, Extension personnel should take action to provide enhanced opportunities for audience interaction to keep attendees engaged (Zoumenou et al., 2015a, 2015b) because of short attention spans, distractions, and the difficulty of reengaging an audience once participants lose focus

(Forest, 2012). In webinar formats, two phenomena are especially concerning: *death by PowerPoint*, coined in 2001 by Angela Garber, and *video call fatigue*, experienced by 40% of video call users in a 2021 Pew Research survey (McClain et al., 2021). Reports such as these suggest a need for innovative online programming that elevates the webinar experience.

Using ARS (e.g., student response systems, clickers) is one approach to reset attendees' attention and draw them back into the program. These platforms provide opportunities for participants to synchronously engage with other attendees without interrupting program facilitators. When used in face-to-face learning, ARS allow educators to project questions for all participants to view and respond to using a handheld tool provided by the instructor (historically) or a personal electronic device (with the rise of smartphone use). Traditional ARS require the purchase of a handheld clicker and often require the user to be in the same room as the person or computer projecting the questions. Newer ARS, such as Mentimeter (Iona, 2018; Rudolph, 2018), allow participants to answer questions using a personal electronic device by linking to a corresponding account or webpage.

Application and Benefits of ARS

While commonly used in undergraduate educational settings (Cavender & Gannon, 2019), ARS have potential in a variety of settings, including Extension education. Previous work highlights the success of ARS in agriculture-focused programming. Maine Cooperative Extension used ARS as a foundation for small-group discussion with blueberry farmers who reported feeling more engaged and enjoyed the interaction and critical thinking that clicker questions sparked (Smith et al., 2012). North Carolina Cooperative Extension used ARS during farmer pesticide training and noted similar outcomes between ARS and traditional education settings (LePrevost et al., 2021). The success of ARS in these settings suggests the modality may be effectively used with other Extension disciplines to strengthen programmatic delivery.

Benefits of the use of an ARS include increased attendance, attention, participation, engagement, peer interaction, discussion, learning performance, and learning quality (Forest, 2012). These platforms are also relatively easy to use and integrate into existing presentations, providing a helpful mechanism to reinforce content being presented (Salzer, 2018). Additional benefits include assessment of audience understanding and adaptation of teaching based on the feedback obtained through the ARS (Forest, 2012). These benefits could be especially helpful in Extension efforts to engage attendees more consistently through distance learning technology such as webinars and other online programming formats.

Mentimeter

The case studies presented in this article used Mentimeter (https://www.mentimeter.com), an ARS that allows participants to respond to questions and prompts in real time using a personal electronic device. Responses are displayed in aggregate for participants to view. This platform

has been successfully used in formal education settings to enhance engagement and learning outcomes (Bejda & Huff, 2022; Mayhew et al., 2020; Mohin et al., 2022). Unlike other ARS, Mentimeter does not require the audience to create accounts or enter their names, which keeps responses anonymous from fellow participants and instructors (provided no identifying information is included in the responses an individual shares). This makes Mentimeter well-suited for use in Extension programming, as participants do not need to create and maintain an account, and personal responses cannot be identified by Extension personnel.

Mentimeter provides a visual method of engaging participants with customizable polling options such as word clouds, scales, traffic lights, and more (Iona, 2018). The platform presents a mechanism for participation that may limit distractions during the presentation and increase the focus and engagement of participants. Posing questions not only allows participants to interact in a large group setting, but they can also provide time for participants to reflect on what they know or test their knowledge and serve as a transition to the next segment of the program.

Anonymity of Mentimeter

Polling responses in Mentimeter are retained anonymously, offering benefits to Extension professionals. The anonymity of Mentimeter can decrease barriers to participation in both in-person and virtual settings. Mentimeter has been used in sensitive topic discussions such as sexuality education (Bejda & Huff, 2022), economics (Lucey et al., 2021; Mayhew et al., 2020), and mental health (Sullivan et al., 2022). It has also been used to collect potentially sensitive data on relationships, suicidality, and sexual behaviors (Toscos et al., 2019). In these and other applications, the full anonymity provided by Mentimeter was reported as a key benefit (Bejda & Huff, 2022; Lucey et al., 2021; Mayhew et al., 2020; Van Daele et al., 2017). This anonymity aided in lowering barriers to participation, such as perceived lack of knowledge, fear of conflicting perspectives, or sharing confidential information.

The benefits of anonymity may be relevant to Extension educators who regularly facilitate discussions and conduct learning activities on similar topics. Extension personnel may experience additional challenges when discussing sensitive subject matter, including client misinformation, topic complexity, internal conflict, emotional responses, personal beliefs, politics, and religion, as they often take on the role of mediators when discussing or teaching about sensitive or potentially controversial topics (Leal et al., 2020). Research suggests these challenges can be minimized using ARS because of the anonymity provided, while still soliciting honest responses from participants (Cavender & Gannon, 2019).

Theory and Purpose for Two Case Studies

This research is a practice and pedagogy report that discusses the process and outcomes of informal teaching and learning in non-traditional settings. The presented case studies demonstrate the effectiveness of Mentimeter in improving participant engagement during virtual

Extension programming focused on distinct online book club topics within FCS Extension [i.e., *family finance* (Study 1) and *human nutrition* (Study 2)]. For each study, Mentimeter was chosen to increase real-time user engagement, participation, and discussion for larger online audiences. Both studies use Mentimeter to demonstrate achievement of session learning objectives; however, they take different approaches for program evaluation. The first case study demonstrates the impact, perceptions, and comfortability of participants using Mentimeter. The second case study showcases the use of Mentimeter as a tool to collect data at multiple time points for comparison and to show knowledge change over time with virtual programming.

To undergird both case studies, the authors used Robideau and Matthes' *Webinar Evaluation Rubric for Extension Teaching* (2021) as a conceptual foundation, which provides considerations for the planning, peer-review, and reflection phases of webinar programming. Robideau and Matthes detail seven components of webinar teaching deemed critical for Extension professionals to consider when delivering a high-quality webinar. Although all components of this rubric were considered in the development of the online book club sessions, Mentimeter specifically aided with four of the seven key components identified: technology, delivery, visual aids, and participant interaction. Table 1 details how Mentimeter was used in the presented studies to fulfill these components of the *Webinar Evaluation Rubric for Extension Teaching*.

Table 1. Mapping Mentimeter Use in Online Book Club Sessions Across Case Studies

Technology	Delivery	Visual Aids	Participant Interaction
An overview of Mentimeter is provided in detail at the beginning of each session. Options are provided for joining Mentimeter during sessions (e.g., QR codes, URL).	Mentimeter: (1) allows for changes in presentation modes during sessions, (2) provides reflection points for participants, and (3) provides transition points for presenters.	The design of Mentimeter questions is clear with minimal text. Various question types allow for the scaffolding of information during sessions.	Various question types support active learning approaches and provide interactive opportunities. Opportunities for participant engagement with questions are clearly defined during the sessions.

Methodology

Building upon the conceptual foundation provided by Robideau and Matthes (2021) and leveraging the known benefits and flexibility of an ARS like Mentimeter, University of Kentucky Family and Consumer Sciences (FCS) Extension implemented a virtual book club, titled the *Big Blue Book Club* (BBBC), featuring six books since 2020. Topics covered include mental health, substance use recovery, retirement planning, identity theft, and food and nutrition. For the current studies, two disciplines within FCS Extension are used to demonstrate the flexibility and applicability of Mentimeter in virtual learning sessions. The presented case studies showcase evaluation data from two different installments of the BBBC, for a total of 7 webinars,

with one focused on *Family Finance & Resource Management* (BBBC1) and the second focused on *Food & Nutrition* (BBBC2). For both installments, the respective book author joined the final session for a time of question and answer (Q&A) with the facilitator and the audience.

Attendance

All sessions for both book clubs were approximately 60 minutes in length and offered through Zoom webinars, limiting microphone and camera privileges for participants. In total, 159 overlapping attendees registered for both BBBC1 and BBBC2. Average attendance across webinars was $N = 105.57$ ($SD = 31.11$). Note, all webinars were also recorded for later viewing; however, the attendance data presented here is for synchronous webinar attendance only.

Mentimeter Integration

Mentimeter was selected for the book clubs to promote user engagement while providing educational content and to facilitate virtual, anonymous discussion around sensitive topics such as identity theft, credit reports, and personal dietary choices. Instructions on how to access Mentimeter were provided by the presenter, shown on the screen at the start of each session, and added to the webinar chat by a moderator. Participants could link to Mentimeter through a unique QR code or URL using their personal electronic device (e.g., computer, tablet, smartphone). Zoom chat features were available for users who wished to participate in the virtual discussions apart from Mentimeter, and relevant Extension professionals moderated the chat.

Book Club Design

By BBBC design, facilitators select non-fictional books that are interesting to the reader but are also educational. Each installment is led by a content-specific FCS Extension specialist whose role is to help participants unpack the text while finding ways to apply related research-based information to their financial or nutritional situations, as demonstrated by the presented case studies. Table 2 and Table 3 summarize book selections, learning outcomes for each session, and the scope of Mentimeter engagement in both book clubs.

Table 2. Sessions and Key Learning Outcomes Related to Mentimeter Engagement (BBBC1), The Less People Know About Us: A Mystery of Betrayal, Family Secrets, and Stolen Identity

Session	Session Topics	Learning Outcomes	Mentimeter Engagement
1	Family Dysfunction: Finances, Fraud, & Family Dynamics	• Examine generational dynamics within families • Compare healthy and unhealthy coping strategies • Identify financial red flags	16 Total • 1 Pinned Image • 7 Word Clouds • 4 Polls • 3 Open Ended • 1 Scale

Session	Session Topics	Learning Outcomes	Mentimeter Engagement
2	Financial Despair: Identity Theft, Credit, & Consumer Protection	• Identify warning signs of fraud, scams, identity theft • Develop strategies to reduce identity theft • Discover ways to improve credit scores	11 Total • 7 Open Ended • 2 Polls • 1 Word Cloud • 1 This or That
3	Financial Discoveries: Concluding Thoughts	• Q&A with Author	Mentimeter not used

Table 3. Sessions and Key Learning Outcomes Related to Mentimeter Engagement (BBBC2), Is Butter a Carb?: Unpicking Fact from Fiction in the World of Nutrition

Session	Session Topics	Learning Outcomes	Mentimeter Engagement
1	Harm of Nutrition Misinformation, Calories, & Fats	• Explain spectrum of harm that can occur when led by nutrition misinformation • Discuss importance of nutrient quality rather than focus on calories in food • Identify ways to prioritize unsaturated fats in the diet	12 Total • 1 Pinned Image • 1 Word Cloud • 3 Scales • 5 Polls • 1 Traffic Light • 1 Open Ended
2	Carbohydrates, Sugar, Protein, Micronutrients, & Supplements	• Identify ways to add high-quality carbohydrates and fiber into the diet • List benefits of diversifying protein sources in the diet • Explain why choosing a variety of foods over time is preferred to supplements	13 Total • 5 Polls • 2 Open Ended • 4 Scales • 1 Guess the Number • 1 Ranking
3	Balanced Eating, Plant-based Eating, Supporting a Healthy Gut, Food Allergies & Intolerances	• Discuss components of balanced eating • Identify ways to include more plant-based foods • Describe similarities of supporting a healthy gut with balanced eating	11 Total • 3 Open Ended • 1 Spin the Wheel • 5 Polls • 1 Scale • 1 Guess the Number
4	Diet Culture, Weight Stigma, Nutrition Fads, Exploring Evidence Q&A with Author	• Explain physical & mental impacts of weight stigma • Define diet culture & how it impacts our daily lives • Identify red flags associated with nutrition misinformation	3 Total • 1 Word Cloud • 1 Scale • 1 Open Ended

Education and Engagement

When designing the webinars, the Extension specialists were intentional in incorporating Mentimeter questions that promoted or measured gains in participant knowledge, confidence, or intended behavior changes. Audience polling was followed by educational content to reinforce learning concepts. To illustrate this, in BBBC1 Session 2, one learning objective was to develop strategies to reduce identity theft. Using the open-ended function of Mentimeter, participants were asked, *"How can you reduce your risk of identity theft?"* (see Figure 1). Thirty-eight responses were submitted, which continuously looped on the screen as participants typed. Panel (A) offers a still-shot sample of this question-and-response sequence. The facilitator read aloud the responses as they appeared in real time. After polling, the facilitator discussed ways to reduce the risk of identity theft using Kentucky Extension educational materials, as shown in Panel (B).

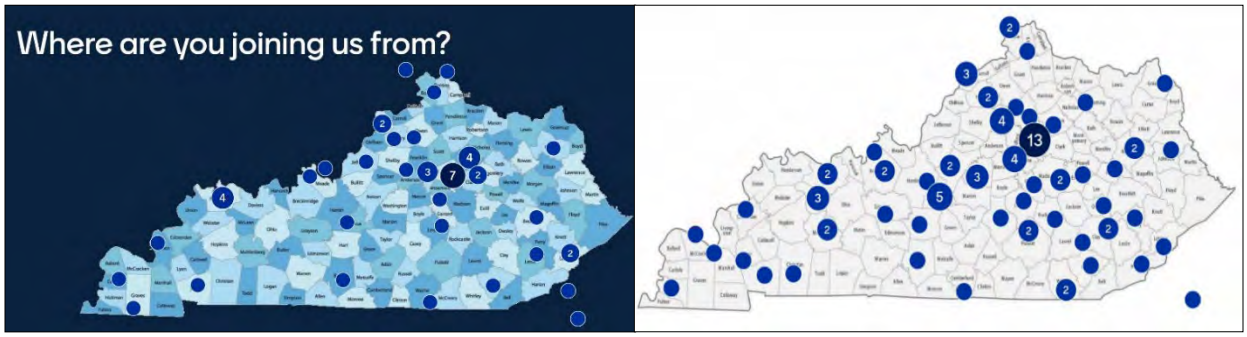
Figure 1. Example of Using Mentimeter as an Educational Prompt

(A)

(B)

Figure 2 shows a state-level map where participants identified their location in real time using Mentimeter to show the reach of virtual programming. Using the pinned image function in Mentimeter, both installments of BBBC used an interactive Kentucky state map during their first session to introduce participants to the interactive features of Mentimeter and to demonstrate the scope of audience participation in the book clubs.

Figure 2. Example of Using Mentimeter to Demonstrate Participant Reach



BBBC1 *N* = 48 responses **BBBC2 *N* = 90 responses**

Methodological Differences Between Case Studies

Although a similar framework was used for both installments of BBBC, there were distinctions between the two book clubs. The number of sessions correlated with the book chapters/sections in each book, and the times they were offered were determined by external factors such as book author schedules, facilitator schedules, and accommodating participants in multiple time zones across the state. Both case studies received exempt status from the Institutional Review Board at the University of Kentucky.

Case Study One

A 3-week installment of the BBBC was held virtually in April 2022 featuring the book, *The Less People Know About Us: A Mystery of Betrayal, Family Secrets, and Stolen Identity* by Axton Betz-Hamilton (2019). The series was led by the state Extension Specialist for Family Finance & Resource Management with a focus on identity theft, financial fraud, and consumer protection. Each session focused on one of the three distinct sections of the book. Mentimeter was used during the first two sessions of the series but was not used during the final session to allow adequate time for audience interaction with the author. Prior to Sessions One and Two, participants were instructed via email to have available a personal computing device (e.g., computer, smart phone, tablet) for in-session polling, if desired.

Program attendees were invited to complete an online evaluation survey through Qualtrics XM (Qualtrics, Provo, Utah, USA) after each session to measure progress towards learning objectives, intended behavior changes, and their experience with the teaching tool Mentimeter. Average attendance across sessions was $N = 80.33$ ($SD = 15.95$). Demographic data were

collected in each evaluation survey. All respondents self-identified as female and represented 54 Kentucky counties. Table 4 presents additional demographic data in BBBC1.

Table 4. Synchronous Demographic Data Reported Across BBBC1 Session Evaluations

		Evaluations submitted				
	Total attendees	***n (% of attendees)***	***White***	***Black***	***Age 66-74***	***Age 56-65***
Session One	98	73 (74.5%)	91.8%	5.5%	34.3%	30.1%
Session Two	76	35 (46.1%)	97.1%	2.9%	34.3%	28.6%
Session Three	67	63 (94.0%)	90.5%	7.9%	28.6%	34.9%

Descriptive statistics and response frequencies were calculated using Qualtrics XM (Qualtrics, Provo, Utah, USA) and SPSS (IBM Corp. Released 2022. IBM SPSS Statistics for Windows, Version 29. Armonk, NY). Thematic patterns were also identified from open-ended response questions across sessions.

Case Study Two

A four-week installment of the BBBC was held virtually in March 2023 featuring the book, *Is Butter a Carb?: Unpicking Fact from Fiction in the World of Nutrition* by Rosie Saunt and Helen West (2019). The series was led by the state Extension Specialist for Food & Nutrition with a focus on nutrition literacy and the ability to understand and apply nutrition information to address overall health. Each session covered multiple chapters from the book. Mentimeter was used during all four sessions of this series, including the final session with the author Q&A. No demographic data were collected using Mentimeter during sessions; however, the number of respondents was captured for each question and is reported when appropriate.

Using Mentimeter, participants were asked to indicate their change in understanding of specific nutrition topics after reading a specific chapter in the book. Responses were measured with a five-point Likert scale; however, categories were collapsed into three categories (none, a little/somewhat, and quite a bit/a great deal). Confidence questions were asked at the beginning of Session 1 and again at the conclusion of Session 4. Again, responses were measured on a five-point Likert scale, with 1 representing strongly disagree to 5 being strongly agree. Finally, two Word Clouds generated in Mentimeter with the same question were prompted at the beginning of Session 1 and the conclusion of Session 4.

Descriptive statistics and response frequencies were calculated. Responses were analyzed using Microsoft Excel (Microsoft 365, 2021). Statistical comparison of change as a result of the online book club was not feasible because of the anonymity of the sample and respondents potentially being different at the two time points.

Results

Case Study One

Following BBBC1-Session One, participants who submitted an evaluation (N = 73) were asked about their prior experience with Mentimeter. A majority (77.1%) indicated first-time use with the application. Participants also indicated whether Mentimeter aided them in feeling more *comfortable* sharing their opinions with the group, as well as whether Mentimeter helped them feel *engaged* in the discussion. Both questions were measured on a 3-point scale (yes, somewhat, no). Most participants indicated that Mentimeter helped them to feel more comfortable (71.6% yes; 16.4% somewhat) and engaged (73.5% yes; 17.7% somewhat) during the book club.

Participants were also asked to rate Mentimeter's *ease of use*, as measured on a five-point Likert scale, with 1 representing extremely difficult and 5 being extremely easy; however, categories were collapsed into easy, neutral, and difficult. The *ease-of-use* score was M = 4.37 (SD = 1.05).

Following BBBC1-Session Two, participants were asked to rate their agreement with three statements about Mentimeter. No participants reported disagreement with the statements; thus, only agreement and neutrality are presented in Table 5.

Table 5. Participant Agreement with Mentimeter Statements after BBBC1 Session

Using Mentimeter during the virtual discussion allowed me to...	**Agree** ***n (%)***	**Neutral** ***n (%)***
Stay engaged in the discussion	27 (81.8%)	6 (18.2%)
Express my opinions in a large group	26 (78.8%)	7 (21.2%)
Share information anonymously	27 (81.8%)	6 (18.2%)

Note. N = 33 evaluation responses.

Participants were also given the option to provide open-ended feedback about Mentimeter and the book club overall across the sessions. Of the emergent response patterns, two positive themes (*management* and *engagement*) and one negative theme (*distraction*) were identified specifically related to the use of Mentimeter in the book club discussions, as detailed below.

Management

Participants commented on the positive presentation of the material, the organization of the session and discussion, and the way Mentimeter helped manage and facilitate discussion. One participant responded, *"It was my first time participating in any book club. I really enjoyed the book, participating with a group, and the way the Zoom was presented. I plan to do another one."* Another added regarding Mentimeter, *"It was the only way to manage this many readers."*

Engagement

Respondents also noted that Mentimeter made it easier to follow along with and participate in the discussion. One participant commented that they enjoyed *"the new interaction tool,"* highlighting the interactive element of Mentimeter. Another echoed, *"I liked the way it was presented and especially think the use of menti.com is a great way to be interactive."*

Distraction

Not all open-ended responses regarding Mentimeter were positive; although it is of note that only two responses were negative across all three session evaluations. Specifically, two participants commented that the spinning motion of the Word Cloud question in Mentimeter was distracting and/or dizzying.

In addition to participants' experience with Mentimeter, BBBC1 evaluation data was captured to measure progress towards learning objectives and intended behavior changes as a result of participating in the book club (see Table 6). Of Session Two participants, 97% indicated they understood factors to consider when using credit wisely; 85% indicated they increased their knowledge of identity theft and consumer protection; and 85% feel more confident in their general knowledge related to financial management. Regarding intended behavior changes, 87% of Session Three participants indicated they planned to check their credit report as a result of participating in the book club, and 92% plan to take better steps to protect themselves from fraud and identity theft.

Table 6. Changes in Understanding Reported during BBBC1

	Session 2 *N* Session 3 *N*	**Agree** ***n (%)***	**Neutral** ***n (%)***	**Disagree** ***n (%)***
I gained new knowledge /skills about the financial topics presented.	34 61	31 (91.2%) 58 (95.1%)	3 (8.8%) 3 (4.9%)	0 (0.0%) 0 (0.0%)
I am likely to apply the new knowledge/skills I gained.	35 63	28 (80.0%) 60 (95.2%)	7 (20.0%) 3 (4.8%)	0 (0.0%) 0 (0.0%)
I discussed the reading/ topic with someone outside of the book club.	34 61	29 (85.3%) 54 (88.5%)	3 (8.8%) 2 (3.3%)	2 (5.9%) 5 (8.2%)

Case Study Two

Almost all participants reported gains in knowledge related to key chapter content (see Table 7). The greatest gains in knowledge, as demonstrated by scale questions in Mentimeter during the online book club sessions, were related to fats (69%), carbohydrates (66%), and micronutrients and supplements (72%).

Table 7. Changes in Understanding Captured by Mentimeter during BBBC2

	N	**None** ***n (%)***	**A little/Somewhat** ***n (%)***	**Quite a bit/A great deal** ***n (%)***
Calories	77	4 (5%)	32 (42%)	41 (53%)
Fats	64	2 (3%)	18 (28%)	44 (69%)
Carbohydrates	59	1 (2%)	19 (32%)	39 (66%)
Sugar	54	1 (2%)	25 (46%)	28 (52%)
Protein	51	2 (4%)	34 (67%)	15 (29%)
Micronutrients & supplements	47	0 (0%)	13 (28%)	34 (72%)
Balanced eating	36	2 (6%)	15 (42%)	19 (52%)

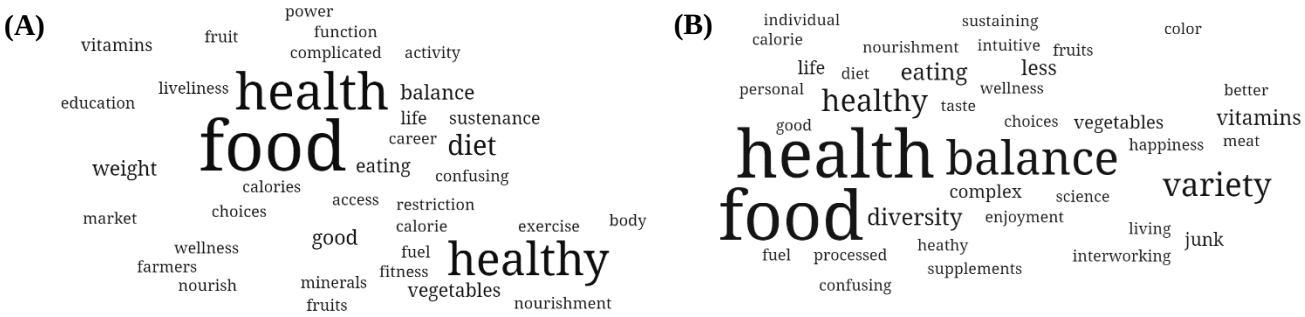
Participants were asked to rate their confidence related to nutrition on a scale from 1 (strongly disagree) to 5 (strongly agree) at the beginning of Session 1 and at the end of Session 4 (see Table 8 for mean responses). At both time points, participants self-reported that nutrition was highly important. However, there were increases in confidence related to making food and nutrition choices and feeling confident in determining if nutrition information is fact or fiction.

Table 8. Changes in Confidence Between Session 1 & Session 4 Captured by Mentimeter

	Session 1 (*N* = 89)	**Session 4 (*N* = 48)**
Nutrition is important to me.	4.61	4.73
I feel confident making food and nutrition choices.	3.60	4.27
I feel confident knowing if nutrition information is fact or fiction.	3.38	4.32

Using the word cloud function in Mentimeter, the prompt, *"When you hear the word "nutrition," what is ONE word that comes to mind?"* was used at the beginning of Session 1 and at the end of Session 4 to capture changes in the perception of nutrition in a unique qualitative format. At the beginning of Session 1, 145 submissions, including 38 unique words, were submitted with the following most frequently cited: food (39), health (26), healthy (22), diet (9), and balance (4) (see Figure 3). At the end of Session 4, 121 words were submitted, representing 40 unique words, with a shift in the five most frequently mentioned: food (23), health (22), balance (14), variety (8), healthy (7). Further, 18 words (e.g., complex, enjoyment, happiness, intuitive) were cited at the end of Session 4 that were not included in the first session. Finally, the word "weight" was not mentioned once at the end of Session 4, which represents a clear shift in thinking about food and nutrition (see Figure 3). Panel (A) represents the word cloud generated from the beginning of Session 1 and Panel (B) represents the word cloud generated at the end of Session 4 using the same prompt in Mentimeter.

Figure 3. Sample Word Clouds Created in Mentimeter



Discussion

Previously documented applications of Mentimeter in Extension education have been limited. However, Mentimeter has the potential to address concerns regarding engagement and technology use in Extension, as mentioned by Jernigan et al. (2015), Lubell and McRoberts (2018), and Narine and Meier (2020). The anonymity and comfort provided by Mentimeter can help facilitate a more honest discussion in both online and in-person programming, especially when discussing sensitive topics (e.g., Lucey et al., 2021; Mayhew et al., 2020). Participants in the current studies largely reported that Mentimeter helped them feel engaged in the program, echoing previous research on Mentimeter and other ARS (Mayhew et al., 2020). Mentimeter could be used in future programs to engage an audience and allow them to interact, regardless of whether the program is delivered in-person or virtually.

In the current virtual delivery settings, Mentimeter may have been a new engagement method for participants. As with any new technology, adequate training would be needed for Extension personnel to improve comfortability and skill (Cummings et al., 2015; O'Neill et al., 2011). Allen et al. (2014) detail their experience holding a single-day training for Extension personnel on social media use. A similar strategy could be used to introduce Extension personnel to Mentimeter or a comparable ARS, including pedagogy on how to create more engaging educational presentations using technology to facilitate and/or promote discussion.

The variety of question types available through Mentimeter, as used in the current studies, allows instructors to engage their audience in different ways, such as meeting the needs of diverse learners. Customizing questions to different learning styles allows more participants to engage with the presentation, whether by answering quiz-style questions or sharing their opinion through anonymous open-ended questions. The question types available also allow for both quantitative and qualitative data to be collected from the same sample. As demonstrated through the BBBC installments, using a mix of question types in the same presentation — such as scale questions and word clouds — allows a wide range of data to be collected through audience participation.

Further, as highlighted in BBBC2, Mentimeter can be used to collect data that capture real-time changes in participant understanding and confidence during programming.

Limitations

The case studies presented here were conducted using evaluation data from two online Cooperative Extension programs in Kentucky. Participants who attended the online program(s) may have demonstrated self-selection bias and exhibit more positive attitudes towards technology than those who chose not to attend. For example, their existing attitudes towards technology use (e.g., choosing to participate in one or more virtual book clubs) could have impacted their perceptions of Mentimeter's ease of use. Further, social desirability bias may have contributed to improvements in knowledge and confidence knowing that responses would be viewed by all participants and that instructors would hope to see changes, even though submitted answers were anonymous. The authors also recognize digital inequality exists in some rural and low-income settings, which may limit engagement in virtual programming (Office of Policy Development and Research, 2016). Research should examine the application of Mentimeter and other ARS in a variety of Extension-based contexts such as online programming, in-person programming, and Extension personnel training with consideration of these limitations.

Lessons Learned and Practical Application

For others looking to leverage Mentimeter in virtual learning environments, several important considerations were identified during these studies. Lessons learned are outlined below.

- Zoom now has a Mentimeter application that lets the host run a Mentimeter presentation using Zoom. This feature allows participants to directly answer questions using Zoom, which may reduce the burden on participants to respond from a separate personal electronic device (or through another window on the device viewing the online program).

- While Mentimeter is user-friendly overall, well-curated presentations require ample preparation time to build out content and explore creative question formats and overall program design. Using this type of ARS requires educators to intentionally map out polling questions and integrate them into the educational narrative of the presentation. The time required to do this effectively should not be underestimated.

- Because polling responses can be retained, the use of Mentimeter as an evaluation tool should also be explored. Studies are limited examining the potential use of Mentimeter for data collection and program evaluation. However, Mentimeter functions provide quantitative and qualitative data collection methods that could align with evaluation tools routinely used to evaluate, assess, and report on Extension programming.

- The use of novel technology-based platforms like Mentimeter will take time and patience for professionals and participants to adopt. In addition to personnel training, professionals should consider appropriate user training or slow integration of technology into Extension programs to reduce the adoption burden on participants. Placing emphasis on technology training for professionals and participants helps to ensure that Extension agents are comfortable in adopting platforms like Mentimeter, particularly in educational settings (e.g., Allen et al., 2014; Beattie, 2021).

Conclusion

Although Extension programming has largely returned to in-person delivery after the COVID-19 pandemic, Kentucky FCS Extension has continued the virtual BBBC due to its success, with the next installment slated for Spring 2024. The online platform, Mentimeter, shows potential as a teaching tool to increase engagement in online Extension programming for various audiences. While further research is needed to determine the effectiveness of its application and establish best practices for use, Extension educators should consider exploring this tool in a variety of settings across practice disciplines.

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