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# Assessment of Interest in a Virtual Avatar-Based Nutrition Education Program Among Youth-Serving Community Partners

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## ABSTRACT

**Objective:** Examine the appeal of a virtual avatar-led nutrition education program among youth-serving community partners in North Carolina.

**Methods:** We surveyed community partners using the Diffusion of Innovation Theory constructs of relative advantage, compatibility, and complexity. Logistic regression evaluated the appeal and likelihood of the program's future use.

**Results:** Community partners (n = 100) agreed that the program was an innovative (87%) and convenient (85%) way for youth and parents to learn about nutrition. Partners who perceived the program as a relative advantage to current programs had significantly higher odds of future use intention ( $P = 0.005$ ). Those who found it compatible with organizational and personal values had significantly higher odds of future use ( $P < 0.001$ ).

**Conclusions and Implications:** A nutrition education virtual avatar program is of interest to youth-engaged community partners. Future research examining the potential integration of this type of program within community organizations is warranted.

**Key Words:** nutrition education, virtual, avatar, community partners, youth (*J Nutr Educ Behav.* 2024;56:719–727.)

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## INTRODUCTION

Childhood obesity is a significant public health concern, affecting 14.4 million children and adolescents in the US, and Hispanic and African American

youth with low income are disproportionately affected.<sup>1,2</sup> Although the causes of childhood obesity are complex and multifactorial, lifestyle factors such as poor dietary habits and lack of physical activity have been strongly

associated with excess weight gain.<sup>3–5</sup> As these health behaviors often track from childhood into adulthood, finding effective ways to improve these behaviors and prevent childhood obesity is paramount.<sup>5,6</sup>

Using innovative digital technology in nutrition education (NE) to promote health behavior change could help address childhood obesity, especially for school-age children and adolescents (hereafter referred to as youth). Today's youth are digital natives who have grown up understanding the digital language of computers, video games, and the internet and demonstrate a preference for seeking health information online.<sup>7</sup> In a systematic review assessing the effectiveness of digital interventions to increase fruit and vegetable intake among healthy populations, Rodriguez Rocha and Kim<sup>8</sup> found a small positive effect among adolescents, but not school-aged children, through computer-based, text message-based, and internet-based interventions.<sup>8</sup> Although

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the findings of this systematic review were positive, there were very few digital interventions focused on youth. Similarly, McGuirt et al<sup>9</sup> found that the use of digital technology, particularly virtual reality (VR), for NE among youth has not been well documented. Virtual reality is a computer-generated 2-dimensional or 3-dimensional (3D) environment that can be nonimmersive, semi-immersive, or fully immersive, allowing the user to interact in numerous ways through sound, sight, or physical movement. Many VR platforms use avatars or personalized digital characters.<sup>9,10</sup> Youth report strongly identifying with avatars as friends and idealized versions of themselves, and they are more open to receiving health-related guidance from an avatar than adults or health care practitioners.<sup>11,12</sup> Thus, programs using VR may be a viable option to address the behavior change intervention gap in youth.<sup>12–15</sup>

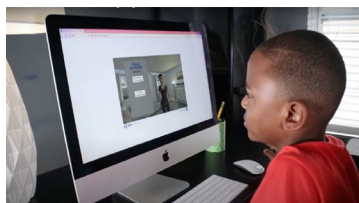
Given the dearth of technology-based nutrition interventions for these age groups, McGuirt et al<sup>10</sup> developed an interactive, nonimmersive 3D virtual avatar-led NE program to reduce childhood obesity among youth (aged 8–14 years) with low income that is accessible via an internet-enabled computer or smartphone and does not require a head-mounted device. Grounded in the Socioecological Model, Social Cognitive Theory, and Self-Determination Theory, this study's version of the software program concept used a conversational and customizable avatar.<sup>16–18</sup> The avatar engages with a child and parent through interactive video chats about making healthy snack choices and increasing physical activity. The interactions included short weekly 7-

minute lessons with youth and their parents, designed to last for 8 weeks (see Figure).<sup>10</sup> In addition to video chats, the program design included sending text messages from the avatar to youth and parents to reinforce learning and provide accountability. The program was built with a flexible, modular software design that can be easily modified to reach different age ranges of youth (eg, early school-aged children to early adolescence vs later adolescence to emerging adults). The interaction of the interpersonal program with the avatar may provide observational learning and support self-efficacy in improving dietary intake. In addition, this type of interaction may increase and influence motivation and behavior change by increasing autonomy, competence, and relatedness as youth develop a personal relationship with the avatar.<sup>10</sup>

To effectively reach youth with this type of innovative programming, it is important to identify the needs and interests of community organizations that might use this type of programming to best support and reach youth and their parents. These trusted organizations engage with youth in numerous ways. For example, North Carolina (NC) Cooperative Extension (*Supplemental Nutrition Assistance Program Education Agents and Expanded Food and Nutrition Education Program*) educators deliver 4–6 week nutrition programs to youth in school classrooms, afterschool programs, and summer camps.<sup>19,20</sup> Civic and other community organizations, such as the United Way and Boys and Girls Clubs, provide safe spaces for children to play and learn about health daily after school and on weekends.<sup>21</sup> Parents and youth

may also receive more personalized nutrition guidance from a pediatric dietitian if referred by their physician. Thus, numerous community settings present optimal places for implementing the virtual avatar program as a standalone offering or as an adjunct to current nutrition programming. Integrating new NE programs in community settings requires community partners to perceive the program as bringing clear value. However, to date, little is known about the factors that influence the adoption of novel technology-based NE programs, particularly using virtual avatars for NE.

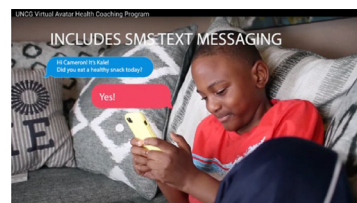
The Diffusion of Innovation Theory (DOIT) seeks to explain how individuals and groups adopt new ideas or innovations. It has been used to assess the adoption of mobile-based interventions in several areas of health behavior, including mental health and physical activity.<sup>22–26</sup> Although, to our knowledge to date, this theory has not been used in the area of 3D virtual-based NE, it may help increase the chances of successful adoption and dissemination of new technology-driven NE models in the future. This theory proposes 5 attributes of innovation that affect adoption: (1) relative advantage, (2) compatibility, (3) complexity (simplicity or ease of use), (4) trialability, and (5) observability.<sup>27</sup> Previous research has demonstrated that relative advantage, compatibility, and complexity are significant predictors of the adoption and dissemination of mobile health applications.<sup>22,24,26</sup> Relative advantage is the perceived value, benefit, and improvement of the innovation relative to current programs. Innovations with a clear



A youth interacting with their personalized avatar



The Avatar providing healthy snacking tips



A youth receiving a text message from the Avatar

**Figure.** Screenshots of the virtual avatar concept overview video.

advantage over current programs will be more easily adopted.<sup>27</sup> Compatibility relates to how the innovation fits the user's or organization's values, experiences, needs, and behaviors. Literature suggests that the more an innovation, such as the virtual avatar program, can integrate with existing behaviors, values, and technologies, the higher the likelihood of adoption.<sup>23,25,28,29</sup> Complexity is the degree to which an innovation is difficult to understand or use. The more users perceive innovations as simple to use (or less complex), the more they will be readily adopted.<sup>23,25,27</sup> Trialability describes how readily users can experience an innovation firsthand on a limited basis.<sup>27</sup> As innovations often require an investment of time, energy, and resources, the greater the extent to which a potential adopter can trial or foresee themselves using an innovation, the more it will be adopted.<sup>23,29</sup> Finally, observability is the degree to which potential adopters can see the results or benefits of the innovation.<sup>27</sup> In previous research, an individual's pattern to adopt new technologies before others (early adopter vs late adopter) was also associated with the successful implementation of new virtual learning technologies at the organizational level, along with organizational readiness and technology support.<sup>28,30–32</sup>

The Diffusion of Innovation Theory can provide a framework for understanding the factors that might influence the adoption of a digital NE program.<sup>27</sup> However, to our knowledge so far, it has not been used to study the adoption of youth-focused virtual-based NE programming. Thus, this study aimed to assess the extent to which community partners were interested in the virtual avatar program and what DOIT characteristics are associated with the willingness to adopt the program.

## METHODS

### Survey Recruitment

Study recruitment was completed in September 2021. Given the lack of research regarding the types of community partners most interested in a

virtual avatar program, various partners engaged in NE were intentionally recruited for a diversity of perspectives across a broad range of ages of children served.<sup>9</sup> We recruited representatives at federally qualified health clinics (pediatricians, family medicine practitioners), civic organizations (ie, United Way, Salvation Army), health departments, school systems (health educators), large hospital systems (pediatricians, pediatric dietitians), NC Cooperative Extension (*Supplemental Nutrition Assistance Program Education Agents and Expanded Food and Nutrition Education Program* educators), and afterschool programs (ie, Boys and Girls Clubs) in NC. We recruited through email, phone, established research contacts, and internet searches. Eligibility to participate in the survey included individuals who were (1) aged  $\geq$  18 years, (2) able to communicate fluently in English (read/write), (3) worked for a community entity (government, private, or nonprofit) or health care organization that provides NE programs, and (4) had influence or authority to provide nutrition information or NE programs to end-users. All eligible participants ( $n = 211$ ) received an email describing the study and an invitation to participate by accessing the web survey through an embedded hyperlink. Following the initial prompt, an email reminder was sent to eligible participants after 2 weeks and again after 1 month.

### Avatar Experience

Respondents provided implied consent by checking yes to participate in the online survey, then completed the first part of the survey asking for demographic information and information about existing NE programs used in their organization. Participants watched a 2-minute-long concept video about the virtual avatar program, which provided an overview of the program experience, including examples of each of the main components and types of avatar interactions, technology needs, and how it could be used by youth and parents to learn about healthy snacking and physical activity. This study used this concept overview

video approach to reduce community organization respondent burden, increase survey participation, and help organizations grasp the general concept of the program and its components. The concept video showed 2 African American boys aged 8–10 years and their parents interacting with the virtual avatar program and described how the program would provide weekly lessons on healthy snacking and physical activity in 7-minute modules guided by a customizable avatar for 8 weeks.<sup>10</sup> The concept video concluded by demonstrating text messages sent from the avatar to youth and parents to reinforce learning.

After watching the concept overview video, participants completed the second part of the survey, in which they were asked about their perceptions of what they saw in the video. As an incentive for participating, 10 survey participants were randomly selected to receive a \$25 electronic gift card. The University of North Carolina Greensboro Institutional Review Board provided expedited approval of this study (approval no. 20–0477).

### Survey Measures

The survey was developed in REDCap with questions modified from the previously validated research of Miller et al<sup>22</sup> (Cronbach  $\alpha$  ranging from 0.75 to 0.84) to focus on the virtual avatar program vs a mobile health application, using the DOIT constructs of relative advantage, compatibility, complexity (or simplicity/ease of use), trialability and observability.<sup>33,34</sup> Questions were asked on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The research team and 2 experts (pediatric registered dietitians) reviewed the survey for face validity. The items assessing trialability and observability were deleted, as these constructs were perceived as difficult to interpret, given that participants only watched a video overview of the program. The final survey included 31 questions assessing agency demographics and the following DOIT constructs: relative advantage (9 items), compatibility (4 items), and simplicity (ease of use; 3



items), future use intention (3 items). The relative advantage of the virtual avatar program was described in terms of innovation and convenience in reaching and teaching families compared with current nutrition programs. Participants were asked to respond to statements positively (strongly, agree), neutral, or negatively (disagree, strongly disagree), such as whether the avatar program is a more innovative way for families/youth that their organization serves to learn about nutrition to assess relative advantage. In addition, participants were asked to respond to statements positively (strongly, agree), neutral, or negatively (disagree, strongly disagree), such as whether they would use this program with the youth and families that their organization serves to assess future use intention (agency willingness to adopt the program; see Table 2 for items). Participants who answered positively (strongly agree, agree) to using the virtual avatar program with the families they serve were asked about potential methods to promote the program (ie, social media, website, email, staff, or newsletter).

Reliability analysis was conducted, with Cronbach  $\alpha$  computed for the questions assessing the DOIT constructs. We removed 2 items in the relative advantage subscale, given low corrected item-total correlations (the virtual avatar NE program is on par with existing programs in terms of convenience [ $r = -0.145$ ] and innovation [ $r = 0.001$ ]). The revised relative advantage subscale consisted of 7 items for analysis. All subscales were found reliable with Cronbach  $\alpha > 0.8$  (relative advantage [ $\alpha = 0.89$ ], compatibility [ $\alpha = 0.85$ ], complexity [ $\alpha = 0.84$ ], and future use intention [ $\alpha = 0.89$ ]).

An additional open-ended question asked participants about their intention to use or not use the virtual avatar program. Participants were also asked to provide demographic information about themselves and their organization. Respondents selected the type of community partner (ie, hospital system, afterschool program, school system), the age range of youth served (infant aged 19 years), current use of technology-based tools (ie, website, video,

smartphone application, text messaging) to deliver NE (yes/no), personal likelihood to adopt new technology before others (very unlikely to very likely; referred to as an early adopter from this point forward), to rank their perception of their organization's support to implement new technology (not supportive to very supportive), and the counties their organization served. We also provided respondents with definitions to select their organizational role in adopting new technology (decision-maker, influencer, disseminator of information, or other). The survey was emailed to all eligible participants ( $n = 211$ ).

### Statistical Analysis

Data were analyzed using SPSS (version 28.0, IBM Corp, 2021). Normality assumptions were confirmed for all variables using the Shapiro-Wilk test. Agency type or affiliation, the age range of youth served, current use of technology-based learning tools, and counties served were summarized with descriptive statistics (frequency, percentage of the total sample for categorical variables; mean, and median for continuous variables). On the basis of the approach of a previous study using DOIT constructs (subscale), the mean of each variable was combined for each DOIT subscale (relative advantage [7 items], compatibility [4 items], simplicity [3 items], and future use intention [3 items]) into an overall composite index (advantage, compatibility, simplicity, and future use indexes).<sup>23,35</sup> Given the low frequency of responses (3% to 6%) of disagree/strongly disagree, the index (subscale) variables were dichotomized as 1 = agree (strongly agree, agree), 0 = neutral/disagree (neutral, disagree, strongly disagree), with agree to represent the virtual avatar program as having a high likelihood of a perceived advantage, compatibility, complexity (ease of use), and future use, compared with current NE programs.

The chi-square test of independence and Fisher exact test were employed to test whether categorical variables—including the agency type (hospital system, school system, civic

organization, Cooperative Extension, after school), the age range of youth served (aged infant to 2 years, 3–5 years, 6–10 years, 11–15 years, and 16–19 years), current use of technology-based tools (yes/no), early adopter status (personal likelihood to adopt new technology before others; yes/no), organizational support for technology (yes/no), or technology adoption role (decision-maker, disseminator, influencer, other)—accounted for differences in future use intention. Those who served young children (aged infants to 5 years) were included in the final analysis, as they worked for a hospital system or a health department, also providing care to older youth. Logistic regression was conducted to examine the relationships between the independent variables of early adopter status, use of online programs, agency support for technology, and perceived DOIT construct attributes (relative advantage, simplicity, and compatibility; high/low) and the dependent variable of the likelihood of future use (high/low; willingness to adopt the virtual avatar NE program).

Finally, we conducted a rapid thematic analysis of responses to the open-ended question regarding the rationale for wanting to use the virtual avatar program following the approach of Taylor et al.<sup>36</sup> Two trained researchers reviewed the responses independently, created summaries of the responses, grouping them as affirmative or negative about using the virtual avatar program, met to discuss the discrepancies and came to a consensus on the common emerging themes and salient quotes.

## RESULTS

### Participant Characteristics

Of the 211 individuals invited to participate, 100 respondents completed the survey, with a completion rate of 47.6%. Participants served families in all 100 NC counties, with respondents in urban (57%) and rural (43%) counties. The majority of respondents worked for a hospital system (27%), school system (27%), or health department (16%) and served youth across all age ranges. More

than half of the participants (51.5%) considered themselves as early technology adopters, a disseminator (29.3%), or influencer (33.6%) in new nutrition program adoption, and part of an organization with high support for new technology (54.2%) (Table 1).

Nearly half (49.5%) of the participants reported currently using digital tools to provide NE, with websites (58%) and videos (27%) used the most.

### Adoption of the Virtual Avatar NE Program (DOIT)

Overall perceptions of the virtual avatar NE program were favorable in terms of DOIT constructs. Community partners perceived the virtual avatar NE program as a relative advantage to current programs, particularly in terms of innovation to reach and teach families and for families to learn about NE. Most participants also agreed that the virtual avatar program could positively impact the dietary behaviors of the families they serve. Community partners also perceived the program as compatible with organizational and personal values and as simple to use. Most community partners agreed they would consider using the virtual avatar program with the youth and families

**Table 1.** Community Agency Characteristics (n = 100)

Participant Characteristics	n (%)
Community partner affiliation	
Hospital system	27 (27.0)
School system	27 (27.0)
Health department	16 (16.0)
Community or civic organization	11 (11.0)
Cooperative extension	10 (10.0)
Afterschool program	9 (9.0)
Age group of youth served (n = 292)	
Infant to 2 y	41 (14.0)
3–5 y	56 (19.2)
6–10 y	59 (20.2)
11–15 y	65 (22.3)
16–19 y	71 (24.3)
Current use of digital tools for nutrition education (n = 99)	
Yes	49 (49.5)
Early adopter of technology (n = 97)	
Yes	50 (51.5)
Organizational support for technology (n = 96)	
Yes	52 (54.2)
Nutrition education program adoption role (n = 140)	
Decision-maker	32 (22.9)
Influencer	47 (33.6)
Disseminator	41 (29.3)
Other	20 (14.3)

Note: Responses from adults who self-identified as working for youth-serving community agencies in North Carolina providing nutrition education to children of all ages (birth to 19 years old). Respondents were able to select all that apply for the questions regarding age group of youth served and technology adoption role.

they serve and agreed they would provide the program to the families they serve in the future. Community partners also agreed the

families they serve would use the virtual avatar program. See Table 2 for DOIT subscales and corresponding items.

**Table 2.** Participant Perceptions of the Virtual Avatar Nutrition Education Program Likert Scale Responses

Subscales and Items	Agree	Neutral/Disagree
The avatar program is a more convenient way for families to learn about nutrition	82.0	18.0
The avatar program is a more convenient way to reach families with nutrition education	85.0	15.0
The avatar program is a more convenient way to teach nutrition education	82.0	18.0
The avatar program is a more innovative way for families to learn about nutrition	87.0	13.0
The avatar program is a more innovative way to reach families with nutrition education	84.0	16.0
The avatar program is a more innovative way to teach nutrition education	87.0	13.0
The avatar program may improve the dietary behaviors of youth and families	72.0	28.0
My organization may benefit from using the avatar program	78.0	22.0
The avatar program is easily integrated into our current health promotion practices	65.0	35.0
The avatar program aligns with my organization's mission to improve health	82.0	18.0
The avatar program aligns with my personal values on health and wellness	78.0	22.0
The avatar program seemed easy to use	73.0	27.0
It would be easy to offer the avatar program to families that we serve	65.0	35.0
The families we serve would find the avatar program easy to use	66.0	33.0
I would use this program with the youth and families my organization serves	83.0	17.0
I would provide this program to the youth and families my organization serves	78.0	22.0
The youth and families my organization serves would use this program	60.0	40.0

Note: Responses (in %) are from adults who self-identified as working for youth-serving community agencies in North Carolina providing nutrition education to children of all ages (birth to 19 y).

**Table 3.** Differences in Future Use Intention of the Virtual Avatar Nutrition Education Program by Organizational and Participant Demographic Characteristics (n = 100)

Participant Characteristics	Future Use Intention		P
	Agree	Neutral/Disagree	
Community partner affiliation <sup>a</sup>			0.46
Hospital system	18 (18.0)	9 (9.0)	
School system	15 (15.0)	12 (12.0)	
Health department	11 (11.0)	5 (5.0)	
Community or civic organization	7 (7.0)	4 (4.0)	
Cooperative Extension	3 (3.0)	7 (7.0)	
Afterschool program	6 (6.0)	3 (3.0)	
Age group of youth served (n = 292) <sup>b</sup>			0.07
Infant to 2 y	31 (31.9)	10 (10.3)	
3–5 y	39 (40.2)	17 (17.5)	
6–10 y	35 (36.1)	24 (24.7)	
11–15 y	41 (42.3)	24 (24.7)	
16–19 y	45 (46.4)	26 (26.8)	
Digital tools for nutrition education <sup>b</sup>			0.27
Yes	32 (32.0)	26 (26.0)	
No	14 (14.0)	26 (26.0)	
Early adopter of technology (n = 97) <sup>a</sup>			0.43
Yes	33 (33.0)	17 (17.0)	
No	26 (26.0)	21 (21.0)	
Nutrition program adoption role (n = 140) <sup>b</sup>			0.29
Decision-maker	20 (14.3)	12 (8.6)	
Influencer	30 (21.4)	17 (12.1)	
Disseminator	25 (17.9)	16 (11.4)	
Other	8 (5.7)	12 (8.6)	

<sup>a</sup>Fischer exact test was used to assess the relationship between community partner or respondent characteristics and future use intention; <sup>b</sup>Pearson chi-square of independence was used to test the relationship between community partner or respondent characteristics and future use intention.

Note: Responses from adults who self-identified as working for youth-serving community agencies (partners) in North Carolina providing nutrition education to children of all ages (birth to 19 y).

In addition, there were no significant differences in future use intention observed among the respondents by agency type, the age range of youth served, current use of digital tools to teach NE, early adopter status, organizational support for technology, or role in the adoption of new NE programs (Table 3).

Logistic regression demonstrated that community partners who perceived the virtual avatar NE program as having a relative advantage over current programs and being compatible with organizational and personal values had significantly higher future use intentions (Table 4). Those who perceived the virtual avatar program

as a relative advantage over current programs were almost 6 times more likely to intend to use the program in the future ( $P = 0.005$ ). In addition, those who perceived the virtual avatar program as compatible with organizational and personal values were nearly 8 times more likely to intend to use the program in the future ( $P <$

**Table 4.** Associations of Intention to Use the Virtual Avatar Program in the Future With DOIT Construct Attributes, Organizational, and Participant Characteristics

Variable	Odds Ratio	95% CI for Exp(B)	P
Relative advantage	5.59	1.695–18.405	0.005
Compatibility	7.73	2.526–23.660	0.0003
Simplicity	1.52	0.452–5.081	0.501
Early adopter	1.00	0.183–1.816	0.993
Current use of digital programs	1.00	0.350–2.885	0.993
Organization tech support	1.19	0.402–3.505	0.757
Constant	0.18	–	0.007

CI indicates confidence interval; DOIT, Diffusion of Innovation Theory; Exp(B), exponentiation of the B coefficient or odds ratio. Note: All outcomes were analyzed using a logistic regression with significance based on  $P < 0.05$ .



**Table 5.** Participant Quotes From Open-Ended Questions Regarding Why They Would Use or Would Not Use the Virtual Avatar Program in the Future

Theme	Quotes
Positive responses	
Avatar personalization	“From the video this looks like an engaging tool. It goes beyond just a video or workshop and allows for a more personal connection.” “I like that users can create a personalized avatar to look like them. Children love to see themselves like this!”
Fun youth engagement	“I am interested because it would provide a fun, interactive experience for parents and children.” “I think the program is interactive and would work well to capture children’s attention in comparison to a 1:1 lecture/education.”
Increased reach of nutrition education	“This would allow education to continue outside of face-to-face interaction.” “I think this would serve as a great supplemental learning course after participating in my lessons.”
Negative responses	
Language barriers	“Not offered in bilingual format, avatars are odd speaking and moving. We are trying to discourage screen time use.” “Concern is language and barriers to technology.”
Lack of internet access	“I worry about insufficient system resources, computer, internet for the families we serve.” “If a computer and WIFI are available through a school program, that would also make it more accessible for low-income groups.”
Eating disorder development	“I would want to know more, as some verbiage is concerning (eg, those foods are unhealthy and should be eaten once a week).” “While I agree with the statement ‘eating chips once per week’ I worry about some youth developing restrictive eating behaviors.”

Note: Responses from adults who self-identified as working for youth-serving community agencies (partners) in North Carolina providing nutrition education to children of all ages (birth to 19 years old).

0.001). Early adopter status, current use of digital programs to teach NE, and organizational support for technology were not significant predictors of future use.

Participants with high future use intention indicated they would use numerous methods to promote the virtual avatar program to the youth and families they serve once it becomes available. Promotional methods included website (18.7%), social media (18.7%), email (16.9%), staff (15.6%), newsletter (10.2%), and other (4.4%; in clinic or word of mouth).

A total of 77 participants also provided open-ended responses detailing why they do or do not intend to use the virtual avatar program. Several themes emerged from a thematic analysis of the open-ended responses. Positive reasons to use the program in the future included (1) avatar personalization, (2) fun youth engagement, (3) increased reach of NE, and (4) parents and youth learning together. Negative reasons limiting participants’ future use included (1) language barriers, (2) lack of

internet access among families, and (3) concern for eating disorder development with some program language (healthy vs unhealthy) (Table 5).

## DISCUSSION

This study aimed to investigate the interest of a virtual avatar NE program among community partners and identify organizational characteristics that may influence future use intentions or their willingness to adopt and use the program in their communities. Our findings indicate that community partners are interested in the virtual avatar program and recognize the program’s potential to conveniently reach and engage families by using innovative technology.

Two DOIT constructs, relative advantage and compatibility, emerged as significant predictors of future use, with 6–8 times higher odds of future use intention among community partners. These results suggest participants are more likely to use or adopt the virtual avatar program if they perceive it

to be an improvement compared with current programs. In addition, if participants perceive the virtual avatar program to be compatible with current programmatic and organizational practices and norms, they are more likely to use it with the families they serve. Previous studies have also demonstrated that relative advantage and compatibility are critical DOIT constructs predicting technology adoption.<sup>22,37</sup> For instance, researchers assessed factors associated with adopting mobile health applications and found that relative advantage and compatibility represented key predictors of future use.<sup>22,37</sup> Emani et al<sup>23</sup> found that relative advantage and complexity were significant predictors of future use of mobile health applications; however, compatibility was not a significant predictor. In this study, complexity (ease of use) was not a predictor of future use intention and may be related to low variability on questions assessing complexity or inability to fully interact with the program. On the open-ended future use rationale question, participants noted concerns that poor WiFi access may

limit program use among families with low income, which may explain low variability.

Furthermore, in this study, the virtual avatar program's relative advantage was conceptualized in terms of convenience and innovation to reach and teach youth and families about nutrition and health and the potential to impact dietary behaviors. However, community partners may conceptualize the relative advantage of digital nutrition programs in alternative ways, such as cost savings, and would choose a program that provided a clear financial benefit.

Finally, although we assessed program acceptance and future use among a wide range of community partner types, program usage may vary vastly depending on job function and time spent interacting with youth. For example, a pediatric registered dietitian may spend an hour discussing food and nutrition with a family, whereas a pediatrician or family medicine practitioner may only interact with a family once a year and only discuss nutrition for a few minutes.

This study has several strengths as well as limitations to note. Strengths of the study include the use of a theoretical framework and a previously validated survey instrument to assess potential program adoption among a diverse population of community partners that serve youth and families in each county in NC across various agency types, including federally qualified health clinics, school systems, public health departments, Cooperative Extension, and after-school programs. In addition, open-ended responses were collected, providing further details on why a partner may use the program and opportunities for program enhancements.

However, the conclusions drawn from this study are not without limitations. This study was conducted only among community partners in NC and may not be generalizable to other settings. In addition, to minimize the time burden, given that community partners are busy and more burdensome interaction may impact recruitment, community partners were only shown a concept video with an overview of the virtual avatar program and

did not experience it firsthand. Although this approach is commonly used to estimate technology adoption, it is unknown if firsthand exposure to the program would have generated different or more variable responses.<sup>27,29</sup> Furthermore, although we used a previously validated survey with modifications that were face-validated by 2 pediatric registered dietitians, we did not conduct cognitive interviewing with the target audience to ensure the correct interpretation and intended response to the survey questions. We also surveyed community partners who work with a broad age range of children. This research highlights the real-world difficulties encountered in community intervention development. Many community partners do not focus exclusively on a single age group, suggesting a need for community interventions that can be scaled or adapted to simultaneously address the needs of multiple age groups. Finally, this study focused on identifying the organizational characteristics of community organizations that may be interested in the virtual avatar NE program and not on the personal characteristics of the respondents. Although the survey questions focused on organizational characteristics, individual respondent characteristics may influence responses. However, in previous assessments of digital technology adoption among health professionals (therapists and nurses), age and gender were not significant predictors of adoption.<sup>24,37</sup> However, we cannot determine if these individual characteristics would have influenced interest in and potential adoption of the virtual avatar program.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

To our knowledge, few studies have examined interest in a virtual avatar-based NE program among community partners and factors that could influence the adoption or future program use. This study highlights the need to clearly demonstrate the advantages of avatar-based virtual nutrition programs over existing programs for youth-serving community partners, as those who perceived the virtual avatar program as a relative

advantage were more likely to intend to use the program in the future. There is also a need to help community partners assess the compatibility of a new innovative program with current organizational needs, norms, and existing programs. The virtual avatar program shows promise for future use among community partners if they perceive it to be a relative advantage over current offerings, with high compatibility with organizational values. These data support that future research and program development consider further testing the virtual avatar program with youth and families while considering the factors identified in this study to help design the optimal program with community input and to help community partners disseminate virtual avatar programs into community-based settings.

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