

Evaluation of format preference and effectiveness of vodcasts for recipe demonstrations and nutrition education

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Abstract: Video podcasts, termed “vodcasts”, offer viewers a visual aid when learning about health and nutrition. Although there are many vodcasts featuring cooking demonstrations, little is known about their effectiveness in the field of nutrition or which format of communication technology is preferred. The purpose of this study was to determine which vodcast format was best suited to increase nutrition knowledge and interest as well as intention to use a cancer-preventing food. Participants were recruited from a community cancer center in the Midwest region of the United States. The convenience sample received either an email or an information card from the center that contained a link to the online survey instrument. The survey consisted of initial questions, the vodcast link, and access to final survey questions after viewing the vodcast. Participants (n=120) viewed one of three vodcast formats and evaluated length, nutrition information, and cooking instruction. Nutrition knowledge and the effect each video had on participants’ interest and intention to use the food were also measured. A vodcast containing four to six nutrition facts and demonstrating a recipe was preferred by most individuals ($X^2=10.954$, $df=4$, $P=0.027$). Participants were indifferent regarding length preference. All formats were successful in increasing interest in cancer-preventing foods and delivering nutrition information to participants. Vodcasts containing a recipe demonstration may offer a convenient method of delivering nutrition information to community members.

Keywords: community, dietetics, podcasts

Introduction

Podcasting is recognized as an efficient educational technology, and podcasts can be easily downloaded to a computer or mobile device.¹ The term “podcasting” was created in 2004 by combining Apple’s “iPod” (Apple Inc., Cupertino, CA, USA) with “broadcasting”. Podcasts can be defined as “a multimedia digital file made available on the Internet for downloading.”² Video podcasting has been termed “vodcasting” and is defined as “clips produced originally for television viewing.”³ Vodcasts are portable and can be downloaded and watched anywhere and anytime. They are thought to enhance learning because of their multimodal presentation.⁴

Vodcasts present material in a way for students, patients, and the general public to learn. They are used in classrooms and lectures to present educational materials,⁴ and, by using a variety of instructional methods, they differentially influence student understanding.⁵ There are also many public vodcasts that focus on health and nutrition behavior change through campaigns, lectures, and cooking. US First Lady Michelle Obama’s Let’s Move Campaign includes podcasts, vodcasts, and activities to fight childhood obesity. The Center for Disease Control and United States Department of Agriculture have used vodcasts to

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educate the public.⁶ There are many vodcasts featuring cooking demonstrations, although little is known about their effectiveness or the format components that are preferred by the general population. Many studies have investigated the learning of high school or college-level students through vodcasting in the classroom settings.⁷⁻⁹ These studies have measured learning with vodcasting, but have not looked at format and its relationship to learning effectiveness.

Educational vodcasts concerning nutrition, recipe development, or cooking techniques should target those preparing meals.¹⁰ Vodcasts allow viewers hands-on learning while preparing meals with the video's instructor in the viewer's own kitchen.^{11,12} Comparison of this type of learning to demonstration learning concluded that hands-on learning had higher recall scores.¹³

Proper nutrition is essential for cancer prevention, and is important during and after treatment. With limited resources at community cancer centers, more research is needed to determine the best strategies for effective cancer interventions and nutrition education. It has been shown that traditional methods such as journals and conferences were not proven to be effective in changing behavior.¹⁴ Previous research has noted that vodcasts can influence learner understanding of concepts, yet specific structure to a vodcast's format for optimal learning has not been identified.^{5,15}

Objective

The purpose of this study was to examine three types of cooking demonstrations (ingredient focus and cooking techniques, quick recipe demonstration, and full recipe demonstration) to determine the effectiveness and preference of the vodcast formats.

The research questions addressed in this study were:

1. What format components do individuals prefer to see in nutrition and cooking vodcasts?
2. Is there a statistically significant difference among the three formats in terms of their: a) ability to facilitate learning of key nutrition components; b) participants' interest in consuming cancer preventing foods; and c) participants' intention of using cancer preventing foods?

Methods

Recruitment

Participants were recruited from a community cancer center in the United States' Midwest area. The center serves approximately 200 patients a day. The convenience sample included cancer patients, cancer survivors, friends and family of patients, as well as volunteers and employees at the center.

These participants received either an email from the cancer center's dietitian or an information card when they arrived at the center to watch the vodcast, and they completed the online survey at either home or at one of the computers in the resource center at the community cancer center. To increase the response rate, participants at the conclusion of the survey were directed to an optional survey where they could submit their email addresses into a drawing for one of three gift cards to a local retail store. This study received approval from the Institutional Review Board for use with human subjects.

Study design

Participants were assigned to view one of three vodcast formats on one nutrition topic. The topics developed for this study were wheat berries, kale, and beans, which are foods that research has identified to be beneficial for cancer patients and survivors.¹⁶⁻¹⁸ The same three formats were used for all three nutrition topics and were defined as: 1) ingredient focus and cooking techniques; 2) quick recipe demonstration; and 3) full recipe demonstration. The vodcasts for format 1 were between 2 and 3 minutes in length, the vodcasts for format 2 were 4-6 minutes in length, and the vodcasts for format 3 were 5-11 minutes in length. During each vodcast, four to six nutrition facts were presented. Format 1 focused on the food itself as well as details of how to buy, cut, cook, and store the ingredient featured. Formats 2 and 3 included these facts and also demonstrated a recipe. The major difference in these formats was that format 2 did not include measuring or cutting whereas format 3 illustrated those cooking techniques.

The three formats on one topic (eg, wheat berries) were available to view at the same time; however, participants only received one specific web link, which directed them to the survey and their assigned vodcast format. Formats were assigned at random using the cancer center email list and sent via email to each participant. Additional participants were gathered at the cancer center and given an information card containing the survey web-link address. In order to receive similar numbers for each format, the recruitment cards and emails were organized to allow every third person to view the same video podcast format. Only one topic was available for a 4-week period before recruiting participants to watch a format on the next topic. The web-link directed participants to the informed consent webpage, at which participants needed to agree to participate prior to entering the online survey.

Instrument

The survey instrument consisted of initial questions, the link to the vodcast, and then access to final survey questions

after viewing the vodcast. The first part of the online survey measured their interest in and usage of the food item that would be presented in the vodcast. Interest was measured on a 4-point Likert scale (1= not very interested, 4= very interested). Each vodcast was imbedded into its own survey, which the participants viewed after the initial survey questions. The questions on interest in and usage of the food item were repeated after participants viewed the vodcast to determine which format led to an increased interest or intention to use the food item. Participants were also asked quiz-type questions on the material that was presented in the vodcast to determine if the video was effective in delivering nutrition information. The quiz-type questions were asked only after the vodcasts in order to minimize any possible reactive effect of testing due to pretest. Having a pretest sometimes can cause participants to be more sensitized to the experimental treatment, ie, in this study, the content of the vodcasts. Therefore, in order to understand effectiveness of vodcast formats in delivering nutrition knowledge and cooking information, this study used the one-shot case study design in which participants are exposed to an experiment and its response is measured once. Such a design can be adopted for exploratory research to avoid pretest sensitization.¹⁹ After viewing the vodcast, participants were asked about their intention of using the featured food using a 4-point Likert scale (1= not very interested, 4= very interested). Lastly, participants evaluated each vodcast's format components, including length, amount of nutrition information, and amount of cooking technique.

Data analysis

Data analysis was performed using SPSS version 18 (SPSS Inc., Chicago, IL, USA) and included chi-square test, analysis of variance (ANOVA) with Gabriel's post hoc test, and paired sample *t*-tests. Gabriel's post hoc test was used due to the fact that the groups were unequal in size.²⁰ Chi-square test was used to determine which format components participants preferred to see in food and nutrition vodcasts. Each format component was analyzed separately among formats 1, 2, and 3. Significance for statistical analysis was set at the $P < 0.05$ level.

ANOVA was used to compare nutrition knowledge quiz scores among the three vodcast formats for each featured food. Answers were converted to a total score out of ten for analysis. Once it was determined that a significant difference existed between the means, Gabriel's post hoc test was used to determine which means differed.

A paired sample *t*-test was used to measure the change in interest by comparing pre- and post-survey questions.

Responses for the participants' intentions to use the featured food were combined by format type and ANOVA was used to evaluate which video format best inspired participants to cook with the featured food.

Results

A total of 245 surveys were started from cancer center patients and community members. Many participants completed the initial survey questions but did not complete the survey questions after the vodcast. These incomplete surveys were discarded; therefore, only 120 were deemed usable for data analysis. Of the 120 participants, 41 watched the ingredient focused format (format 1), 39 watched the short recipe demonstration (format 2), and 40 watched the long recipe demonstration (format 3) (refer to Table 1 for demographic characteristics for all participants).

A series of questions regarding format components were asked of participants and analyzed to answer research question 1. The chi-square test results showed that there was no significant difference for length preference among the formats. Table 2 displays the responses for format components.

Participants were also asked about the amount of nutrition information they prefer to see in a vodcast. Results from the chi-square test showed significant difference ($\chi^2=10.954$, $df=4$, $P=0.027$). The majority of participants, 54% and 61% who viewed format 1 and 2, respectively, responded that the usefulness would be no different if more nutrition information

Table 1 Frequency distribution of the sex, age, and race of vodcast viewers (n=120)

Variables	Total participants n=120 n (%)	Format 1 n=41 n (%)	Format 2 n=39 n (%)	Format 3 n=40 n (%)
Sex				
Male	13 (10.8)	7 (17)	2 (5)	4 (10)
Female	107 (89.2)	34 (83)	37 (95)	36 (90)
Age (years)				
18–29	21 (17.5)	9 (22)	10 (26)	2 (5)
30–39	13 (10.8)	5 (12)	5 (13)	3 (8)
40–49	11 (9.2)	2 (5)	3 (7)	6 (15)
50–59	28 (23.3)	11 (27)	9 (23)	8 (20)
60–69	26 (21.7)	9 (22)	5 (13)	12 (30)
70+	13 (10.8)	4 (10)	5 (13)	4 (10)
No response	8 (6.7)	1 (2)	2 (5)	5 (12)
Ethnicity				
African American	6 (5)	2 (5)	2 (5)	2 (5)
Hispanic	3 (2.5)	1 (2)	1 (3)	1 (3)
White	111 (92.5)	38 (93)	36 (92)	37 (92)

Table 2 Vodcast viewers' perception of usefulness of changes to format components

Change	Usefulness	Format 1 n=41 n (%)	Format 2 n=39 n (%)	Format 3 n=40 n (%)	X ²	df	P
Shorten the vodcast	More useful	1 (3)	1 (3)	2 (5)	0.520	4	0.972
	No difference	23 (56)	22 (56)	22 (55)			
	Less useful	17 (41)	16 (41)	16 (40)			
Lengthen the vodcast	More useful	16 (39)	5 (13)	9 (22)	8.75	4	0.067
	No difference	21 (51)	25 (64)	22 (56)			
	Less useful	4 (10)	9 (23)	9 (22)			
More nutrition information	More useful	18 (44)	10 (26)	12 (30)	10.95	4	0.027*
	No difference	22 (54)	24 (61)	18 (45)			
	Less useful	1 (2)	5 (13)	10 (25)			
Less nutrition information	More useful	2 (5)	7 (18)	10 (25)	5.87	4	0.208
	No difference	18 (44)	17 (44)	15 (38)			
	Less useful	21 (51)	15 (38)	15 (38)			
More cooking instruction	More useful	24 (59)	11 (28)	6 (15)	24.42	4	<0.001*
	No difference	17 (41)	21 (54)	22 (55)			
	Less useful	0 (0)	7 (18)	12 (30)			
Less cooking instruction	More useful	0 (0)	2 (5)	4 (10)	8.43	4	0.077
	No difference	18 (44)	24 (62)	21 (52)			
	Less useful	23 (56)	13 (33)	15 (38)			

Note: *These values are below the level of significance, which is $P < 0.05$.

was provided. Of the 40 participants that viewed format 3, 45% felt that more nutrition information would have no effect in learning while 30% felt more information would be more useful. The effect of providing less nutrition information was also analyzed. Results from the chi-square test showed no significance among formats. A summary of the participants' responses can be found in Table 2.

Results from the chi-square test showed significant differences among formats regarding usefulness of more cooking instruction ($X^2=24.419$, $df=4$, $P=0.0001$). The majority of format 1 viewers (59%) felt that more cooking instruction would be more useful to their learning, whereas the majority of format 2 (54%) and format 3 (55%) viewers responded that more cooking instruction would make no difference in effectiveness of these formats. After measuring the effect that less cooking instruction would have on each vodcast format, there were no significant differences among formats. A breakdown of each format and format component are shown in Table 2.

Research question 2a, regarding the facilitation of learning key nutrition components from each vodcast format, was measured through nutrition questions that participants answered after viewing the vodcast. The mean scores out of ten for formats 1, 2, and 3 were 8.4, 8.8, and 7.8, respectively. Although all three mean scores were acceptable, ANOVA analysis found a significant difference ($F[2,114]=3.29$, $P=0.041$) and Gabriel's post hoc test indicated that the significant difference was between formats 2 and 3

(mean difference =1.028, $P=0.035$). Tables 3 and 4 display the scores as a percentage for all three formats.

To answer research question 2b, regarding participants' interest in consuming cancer-preventing foods, participants were asked about their interest in the featured food as well as their interest in cooking with that food both before and after viewing the vodcast. The results were analyzed using a paired sample t -test. All three formats showed increased scores for the interest in the featured food and the participants' interest in cooking with the food. The difference between the two means before and after viewing the vodcast were significantly increased for formats 1 and 3. Format 2 showed an increase in the means for each variable, but only the increase in the interest in the food item, and not the increase in interest in cooking with the food item, was significant. Interest scores are shown in Table 5.

After viewing the vodcast, participants were asked questions pertaining to their intention to use the food and

Table 3 Nutrition knowledge scores of vodcast viewers

Format	Mean ¹	SD	F	df (Between, within groups)	P
1 (n=41)	8.39	0.30	3.29	2(117)	0.041*
2 (n=39)	8.84	0.23			
3 (n=40)	7.81	0.30			

Notes: ¹Scores based on ten points possible. *These values are below the level of significance, which is $P < 0.05$.

Abbreviation: SD, standard deviation.

Table 4 The difference of nutrition knowledge scores between formats

Format	Mean difference	Standard error	P
1 versus 2	0.453	0.399	0.590
1 versus 3	0.575	0.396	0.384
2 versus 3	1.020	0.401	0.035*

Note: *These values are below the level of significance, which is $P < 0.05$.

recipe that they viewed, which helped answer research question 2c. Results from ANOVA showed no significant difference in any vodcast format's ability to prompt intention of using the food or cooking the recipe demonstrated. The mean scores for formats 1, 2, and 3 for likeliness to cook with the featured food were 2.70 (standard deviation [sd] =1.05), 2.69 (sd =1.00), and 2.65 (sd =0.92), respectively. Mean scores for likeliness to cook the demonstrated recipe were 2.43 (sd =1.04), 2.44 (sd =1.17), 2.50 (sd =1.03), respectively.

Discussion

Vodcasts are becoming increasingly popular as a method to deliver nutrition information, including cooking demonstrations, to the general public.⁴ However, previous research has not investigated the type of format that is best for effective learning through vodcasts.^{8,9} This study tailored its research questions to find preferred video components and the success of recipe demonstrations on viewer knowledge, interest, and intention of using cancer-preventing foods.

Previous literature indicates that the preferred length for digital delivery in education was 2–9 minutes long.¹¹ In this study, the 120 participants watched vodcasts that were 2–3,

4–6, or 5–11 minutes in length. Participants in the three format groups had no significant preference for vodcast length. The results of this study support previous research¹¹ as the majority of participants felt that a shorter or longer vodcast would not be any more or less useful in learning.

After scoring nutrition-knowledge questions, there was a significant difference between formats 2 and 3. Overall, the results showed that format 2 was the most effective in facilitating learning of key nutrition facts, although formats 1 and 3 did receive acceptable scores. During the vodcasts, four to six nutrition facts were presented. The vodcasts' use of both audio and visual presentation effects likely enhanced the participants' learning in all formats.⁴

Format 1 as well as format 3 significantly increased participant interest in a cancer preventing food as well as interest in cooking with that food. Format 2 significantly increased interest in the featured food, whereas the scores for interest to cook with the food item increased but were not significant. Videos that are ingredient focused or are full recipe demonstrations both have the potential to develop interest in foods. Ongoing health and nutrition campaigns that post information on iTunes (Apple Inc.)⁶ should continue to vary their cooking demonstration vodcasts if they are seeking to increase interest in healthy food items. The interest scores for all three formats did increase post-vodcast. The increase, although not necessarily significant, indicates that all three formats were successful in inspiring participants to buy and cook these cancer-preventing foods.

Limitations

Some of the limitations to this research should be noted. The study was open to all cancer center patients and community members. Although the study was open to a large number of people, the sample size was still relatively small, with a high percentage of female and Caucasian participants. It is possible that the high loss of follow-up of participants who started but did not finish the survey may have been due to the technology involved. The majority of the participants that started but did not finish the survey did complete the initial questions but, after viewing the video, did not complete the remainder of the survey. Participants may not have had access to a computer with the software necessary for viewing the vodcast. This loss of follow-up may have affected internal validity. The applicability of results from patients and family members from a community cancer center setting may be limited. However, vodcasts that target improvement of disease risks, symptoms, or overall health may benefit from the results of this study.

Table 5 Participants' interest in the featured food by vodcast format

	Format	Pre-vodcast	Post-vodcast	
Interest in the featured food	1 (n=41)	2.3	2.8	$t = -3.856, df = 40, P < 0.001^*$
	2 (n=39)	2.5	3.0	$t = -3.582, df = 39, P < 0.001^*$
	3 (n=40)	2.3	2.7	$t = -3.798, df = 39, P < 0.001^*$
Interest in cooking with featured food	1 (n=41)	2.3	2.8	$t = -4.398, df = 40, P < 0.001^*$
	2 (n=39)	2.7	2.8	$t = -1.780, df = 39, P = 0.083$
	3 (n=40)	2.3	2.7	$t = -3.085, df = 38, P = 0.004^*$

Notes: A 4-point Likert scale was used: 1 = not very interested, 4 = very interested. Pre- and post-vodcast are mean values. *These values are below the level of significance, which is $P < 0.05$.

The quality of the podcasts/vodcasts used in nutrition education may have an impact on their effectiveness. Due to minimal funding for this study, the vodcasts made in this study were not professionally recorded nor did they contain any professional sound or lighting. The videos may be more appealing to viewers if they were professionally created. Parson et al¹² surveyed students on podcasts/vodcasts that were made either professionally or nonprofessionally. There was a 55.5% increase in the amount of viewers that wanted to see podcasts/vodcasts used in the future that were made professionally compared to those that were made nonprofessionally.

The researchers point out that the stage of change a participant is in may have an effect on their interest. It is likely that, if participants had very little interest prior to watching the video, a short and less detailed video would be more preferred because they would not want to see much information on a topic that did not interest them. If participants had some initial interest in the featured food, they may prefer a more detail step-by-step recipe demonstration.²¹ It is noted that participants of this study preferred to view a recipe demonstrated in the vodcast, rather than ingredient focused information without a recipe.

Implications for research and practice

Findings in this study show positive results for vodcasting nutrition education in the community setting. All three formats were successful in participants' correctly responding to questions relating to the application of recently acquired nutrition information. Additionally, all three formats were successful in increasing interest in cancer-preventing foods. Nutrition professionals may find the use of vodcasts useful as a method to increase interest in new food items for their clients. Vodcasts offer a method of delivering nutrition information to community members and clients that is convenient and accessible at any time. The authors do caution nutrition professionals that access to a computer, and most likely the Internet, is necessary for community members to view vodcasts.

Participants in this study did not have a preference in video length, although the videos ranged from 2 to almost 12 minutes long. Practitioners should note that vodcast viewers showed a desire to view a vodcast with a recipe demonstration in the video. Format 2 had the highest mean score on the nutrition-facts quiz. This preferred vodcast was 4–6 minutes in length and contained a recipe demonstration with four to six nutrition facts presented.

The results of this study show the positive effect that vodcasts can have on delivering nutrition information to consumers through various formats. The specifics of the vodcast's format itself may influence a viewer's nutrition knowledge or spark interest in various food items. A 4- to 6-minute vodcast that demonstrated a recipe while presenting four to six nutrition facts was shown to be the most successful format in increasing interest in cancer-preventing foods and in terms of application of recently acquired nutrition knowledge. Nutrition professionals such as registered dietitian nutritionists may wish to explore vodcasts as a vehicle to increase learning, awareness, and interest in healthy foods within the community.

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References

- Harris H, Park S. Educational usages of podcasting. *Br J Educ Technol*. 2008;39(3):548–551.
- Zelin RC, Baird JE. Using publicly available podcasts and vodcasts in the accounting curriculum: suggestions and student perceptions. *Academy of Educational Leadership Journal*. 2012;16(1):87–98. Available from: <http://www.thefreelibrary.com/Using+publicly+available+podcasts+and+vodcasts+in+the+accounting...-a0289620948>. Accessed August 5, 2014.
- Brown A, Green TD. Video podcasting in perspective: The history, technology, aesthetics, and instructional uses of a new medium. *Journal of Educational Technology Systems*. 2007–2008;36(1):3–17.
- Garver MS, Roberts BA. Flipping and clicking your way to higher-order-learning. *Marketing Education Review*. 2013; 23(1):17–22.
- Moryl RL, Jiang S. Using economic podcasts to engage students of different learning styles. *International Atlantic Economic Society Journal*. 2013;19(2):201–202.
- White S. Media social action campaigns: A theoretical approach. *Media Psychology Review*. 2014;7(1).
- Cassidy ED, Britsch J, Griffin G, Manolovitz T, Shen L, Turney L. Higher education and emerging technologies: Student usage, preferences, and lessons for library services. *Reference and User Services Quarterly*. 2011;50(4):380–391.
- Jarvis C, Dickie J. Podcasts in support of experiential field learning. *Journal of Geography in Higher Education*. 2010;34(2):173–186.
- Lazzari M. Creative use of podcasting in higher education and its effect on competitive agency. *Computers and Education*. 2009; 52:27–34.
- Boulos MN, Maramba I, Wheeler S. Wikis, blogs and podcasts: A new generation of web-based tools for virtual collaborative clinical practice and education. *BMC Med Educ*. 2006;6:41.
- Ekberg J, Timpka T, Angbratt M, et al. Design of an online health-promoting community: negotiating user community needs with public health goals and service capabilities. *BMC Health Serv Res*. 2013;13:258.

12. Parson V, Reddy P, Wood J, Senior C. Educating an iPod generation: undergraduate attitudes, experiences and understanding of vodcast and podcast use. *Learn Media Technol.* 2009;34(3):215–228.
13. Hearn MK, Kopp Miller B, Nelson D. Hands-on versus learning by demonstration at three recall points in university students. *OTJR: Occupation Participation and Health.* 2010;30(4):169–171.
14. Ciliska D, Robinson P, Armour T, et al. Diffusion and dissemination of evidence-based dietary strategies for the prevention of cancer. *Nutr J.* 2005;4:13.
15. Ng'ambi D, Lombe A. Using podcasting to facilitate student learning: A constructivist perspective. *J Educ Techno Soc.* 2012;15(4):181–192.
16. Dalton SM, Taspell LC, Probst Y. Potential health benefits of whole grain wheat components. *Nutr Today.* 2012;47(4):163–174.
17. Tang L, Zirpoli GR, Jayaprakash V, et al. Cruciferous vegetable intake is inversely associated with lung cancer risk among smokers: a case-control study. *BMC Cancer.* 2010;10:162.
18. Lin J, Zhang SM, Cook NR, et al. Dietary intakes of fruit, vegetables, and fiber, and risk of colorectal cancer in a prospective cohort of women (United States). *Cancer Causes Control.* 2005;16(3):225–233.
19. Churchill GA, Iacobucci D. *Marketing Research: Methodological Foundations.* 10th ed. Mason (OH): South-Western Cengage Learning; 2009.
20. Field A. *Discovering Statistics using SPSS.* 3rd ed. Thousand Oaks (CA): SAGE Publications Inc.; 2009.
21. Logi-Maclver L, Piacentini MG. Towards a richer understanding of consumers in social marketing contexts: Revisiting the stage of change model. *J Mark Manage.* 2011;27(1/2):60–76.

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