

Exploring the Need for Web-Based Training among School Nutrition Directors

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Please note that this study was published before the implementation of Healthy, Hunger-Free Kids Act of 2010, which went into effect during the 2012-13 school year, and its provision for Smart Snacks Nutrition Standards for Competitive Food in Schools, implemented during the 2014-15 school year. As such, certain research may not be relevant today.

ABSTRACT

Objectives

Web-based training (WBT) has the potential to meet the diverse learning needs of school nutrition directors (SNDs). The overall objective of this needs assessment targeting SNDs was to explore their needs and interests in utilizing WBT.

Methods

Researchers developed and administered two instruments: 1) a qualitative structured-interview questionnaire to assess SNDs' use of computers, experiences in Web-based education, and perceived acceptance to WBT, and 2) a quantitative survey to assess perceived knowledge, skill, training, and interests in utilizing WBT within 14 established functional areas. The sampling plan accounted for SNDs who had attended a 5-day Orientation to Child Nutrition Management Seminar (attendees) and those who had not attended (non-attendees).

Results

Participants included 42 SNDs (21 attendees and 21 non-attendees) with an average of 3.1 (SD+4.6) years of director experience. There were no discernable response differences between attendees and non-attendees. The majority of SNDs have the technology infrastructure needed to support WBT at work and at home. Thirty-eight (90%) reported interest in utilizing WBT to acquire knowledge, and 40 (95%) reported interest in WBT for practice activities to further improve skills. Benefits of WBT included convenience, opportunities to study unfamiliar areas in more detail and practice skills, ability to gain knowledge, and accessibility of information. Barriers included lack of instructor/student interaction or feedback to questions, on-site interruptions or time, technology problems, and the motivation or discipline needed to complete assignments. Functional areas with the highest ranking for WBT format included *Financial Management and Record Keeping and Nutrition and Menu Planning*.

Application to Child Nutrition Professionals

As the potential to integrate WBT into current educational offerings is further investigated, it is important to begin WBT module development with competency-based functional areas as prioritized by SNDs and to address perceived benefits and barriers during development, field testing, and marketing of WBT modules.

INTRODUCTION

School nutrition directors, supervisors and/or coordinators (SNDs) must function under a complex set of job responsibilities in order to successfully execute their role in managing school nutrition programs (Rainville & Carr, 2001). A variety of traditional educational opportunities including conferences, workshops, specialized training, and satellite seminars/teleconferences are available to promote knowledge and skill development for SNDs. However, due to the geographical dispersion and diverse learning needs of SNDs, they are not all able to take full advantage of the current educational opportunities. Since the potential educational opportunities utilizing online learning and Web-based training (WBT) are abundant, it is important to explore the potential of developing and providing WBT opportunities for SNDs (Martin & Parks, 2006).

In the past several years, online learning has gained tremendous popularity with a proliferation of both online course offerings and student enrollment (Allen & Searman, 2006). As suggested by Dryden and Vos (2001), interactive information technology including the Internet, two-way conferencing, and multimedia interactive study is transforming distance education and creating a learning revolution. While the advantages and disadvantages of online learning programs are greatly debated in the literature (Allen & Searman, 2006; Block & Dobell, 1999; Cobb & Mueller, 1998; Jones & Fitzgibbon, 2002; Mills, Fisher, & Stair, 2001), no known researchers have studied the unique WBT needs of SNDs. Furthermore, although the continuing education needs and training needs of school nutrition program professionals (Conklin, Sneed, & Martin, 1995), the information seeking behaviors of school nutrition program directors in small districts (Conklin, Lambert, & Lambert, 2005), and the training needs of school nutrition site managers (Sullivan, Harper, & West, 2002) have all been examined; none of this research specifically focused on WBT.

When conceptualizing the possibility of developing and offering WBT to inform, engage, and assess learning outcomes for SNDs, several potential challenges exist. First, there is not a designated education level, universal set of job qualifications, or common continuing education requirement for SNDs. The SNDs education level may range from high school to doctorate degrees in philosophy or education (*School nutrition compensation and benefits report*, 2006), resulting in the potential for a large variation in a SNDs' familiarity, comfort level, and interest in online learning technologies. Secondly, as mentioned previously, SNDs are required to perform under a complex set of functional areas (Rainville & Carr, 2001). There may be a greater need for training in certain areas, and some functional areas may be better accommodated in a WBT format. Therefore it is important to allow SNDs to self-assess their training needs and interests in WBT for each functional area. Thirdly, as the aging cohort of SNDs begin to retire, there is a need to recognize and accommodate the learning preferences for the next generation of younger SNDs (Conklin et al., 2005; Conklin et al., 1995).

Learning Theory

The Modes of Learning Theory suggests that instruction must be designed to meet different modes of learning including accretion, tuning, and restructuring (Rumelhart & Norman, 1978). Briefly, accretion is the addition of new knowledge to existing memory, tuning is the formation of new conceptual structures or schema, and restructuring is the adjustment of knowledge to a specific task usually through practice. The central theme of the Modes of Learning Theory is that the training experience of learners must be realized and that there is typically not one single approach that meets the need of all intended learners. The constructs of this theory provided the conceptual framework for sampling methodology and questioning route for the qualitative phase of this research to explore how WBT may best accommodate the learning needs of SNDs. For example, as suggested by this theory, it was hypothesized that willingness to participate and perceived benefits and barriers of WBT among SNDs who had recently experienced intensive training may differ from those who had not attended a similar training. Furthermore, differences were anticipated related to WBT targeting different modes of learning; therefore, our qualitative questions distinguished knowledge building WBT (accretion and tuning) from skill building WBT (restructuring).

Purpose and Objectives

Prior to committing the resources to develop, test and deliver WBT modules for SNDs, it was important to conduct a WBT needs assessment. The two primary objectives of this needs assessment research targeting SNDs were to: 1) qualitatively explore their need and interest in utilizing WBT, and 2) quantitatively determine their perceived knowledge, skill, training, and interest in utilizing WBT within the 14 established functional areas.

METHODOLOGY

Survey Instruments

Since no known published research or standardized tool existed to address the research objectives, the researchers developed two instruments: 1) a qualitative structured-interview questionnaire, and 2) a quantitative functional area survey. Content validity was established by an expert review panel including three doctoral-level registered dietitians and two school nutrition directors (SNDs). The panel gave feedback on the content, clarity, and complexity of both instruments. The two instruments underwent a series of reviews resulting in several changes including modifications in the question and answer choices, clarification in functional area definitions, simplification in terminology, and adjustments in overall flow and survey layout.

Face validity was then established with a convenience sample of three SNDs who pilot tested the instruments. They completed both instruments and provided feedback regarding clarity of questions, response categories,

and the instruments' format, flow, and length. As a result of the pilot test, one redundant question was eliminated and minor changes were made to the wording of several questions.

Study Design and Data Collection

This research was approved by The University of Southern Mississippi's Institutional Review Board. In applying the Modes of Learning Theory, it was hypothesized that learning needs for SNDs who had attended and completed the National Food Service Management Institute (NFSMI) 5-day Orientation to Child Nutrition Management Seminar (attendees) may differ from those who have not attended (non-attendees). The NFSMI 5-day orientation is an intensive workshop focusing on competency development in the 14 functional areas for SNDs. (These functional areas are illustrated in Table 4). It was theorized that since attendees had significant classroom exposure to NFSMI's educators and materials, they may identify more benefits and less barriers to continuing their education in an online format and they may be more open and accepting of WBT targeting higher modes of learning, as compared to non-attendees. Therefore the qualitative phase of this study was designed to evaluate differences between 5-day orientation attendees and non-attendees.

In order to evaluate potential differences between attendees and non-attendees, two approaches were used to identify participants. For the attendees, contact information for all 188 participants in the NFSMI 5-day orientation during 2004-2006 was obtained from the NFSMI database. Since the 5-day orientation targets new and aspiring directors, the majority of attendees had less than five years of director experience. Furthermore, approximately 90% of the attendees from 2004-2006 resided in six states including Mississippi, Michigan, Louisiana, Indiana, Florida, and Colorado. In order to closely match the demographics for the non-attendees, the state agency directors from these six states were asked to provide a contact list of SNDs with less than five years of experience. These state agency directors provided a total of 92 contacts. The two lists were cross-referenced with one another to avoid duplicates. On the outset of this project, it was determined to randomly sample each list for a minimum of 20 attendees and 20 non-attendees, and if new responses continued to emerge or overall themes were unidentifiable, additional SNDs would be surveyed to achieve data saturation.

A research packet containing a letter that detailed the purpose of the research, the Functional Area Survey, and a NFSMI-addressed stamped envelope was initially mailed to the SNDs. Approximately 5-7 days later the SNDs were contacted via telephone and asked to participate. Those who participated in the qualitative structured-interview were also asked to complete the Functional Area Survey and return it in the envelope provided. Approximately 5-7 days following completion of the telephone interview, participants were mailed a reminder letter to return the Functional Area Survey.

Data Analyses

During the qualitative structured-interview, the interviewer recorded hand-written field notes. Immediately following each interview the interviewer expanded and typed the field notes. Two independent researchers then thematically categorized, counted, and summarized the participants' responses. The two researchers then met to review findings and reach consensus on the coding of responses, major themes, and counts. The Functional Area Survey responses were analyzed using descriptive statistics, including frequencies, percents, means and standard deviations (SD).

RESULTS AND DISCUSSION

Sample Characteristics

Data saturation was adequately achieved in the resulting sample of 42 school nutrition directors (SNDs), including 21 attendees and 21 non-attendees. The orientation attendees had an average of 3.2 (SD+2.5) years of director experience while the non-attendees had on average 2.9 (SD+6.0) years of director experience. Table 1 indicates the SNDs' level of education, their schools' student enrollment, and their access to computers and the Internet at their place of employment and at home.

Table 1. Characteristics of School Nutrition Directors, Their Schools, and Their Computer and Internet Access (n=42)

	Number (%) Orientation Attendees(n=21)	Number (%) Non-orientation Attendees (n=21)
Level of education		

Less than high school	0 (0)	1 (5)
High school graduate or GED	4 (19)	6 (29)
Some college or specialized training	4 (19)	4 (19)
2-year college graduate	2 (10)	1 (5)
4-year college graduate	4 (19)	6 (29)
Some graduate school	1 (5)	0 (0)
Graduate degree	6 (29)	3 (14)
Student enrollment		
2,799 or less	5 (24)	18 (86)
2,800 to 9,999	8 (38)	2 (10)
10,000 to 19,000	4 (19)	1 (5)
20,000 to 44,999	2 (10)	0 (0)
45,000 to 64,999	2 (10)	0 (0)
65,000 or greater	0 (0)	0 (0)
Computer use at work		
Access to a computer at work	21 (100)	19 (90)
Access to own computer at work	19 (90)	15 (71)
Access to the Internet at work	21 (100)	19 (90)
Computer use at home		
Access to a computer at home	21 (100)	17 (81)
Access to the Internet at home	20 (95)	17 (81)

On average the orientation attendees spent about 21 (SD+10.6) hours each week on their computer at work and 4.1 (SD+3.4) hours each week on their computer at home, while the non-attendees spent about 13.7 (SD+10.8) hours each week on their computer at work and 4.1 (SD+5.4) hours each week on their computer at home. These findings reveal that the majority of SNDs have access to the technology infrastructure needed to support WBT and spend a significant amount of their work time on computer-related activities.

Qualitative Structured-Interview Results

In applying the Modes of Learning Theory, the anticipated differences among orientation attendees and non-attendees were not confirmed. When comparing the responses from attendees and non-attendees, there were no differences between the willingness to participate in knowledge building versus skill building activities, and no discernable differences between the number or types of benefits and barriers identified related to Web-based training (WBT). Therefore, the results are reported as one sample.

In the first set of questions, SNDs were asked to report participation in any previous WBT, and to subsequently discuss what they liked and disliked about the WBT. Sixteen (38%) SNDs, reported participation in some form of previous WBT. When questioned about specific forms of WBT participation, 10 (24%) had communicated with an instructor, five (12%) reported contact with other students via bulletin boards or chat rooms, and 12 (29%) completed tests or assignments to earn professional certificates or college credit. The SNDs most liked being able to complete the training on their own time or at their own pace (n=10), not having to travel (n=6), and being able to study unfamiliar areas in more detail (n=2). There were relatively fewer dislikes reported which included lack of face-to-face interaction or instructor feedback (n=4), and technology or Web site navigation problems (n=3).

In the next set of questions, a scenario was described where SNDs were asked to think of a regulation they were required to implement or a competency they were required to meet in which they had received no or little education/training. When asked if they would be willing to receive computer-based training to acquire knowledge regarding this regulation or competency, 38 (90%) of the SNDs replied yes, one (2%) replied no and three (7%) were undecided. When asked to identify the benefits of utilizing WBT to acquire knowledge, the most frequently discussed topic involved convenience, specifically the convenience of time, travel and cost. The most frequently cited barrier was the lack of interaction with the instructor and other students. Table 2 illustrates a comprehensive summary of the identified themes, counts, and representative comments regarding the perceived benefits and barriers regarding WBT to acquire knowledge.

Table 2. Perceived Benefits and Barriers of using Web-Based Training to Acquire Knowledge (n=42)

<i>Theme</i>	<i>Count</i>	<i>Supporting Comments of Respondents</i>
Benefits		
Convenience: Time	16	<ul style="list-style-type: none"> • Completing it anytime of the day, being able to stop and go • Time saving because I can do it right from my own computer
Convenience: Travel	16	<ul style="list-style-type: none"> • Would not have to travel 30 minutes to the local college • We don't have the time or resources to plop on a plane and go to NFSMI
Convenience: Cost	5	<ul style="list-style-type: none"> • Cost, we would save time loss at work, airfare, and hotel • Would not have to pay for travel or a registration fee
Study unfamiliar areas in more detail or move at my own pace	18	<ul style="list-style-type: none"> • There are hectic days when you don't get anything done and then calmer days, this would allow you to work at your own pace • The ability to move fast through the easy stuff and dig a little deeper into the parts that are harder • I could keep re-reading the material until I understood it

Gain knowledge or get current information	13	<ul style="list-style-type: none"> • Increase my knowledge base and make me a better supervisor • Stay current with changing information
Accessibility of information	13	<ul style="list-style-type: none"> • More information is usually available online than in a classroom setting • Quicker to link to information online than looking in a manual
Barriers		
No instructor/student interaction or feedback to questions	20	<ul style="list-style-type: none"> • I would miss the one-on-one interaction with the students and instructors • If I did not understand something would I be able to ask questions right away and get an answer, or would there be a delay to getting my questions answered • If you are not understanding something and are not even in the ballpark and you keep moving forward, you would need some sort of feedback
Time or on-site interruptions	9	<ul style="list-style-type: none"> • Taking time away from work, but weighing the options it is still a better alternative than attending a class • The interruptions and distractions with completing it on-site
Computer system or technology issues	7	<ul style="list-style-type: none"> • Trouble navigating on the computer or Web site, not knowing what to do • If the computers are down, and they often are
Motivation or discipline	4	<ul style="list-style-type: none"> • You would need to discipline yourself to complete the course
Typing information	2	<ul style="list-style-type: none"> • Students wouldn't be as participatory because they would have to type everything out

In a second scenario, SNDs were asked to think of a situation in which they had received education on a regulation or competency and felt comfortable in their ability to meet the competency, but needed practice activities to further improve their skills. When asked if they would be willing to receive computer-based training for practice activities to further improve skills, 40 (95%) of the SNDs replied yes and two (5%) said no. The most frequently cited benefits of utilizing WBT for practice activities to further improve skills included the accessibility of current information and the opportunity to engage in hands-on practice of the skill. The lack of interaction with the instructor and other students was again the most frequently cited barrier. A comprehensive summary of the identified themes, counts, and representative comments regarding the perceived benefits and barriers regarding WBT for practice activities are displayed in Table 3.

Table 3. Perceived Benefits and Barriers of using Web-Based Training for Practice Activities to Improve Skill (n=42)

<i>Theme</i>	<i>Count</i>	<i>Supporting Comments</i>
Benefits		

Accessibility of current information	14	<ul style="list-style-type: none"> • Updated on newest regulation • All of the resources would be available in one place,
Practice the skill	14	<ul style="list-style-type: none"> • Hands on are always better than just talking about it, you often don't know if you understand until you actually do it • I could routinely log on and complete as many practice sessions as necessary until I felt comfortable with the information
Convenience	12	<ul style="list-style-type: none"> • Convenience is the main thing • The convenience of being able to do it on my own time
Self-directed learning	10	<ul style="list-style-type: none"> • Skip things you are familiar with and spend more time on things you are less familiar with, versus having to sit through it all • Tailor your learning and zero in on a competency in which you needed more training; we are strong in some areas and weak in other areas
No embarrassment factor	4	<ul style="list-style-type: none"> • If responses are not as they should be, there is not stigma or rejection • Sometimes you don't want everyone to know if you have a question
Barriers		
No instructor/student interaction or feedback to questions	14	<ul style="list-style-type: none"> • If you don't interpret the practice activities correctly, there is no one to let you know that what you have done is wrong • Having someone available to answer the questions that I may have
On-site interruptions or time issues	11	<ul style="list-style-type: none"> • In a seminar you are forced to do the activity, with Web-based you may think yeah, yeah I'll get to it, but then get frustrated with so many interruptions • If it is on a timeline or live teleconference it would be impossible for me to participate
Computer system or technology issues	5	<ul style="list-style-type: none"> • Technology problems • You would have to familiarize yourself with new communication techniques
Activities limitation	5	<ul style="list-style-type: none"> • I would prefer hands-on activities for practice • Lack of role playing activities

Overall, the major perceived benefits and barriers of WBT as identified by these SNDs, supports previously established advantages and disadvantages of online learning (Block & Dobell, 1999; Cobb & Mueller, 1998; Jones & Fitzgibbon, 2002; Mills et al., 2001). Some earlier research that examined the training needs of school nutrition program professionals found that many school nutrition program professionals did not use Web-based or email information or services (Conklin et al., 2005), and that instruction delivered via Internet/World Wide Web and interactive teleconferences was the least preferred training delivery mode (Sullivan et al., 2002).

Additionally, in a more recent study involving 95 SNDs from large school districts, the most preferred form of continuing education were meetings or conferences (94%) and professional development publications/articles (62%), whereas online course work/distance education (25%) and blended learning (28%) was less preferred (Nettles & Carr, 2007). These studies imply that interest in WBT may be low. However, our findings suggest the opposite, with an overwhelming majority expressing interest in utilizing WBT both to acquire knowledge (n=38; 90%) and for practice activities to further improve skills (n=40; 95%). Although several factors may contribute to this discrepancy, it is feasible to suggest that preference for WBT may in part be more related to a lack of availability and resulting exposure, and less related to a lack of interest. This prospect can be supported by the fact that while only 16 (38%) SNDs reported participation in some form of previous WBT, at least 38 (90%) reported they would be interested in participating. Furthermore, the overall thematic counts indicate that SNDs identified substantially more benefits (n=135) of WBT as compared to barriers (n=77).

Next, SNDs were asked to discuss their biggest barriers in trying to stay informed and educated in so many diverse areas. Lack of time (n=18) was the most frequently reported barrier to staying informed and educated in so many diverse areas. Although this finding is not entirely surprising, it is important for those developing WBT be aware and considerate of a SNDs' time demands. Earlier research suggests that SNDs do not want instruction that is just for fun (Carr, 2001). Rather they want instruction that enhances and extends existing knowledge, and instruction that incorporates new findings with further directions. One SND may have said it best when describing her WBT needs when she remarked, "Don't give us a lot of flowery information. It needs to be highly structured and organized. It needs to be very specific."

Keeping up with the changing information or prioritizing information (n=12) and lack of communication (n=8) were also frequently cited barriers. Paulsson and Sundin (2000) examined the obstacles in integrating WBT at work in order to enhance employees' level of competence. They concluded that when workload is high, employees do not have the time to study which areas are a priority. Furthermore, they found that specific times must be set aside for the WBT and that continual competence development at work caused a certain level of stress. These findings are noteworthy within the context of this study, because although WBT has the capability of addressing the major training and educational barriers facing SNDs, their participation in WBT will also put additional demands on them to further their learning.

The lack of funding to travel (n=3) was another educational barrier. Fortunately, funding to travel is not needed to participate in WBT. However, there are fees associated with WBT, which may include registration costs, technology fees, and computer software and hardware purchases or upgrades. Allocating funding for SNDs to participate in WBT may be as difficult as allocating funding for travel. Therefore WBT fees need to be acknowledged and disclosed upfront.

In the final qualitative question, SNDs were asked to describe the most important aspects that would attract them to participate in WBT. A structured probe regarding their desire to earn continuing education credit and/or college credit as a result of participating in WBT was also integrated with this question. The most important aspect reported is that the topics available through WBT must be of interest (n=15). Based on this finding, it is critical that SNDs are given the opportunity to prioritize topic areas of interest. (They were given the opportunity to do this in the quantitative phase of this research and the results are described in the following section). School nutrition directors also reported that the WBT should be convenient/flexible (n=13), user-friendly (n=11), provide access to an instructor (n=6), and must be affordable (n=4). Of all 42 SNDs, nine (21%) SNDs reported interest in only continuing education credit, five (12%) reported interest in only college credit, 14 (33%) reported interest in both continuing education and college credit, and 13 (31%) reported no interest in either continuing education or college credit.

The issue of offering continuing education or college credits to SNDs for WBT courses produced a wide variety of responses. Since there is not a designated education level or common continuing education requirement for SNDs, this finding is not unexpected. However, this does present challenges for trying to appeal to a wide audience base. There are large logistical and financial differences of offering online course for continuing education credit, versus college credit, versus no credit. This is an issue that also deserves further investigation.

Quantitative Functional Area Survey Results

Of the 42 SNDs participating in the qualitative phase, 34 (81%) returned the Functional Area Survey. The SND's rated their knowledge (1=poor, 5=very good), skill (1=poor, 5=very good), and satisfaction in performance (1=very dissatisfied, 5=very satisfied) for each functional area. In general, within each functional area, SNDs rated their knowledge and skills similarly, and the higher the rating for knowledge and skill, the

more positive the rating in job performance. The SNDs were also asked to identify all the forms of continuing education they had received in each functional area. The most widely reported forms of continuing education reported were meetings/conferences/preconferences (n=289), professional development publication/article (n=208), and academic course work (n=186). The fact that Web-based training/online course/distance education (n=38) was the least reported form of continuing education supports previous findings that WBT is not routinely utilized among school nutrition program professionals (Conklin et al., 2005; Nettles & Carr, 2007; Sullivan et al., 2002). It is interesting to note that participation in WBT is very low, despite our findings suggesting an extremely high interest in WBT.

When asked to rate their interest (1=very disinterested, 5=very interested), Table 4 illustrates that overall SNDs indicated they were somewhat interested (4) to very interested (5) in participating in WBT to improve their knowledge and skill in the majority of functional areas.

Table 4. Interest Rating for Participating in Web-Based Training in 14 Functional Areas (n=34)

<i>Functional Areas</i>	<i>Mean^a</i>	Standard Deviation
Nutrition and Menu Planning	4.1	1.3
Financial Management and Record Keeping	4.1	1.3
Computer Technology	4.1	1.3
Program Accountability	4.0	1.3
Procurement	4.0	1.4
Facility Layout and Design and Equipment Selection	4.0	1.4
Nutrition Education	3.9	1.4
Environmental Management	3.9	1.3
General Management	3.9	1.3
Personnel Management	3.9	1.3
Marketing	3.8	1.3
Food Production	3.8	1.2
Sanitation, Food Safety and Employee Safety	3.7	1.3
Customer Service	3.6	1.4

^ainterest (1=very disinterested, 5= very interested)

In addition to rating each individual functional area, SNDs were asked to rank the top five functional areas they were most interested in participating in WBT. When comparing the rating and ranking questions Financial Management and Record Keeping and Nutrition and Menu Planning received the highest priority on both questions. Sanitation, Food Safety and Employee Safety, Nutrition Education, and Program Accountability were also ranked high.

CONCLUSIONS AND APPLICATIONS

This study is not without limitations. Although the sampling methodologies were appropriate for this exploratory needs assessment, the small sample limits generalizability. This research sampled from six states

and targeted SNDs with less than five years of director experience. Although interest in WBT was extremely high in this sample, it is important to note that less experienced SNDs were targeted. It is important to confirm these findings in a larger more representative sample of SNDs.

Notwithstanding the mentioned limitations, the overall results of this needs assessment indicate that WBT has the potential of being a viable delivery method for providing timely training that keeps SNDs informed, engaged, and involved. This research reveals that the majority of SNDs have the technology infrastructure, including access to computers at both work and home, needed to support WBT. There was an overwhelming positive response regarding interest in WBT for acquiring new knowledge and for practice activities among both 5-day orientation attendees and non-attendees. The overall perceived benefits count far surpassed the perceived barriers. Based on these findings, it appears that the majority of SNDs would take full advantage of WBT educational offerings.

Although historically SNDs' participation in WBT has been low, these research findings imply that lack of involvement in WBT is not due to lack of interest, but rather a lack of availability and resulting exposure. With the development of new technologies, the greater demands on SNDs to develop and maintain competencies, and the impending generation of many younger SNDs, WBT learning technologies appear to have a definite role in the future training of SNDs.

The strongest point of application resulting from this research is for the educators and organizations who are responsible for providing training opportunities to promote knowledge and skill development to meet the diverse learning needs of SNDs. Although WBT has the capability of addressing the major education and training barriers facing SNDs, their participation in WBT will result in additional time and resource demands. Therefore, the WBT needs to be user-friendly, flexible, affordable, and may need to provide the opportunity to earn continuing education and/or college credits. As identified through this research, social interaction is important to SNDs. In order to prevent feelings of isolation, future WBT should create a sense of community and promote two-way interactions between instructors and SNDs and among the SNDs. Appropriate technology support should be available, such as a help desk function to deal with potential technology problems or an online tutorial to assist new users in navigating the Web-interface features. The SNDs lack time, have a multitude of interruptions throughout the day, and need convenient and efficient training options. Therefore, they need the ability to customize the WBT modules to meet their needs and skip familiar areas so they can enjoy a useful and self-directed online learning experience. The WBT learning opportunities need to be asynchronous. Aspects such as live teleconferencing or live chats may not be the best options. Around the clock access to the WBT should be provided so that the training can be completed during non-working hours. Furthermore, the SNDs desire to access and review the materials over and over again, and therefore need access to the WBT modules even after the training is completed. Finally, WBT activities need built in features to encourage and assure SNDs they are completing the activities correctly.

As the potential to integrate WBT into current educational offerings is further investigated, it is important to begin WBT module development with the functional areas as prioritized by SNDs and address the perceived benefits and barriers during the development, field testing, and marketing of WBT modules. Based on the findings of this needs assessment the four functional areas with the highest priority ratings and rankings include *Financial Management and Record Keeping and Nutrition and Menu Planning*. There is a continuing need to involve SNDs in the field testing of WBT modules to ensure the illustrated concepts are easily understood, the activities are perceived as applicable, and learning outcomes are measurable.

This project lays the foundation for a multitude of additional research related to future WBT opportunities for SNDs. Although this small pilot study clearly identifies SNDs' interest and perceived barriers and benefits related to WBT, a larger more representative sample of SNDs is needed to: 1) prioritize Web-based training (WBT) functional areas, and 2) identify the logistical issues of developing and delivering WBT learning modules, some examples include: the estimated amount of time SNDs are willing to devote to a module, the cost range willing to pay, and the types of educational credit desired. Once the functional areas have been prioritized and some of the logistical issues have been examined, WBT modules will need to be developed and field tested. Mechanisms for assessing and tracking learning outcomes need to be established through the field testing. Following completion of WBT modules, it will be important to request feedback from the SNDs to determine effectiveness of the course activities, assignments and instructors. As the WBT modules become utilized more broadly, future research is also needed to assess differences between the knowledge and skills acquired through WBT versus more traditional educational settings.

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