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Participants' learning and satisfaction at a Distance Learning Course for School Feeding Counselors

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Abstract

Objective: To evaluate participants' learning and satisfaction in a distance learning training course for school feeding counselors, developed according to their socio-demographic characteristics and training needs. *Methods*: Scales to assess participants' satisfaction regarding the course and tutors were applied. Learning was assessed through diagnostic and summative assessments, pretest and posttest, and with a formative assessment at the end of each unit, with scales to assess participants in forums, case studies, practical activities, and multiple choice questions to evaluate document analysis activities. *Results*: The main topics included as training needs were bidding, submission of accounts and quality control of food products. There was great satisfaction with the course and tutors. In relation to learning, there was no significant difference between the average scores in the pretest and posttest, but the performance observed in the formative assessment was satisfactory. *Conclusion*: The evaluation of the counselors' socio-demographic data and training needs, along with proper planning, allowed the development of an interesting and feasible course, since satisfaction and learning rates among participants were high. We emphasize the importance of expanding low-cost training strategies like this, considering the high number of school feeding counselors in Brazil.

Key words: Counselors. School Feeding. Distance Education.

Introduction

Brazilian National School Feeding Program (PNAE – Programa Nacional de Alimentação Escolar), implemented in 1955, serves about 43.1 million students in public, community and philanthropic school in Brazil.[1] It aims to contribute to students' growth and biopsychosocial development, learning, school performance and the formation of healthy eating habits by means of food and nutritional education activities and the provision of meals covering the nutritional needs during the school period. [2]

The Brazilian School Feeding Councils (CAEs – Conselhos de Alimentação Escolar), according to a resolution by Brazilian National Fund for Education Development (FNDE – Fundo Nacional de Desenvolvimento da Educação), are collegiate bodies with purposes of inspection that are permanent, deliberative and advisory, established within the states, the Brazilian Federal District and municipalities, in order to carry out the program social control.[2] They consist of one representative appointed by the Government Executive Branch, two representatives of parents of students enrolled in the school system, two representatives of education workers and students entities and two representatives of the organized civil society, with an alternate for each of the seven full members.[2] Counselors are elected by a specific meeting held by the segment/entity they represent to exercise the four-year term at CAE.[2]

The counselors' duties are to monitor and supervise the use of funds and compliance with the guidelines and objectives of PNAE; to analyze the management follow-up report; to analyze the submission of accounts and issue a conclusive opinion on the program implementation; to report any irregularity to the FNDE and control bodies; to provide information and reports whenever requested; to hold specific meetings for analysis of the submission of accounts; to prepare bylaws and the annual action plan with estimated expenditure for the council to exercise its duties.[2]

It is estimated that there are 78,358 school feeding counselors in Brazil, considering that each of the 5,570 municipalities, 26 states and the Federal District has seven full members and seven alternates. However, there is a shortage of training courses geared to that audience in the country. The amount of counselors trained by FNDE and Brazilian Collaborating Centers in Students' Food and Nutrition (CECANEs – Centros Colaboradores em Alimentação e Nutrição do Escolar) is approximately 15,000, less than 19% of the total estimated of counselors.[3] The average cost per counselor trained in such actions was estimated in BRL 635.17,[4] an amount considered high to establish a continued and permanent education for CAEs.

The need to expand the training for counselors is pointed out in one of the objectives of the Brazilian National Plan for Food and Nutrition Safety for the period 2012-2015, which provides for the training of 11,000 school feeding counselors.[5] Considering such need, this study has been developed.

The aim of the study was to develop and conduct a distance education course for school feeding counselors in order to test a low cost alternative training that can be offered on a larger scale. The study has also assessed this proposal by means of evaluating the participants' learning and satisfaction.

Methods

Aiming to plan a course that is appropriate for the audience needs,[6] school feeding counselors' socio-demographic characteristics and training needs were identified by means of a cross-sectional study with an intentional sample. Data were collected by means of a self-administered questionnaire answered during the PNAE National Meeting held in Brazilian city Salvador, BA, in November 2010, which had the participation of about 250 counselors. In order to have more respondents, a call was made at the plenary session and the questionnaires were delivered in between the Meeting activities.

Socio-demographic characteristics investigated were: gender, segment that the participant was representing in the council, interest in having a distance learning course on PNAE, and if they had daily access and ability to navigate the Internet and use applications and computer programs.

Training needs were investigated by means of seven closed questions drawn from CAE assignments provided for in Article 27 of Resolution CD/FNDE no. 38/2009.[7] These questions aimed to investigate the counselors' duties, questions or lack of knowledge that they deemed relevant to make up a training course. The response options were: 1) Yes, easily; 2) Yes, with difficulty, because we have questions about the topic; 3) Yes, with difficulty for other reasons; 4) No, because we do not have enough knowledge on the subject; 5) No, for other reasons; 6) I do not know. And also, by means of an open question, the counselors were able to report three issues considered the most important to be dealt with in a training course for school feeding counselors.

The characteristics identified supported the course planning held in nine steps, involving the definitions of: 1) A systematization and application model of the course; 2) An instructional design; 3) A Virtual Learning Environment (VLE); 4) The language; 5) Educational objectives; 6) Classification of educational objectives; 7) Sequence of contents; 8) Instructional procedures and 9) Course content (Chart 1).

Chart 1. Planning stages of the distance education course for school feeding counselors. Brazil, 2012.

Step	Definition	Description
1	Systematization model and implementation of the course	The model by Moore & Kearsley[8] was selected due to presenting a systemic view of the learning process and considering the individuals' needs. It is noteworthy that the aim of the course was to improve the counselors' performance in terms of the training needs identified in order to qualify the social control process of PNAE in their respective work environments (city/state).
2	Instructional design	The cognitive instructional design was adopted due to being a dynamic model that ensures opportunities to the students and encourages learning by means of experience and significant information.[9] The instructional design is the course general plan that provides the sequence and structure of the units and the methods to be used in classes, activities and evaluation.
3	Virtual Learning Environment (VLE)	The (Learning Platform) Moodle VLE had a higher affinity with the course planning due to being guided by a special learning philosophy called "social constructionist pedagogy."[10]
4	Language	There was an option by the dialogic language and multidirectional and asynchronous communication (teacher/student/content/tutor), which differs from traditional education models, as it provides time flexibility for students, one of the main advantages of distance education that meets the characteristics of the course audience.[9]

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Step	Definition	Description
5	Educational objectives	Preparing the educational objectives involved the transformation of the training needs identified in the instructional objectives with clear descriptions of the knowledge, skills and attitudes that one wished to observe in the counselors' behavior after the course, in addition to the specification of objectives at different levels of analysis.[11] Seven objectives were defined: 1) Easily navigating the VLE and getting to know the course objectives; 2) Analyzing the steps of implementation of PNAE; 3) Identifying the objectives, composition and functions of CAE in PNAE; 4) Identifying the management approach adopted by the municipality or state and assessing whether the bidding method adopted is appropriate to the annual amount transferred by FNDE; 5) Identifying the steps and processes of food purchasing from family farms for PNAE; 6) Examining the submission of accounts of PNAE; 7) Performing quality control of food and examining the adequacy of menus in schools.
6	Classification of educational objectives	To classify the educational objectives, Bloom's[12] taxonomy was adopted. Taxonomies or classification systems of educational objectives/skills facilitate the planning, implementation and evaluation of instructional events because they generate information that allows a reflection on educational means and strategies best suited to each result of learning expected.[13] The objectives were classified as: objective 1 – application; objective 2 – analysis; objective 3 – understanding; objective 4 – evaluation; objective 5 – understanding; objective 6 – synthesis; objective 7 – synthesis.
7	Sequence of contents	Posner & Strike[14] approach was adopted, which considers the relationship between the contents to organize them in sequence. The contents have already been presented in the sequence above, in item 5.

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Step	Definition	Description
8	Instructional procedures	To identify the most appropriate procedures/instructional events, one considers: 1) The conditions and type of learning desired, according to the hierarchy in Bloom's taxonomy;[13] 2) Who would build learning; and 3) How would the participants' interaction (apprentice/teacher, apprentice/apprentice, apprentice/tool) be.[6] Classes were developed in the formats of storyboard, files and video tutorials, videos on the PNAE, forum, video conferencing, document analysis, practical activities and case studies.
9	Course content	The content was prepared after the definition of educational objectives and instructional procedures,[13] considering three main aspects recommended by Morrisson et al.:[15] 1) structure, 2) consistency in the structure and 3) appropriateness of the content to the apprentice's knowledge repertoire. For each text, pre-instructional messages were prepared with the desired behavioral objectives and transformational figures that combine concrete images, facilitating the memorization of facts and events.[15]

With a workload of 140 hours, the course was offered from August to November 2011, with four tutors who worked under the principal researcher's coordination, from planning to following up participants. The participants were able to access it by means of a link hosted on the Health Sciences School Nutrition Course Web site of Brazilian Universidade de Brasília (UnB – Brasília University).

To ensure the smooth progress of the activities and the participants' membership, considering the instructional plan of the course, 120 places were offered and each tutor followed up 30 participants. The mobilization process involved sending e-mails and phone calls to the 259 counselors interviewed at the stage of surveying the socio-demographic characteristics and training needs who were in the contact list of the CECANEs at Universidade de Brasília (UnB – Brasília University) and Universidade Federal Santa Catarina (UFSC – Santa Catarina Federal University). Although the course has been planned for counselors, other professionals have also attended, such as technicians who work in the Government Department of Education and nutritionists who have shown interest.

The course evaluation was carried out considering two levels proposed by Hamblin:[16] *Satisfaction*, identifying the participants' opinions or satisfaction on various aspects of the course and *Learning*, which verifies if the instructional objectives were achieved, i.e., if there is a difference between knowledge that counselors had before and after the course. The participants' learning was measured by means of diagnostic, summative and formative assessments.

The tools to assess the participants' learning and satisfaction with the course were developed in an integrated manner, following the design of educational objectives and course content (Table 2).

Chart 2. Characteristics and objectives of the assessment tools designed to evaluate the participants' satisfaction and learning in a distance education course for school feeding counselors. Brazil, 2012.

Evaluation of learning			
Assessment	**Purpose**	**Instrument**	**Characteristics**
Diagnosis	Assessing knowledge, skills and attitudes (KSAs) to be developed during the course	Pretest	23 multiple choice closed questions on the course content of the same weight that totaled 10 points
Summative	Assessing the KSAs developed by the participants	Posttest	25 multiple choice closed questions in consonance with the pretest

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Evaluation of learning			
Assessment	**Purpose**	**Instrument**	**Characteristics**
Formative	Checking the success or failure of educational objectives by means of assessing KSAS developed in each unit.	4 scales	Three-point Likert scales were used (1 – I disagree; 2 – I do not agree nor disagree; and 3 – I agree) to evaluate 4 forums from the following criteria: 1) Focus was kept on the discussion; 2) Information was added and 3) Substantiated contributions were provided.
		2 Tests	Multiple choice with 4 options of answers of 2.5, totaling 10 points.
		Scale	A 3-point Likert scale (1 – unsatisfactorily, 2 – fairly or 3 – satisfactorily) with the following criteria to evaluate a case study: 1) The data on the financial implementation were correctly filled; 2) The data on the physical implementation were correctly filled; 3) The data on the participation of the executing agency were correctly filled.
		Scale	A 3-point Likert scale (1 – unsatisfactorily, 2 – fairly or 3 – satisfactorily) based on the following criteria to evaluate a practical test: 1) A degree of satisfaction for each sensory attribute was reported; 2) The final opinion on the food analyzed was informed, 3) The report was dated and signed by the five participants.
		2 scales	A 3-point Likert scale to evaluate test reports/practical scripts from the criteria: the participant performed the task: 1 – unsatisfactorily, 2 – fairly or 3 – satisfactorily.

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Satisfaction rating		
Assessing the participants' satisfaction with the course	Scale	A 3-point Likert scale, where: 1) no, 2) fairly and 3) yes; based on five items, namely: 1) Compliance with the course program delivered by the teacher; 2) Quality of the educational materials provided; 3) Quantity and quality of audiovisual aids used; 4) Course enrollment process; and 5) Course workload.
Assessing the participants' satisfaction in relation to tutor's performance	Scale	A 3-point Likert scale, where: 1) no, 2) fairly and 3) yes; based on nine items, namely: 1) Have they demonstrated full mastery of the content? 2) Have they properly broached the program subjects?; 3) Have they created a climate conducive to student participation?; 4) Were they were objective in their explanations?; 5) Have they employed teaching techniques in favor of setting the content?; 6) Have they clarified the students' doubts?; 7) Have they taken into account the students' requests?; 8) Have they complied to the times set?; 9) Have they participated in the activities scheduled?

It is noteworthy that the formative assessment conducted at the end of each unit by ten instruments aimed to identify points to be improved, seeking greater efficiency of the subsequent instructional process.[16,17] The group that participated in the learning and satisfaction evaluation consisted of participants who watched at least 50% of classes/units and carried out at least five of the activities proposed (50%).

A descriptive analysis of the demographic data and training needs collected by means of closed questions was held. As for the open question, it was analyzed by means of the technique of analyzing content[18] and subsequent analysis of categories frequency.

To evaluate the course, a descriptive analysis of satisfaction and learning variables was carried out by using the Kolmogorov–Smirnov normality test and the non-parametric statistical hypothesis Wilcoxon signed-rank test to identify the statistical difference between the scores in pretest and posttest. To identify the association between the posttest scores and the participants' average percentage of performance in the formative assessment, the Pearson product-moment correlation coefficient test was applied. The data were analyzed by SPSS (*Statistical Package for the Social Sciences*) version 19 and 5% was the significance level considered.

This study is in line with the guidelines and regulations governing research involving human subjects, provided for in Resolution no. 196 of October 10, 1996, of the Brazilian National Health Council. The project was approved by the Ethics Committee of the Faculty of Health Sciences at Brazilian Universidade de Brasília (UnB – Brasília University) and all participants signed an Informed Consent Form.

Results

The questionnaire survey of socio-demographic characteristics and training needs was responded by 145 counselors and 71% (n = 103) were females; 48.3% (n = 70) were representatives of the education workers segment, teachers or students; 90% (n = 130) showed interest for a distance learning course on PNAE; 78% (n = 113) stated having daily access to the Internet; and 79% (n = 114) mentioned having the ability to use applications and computer programs.

With regard to the training needs, the activity that had the highest frequency of difficulty in implementation due to the presence of questions was "following the bidding procedure" (24.1%, n = 35), followed by "analyzing the submission of accounts" (22.8%) (n = 33) and "evaluating the menu adequacy" (15.2%, n = 22), according to Table 1.

Table 1. Percentage distribution of the school feeding counselors' answers on the ease and expertise of their technical functions. Brazil, 2010.

The counselors' answers	Technical functions of the School Feeding Council													
	Competitive bidding[a]		Menu[b]		Test[c]		Control[d]		Agriculture[e]		Accounts[f]		Stocks[g]	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
YES, easily	32	22.1	60	41.4	50	34.5	55	37.9	27	18.6	59	40.7	66	45.5
YES, with difficulty, because we have questions about the topic	35	24.1	22	15.2	17	11.7	17	11.7	16	11	33	22.8	7	4.8
YES, with difficulty for other reasons	11	7.6	11	7.6	13	9	27	18.6	20	13.8	20	13.8	20	13.8
NO, because we do not have enough knowledge on the subject	33	22.8	31	21.4	22	15.2	13	9	24	16.6	8	5.5	14	9.7
NO, for other reasons	30	20.7	19	13.1	40	27.6	30	20.7	54	37.2	19	13.1	36	24.8
I do not know	4	2.8	2	1.4	3	2.1	3	2.1	4	2.8	6	4.1	2	1.4
TOTAL	145	100	145	100	145	100	145	100	145	100	145	100	145	100

Caption: a) They follow up the bidding procedure; b) They evaluate the menu adequacy; c) They follow up the implementation of the acceptance test; d) They participate on quality control; e) They participate of the purchase of food produced by AF; f) They analyze the submission of accounts; g) They follow up the inventory control.

As for the issues that the counselors mentioned as being important to make up the course, the most common were: following up the bidding (37.2%, n = 54), analyzing the submission of accounts (32.4%, n = 47), following up the food quality control (23.4%, n = 34), the counselors' role/attitude (22.8%), buying food from family farms (19.3%, n = 28). Importantly, the course educational objectives and its contents were drawn from these results, as shown in item 5 of Chart 1.

Of the 259 invitees, 107 participants initiated the course, being 77 school feeding counselors. The dropout rate was 32.8% (n = 35) and 72 participants completed the course. To evaluate satisfaction and learning, only the 47 students who had enough participation and sent pretest and posttest were considered.

Regarding these 47 participants' profiles, (38.3%, n = 18), they represented the segment of education workers, teachers or students. Most (74.5%, n = 35) had college degrees and (23.4%, n = 11) were teachers (Table 2).

Table 2. Profile of the course participants who had enough participation and sent pretests and posttests. Brazil, 2012.

	n	%
Segment they represent in the council Education workers, teachers or students	18	38.3
Students' parents	14.9	7
Civil society	6	12.8
Executive level	6	12.8
Has not informed	10	21.3
Education level		
Specialist Level	1	2.1
Complete higher education	35	74.5
Complete high school	3	6.4
Complete elementary school	1	2.1
Has not informed	11	23.4
Profession		
Teachers	11	23.4
Technical and administrative	8	17
Nutritionists	4	8.5
Businesspeople	1	2.1
Military police office	1	2.1
Has not informed	22	46.8
TOTAL	47	100

The participants' average score of satisfaction regarding the course was 12.4, considering the maximum score as 15 points. And the average percentage of satisfaction was 80.2%. The participants showed greater satisfaction for items: "the course program delivered by the teacher was fulfilled," "the teaching material provided was satisfactory in terms of quality," and "the audiovisual resources used were satisfactory regarding quantity and quality."

In relation to the tutor's performance, the average score among the participants was equal to 19.04, i.e., the average percentage of satisfaction was equal to 70.5%, whereas the maximum scale score was equal to 27 points. Participants showed higher satisfaction for the item "they demonstrated complete mastery of the content."

With regard to learning, the average of the participants' pretest scores was 9.0 (sd = 1.03) and of posttest was 8.7 (sd = 1.89), and a significant statistical difference was not observed ($p = 0.650$). The participants' average score in the ten formative assessment activities was equal to 54.9, i.e., the average percentage of performance was equal to 68.6%, since the maximum score was 80 points.

A significant correlation between the posttest score and the formative assessment ($p = 0.004$ and $r = 0.411$) was found, i.e., the participants' course performance was consistent with the posttest score, suggesting that these instruments are valid.

Regarding the formative assessment, there was a higher performance percentage (91.5%) for the practical activity of submitting a script after a visit to a school. The lowest performance percentage was observed in the discussion forums of Units II and III, 47.8% and 46.7%, respectively.

Discussion

The relevance of this study is highlighted, as articles on school feeding counselors' socio-demographic characteristics and training needs in Brazil were not found in the literature neither on the development and evaluation of training courses aimed at this audience. On the other hand, it is worth noting that data on the counselors' profile do not have a national representativity, since the sample was chosen by convenience among those who participated in the PNAE National Meeting held in 2010.

It is important to note the high percentage (90%) of counselors who reported interest in pursuing the course, as well as the relevance of the data on training needs found, which enabled the development of educational objectives and the course content.

The findings relating to the training needs suggest a priority in relation to tasks of monitoring the bidding process and analyzing the submission of accounts. These findings are consistent with the literature,[19,20] which points out that although the CAEs have 18 years of history, they have focused on monitoring funds transferred from the Federal Government.

The effective social control of PNAE involves other dimensions beyond financial oversight, namely: promoting family farming, local development and progressively achieving the Human Right to Adequate Food in Brazil.[21] These findings reinforce the need for the council's other duties that are relevant to the exercise of an effective social control of PNAE to be valued and effectively implemented by the counselors, which was included in the content of the course proposed.

Using a 3-point Likert scale, the following intervals of satisfaction with the course and tutor's performance were determined: up to 49%, lower; 50 to 69%, fair; and above 70%, high. Noteworthy is the high percentage of participants' satisfaction with the course, with a higher percentage for items "the course program delivered by the teacher was fulfilled," "the teaching material provided was satisfactory in terms of quality" and "the audiovisual resources used were satisfactory as for quantity and quality." These findings reinforce that the instructional event planning process is critical to achieving good results.

A high percentage of participants' satisfaction regarding the tutor's performance was also observed, highlighting the item "showed complete mastery of content." These results reinforce that the tutors performed well their roles and that their involvement in the course development process may have contributed to this outcome.

The participants' higher interest for practical activities supports the assumptions about adult learners' characteristics outlined by Knowles[22] from the study of adult education, called "andragogy," which are: a) They need to know why they must carry out certain learning; b) They learn best experimentally; c) They conceive learning as problem solving; d) They learn best when the topic has immediate value; and e) The most powerful motivators for learning are internal.

Although statistical difference has not been observed between pretest and posttest, suggesting that participants had prior knowledge of the topics covered in the course or the instrument was not adequate to capture possible differences between the two moments, a positive correlation was found between the posttest and the formative assessment, suggesting that the process of teaching and learning was positive, i.e., participants performed well in another mode of assessment.

This result supports the hypothesis that participants had prior knowledge of the topics addressed and, even in this condition, became interested in the course, which is more evident in the course dropout percentage (32.8%). It is emphasized that this percentage was acceptable, considering that the dropout percentage found in the distance courses in Asia reach 50% and in Europe they range from 20% to 30%.[23,24]

The formative assessment proposal used in this study is similar to the experience of the "*Earth Systems Science Approach to Physical Geography*" course, where authentic assessment methods were used, i.e., assessment based on performance characterized by the use of tasks that are significant in the context of the apprentice's real-life.[25]

Among the limitations of the satisfaction evaluation is the fact that the psychometric measures, i.e., the adopted assessment scales of participant's satisfaction with the course and the tutor's performance, have not been validated. According to Pasquali,[26] the validation suggests that a set of questions effectively measures the participants' satisfaction with respect to an instructional event. According to Pilati & Borges-Andrade,[27] ideally there would be the use of scales already validated. However, Zerbini & Abbad[28] consider that this decision may lead to loss of specificity as to the characteristics of different distance training systems. In this study, the was an option for the development of non-validated satisfaction scales that considered the course specificity.

It is also pointed out that, according to Abbad, et al.[13], the most valid and technically acceptable evaluation design is the one that, in addition to measuring learning by means of pretest and posttest, allows the comparison of the group studied with a control group that has not participated in the instructional event. In this research, for ethical and operational reasons, it was not possible to carry out such a design.

Conclusions

Faced with the scarcity of studies on school feeding counselors' socio-demographic characteristics, the findings allowed to minimally get to know the audience, indicating the feasibility of a distance learning course and their interest for a course on the PNAE.

The identification of the counselors' socio-demographic characteristics and training needs, together with a proper planning, allowed the development of a course that would be interesting for participants, as their high rates of satisfaction and learning had already been observed. It is worth noting the participants' greater interest for practical activities, legitimizing assumptions about adult learners' characteristics.

The importance of expanding low-cost training strategies like this is highlighted, considering the high number of school feeding counselors existing in Brazil and the important role they play in relation to the promotion of family farming, local development and progressive achievement of the Human Right to Adequate Food.

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