

Effectiveness and factors associated with the Training Program in Sanitary Management

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Abstract: This study evaluated the transitoriness and associated factors of the Health Management Training Program, from the perspective of former professionals, through survival modeling. The characterization of the 384 graduated professionals was carried out and, in their perspective, the



better the evaluation of the program, the greater the effect on the Effectiveness of professional training.

Keywords: Health Management; Distance Education; Effectiveness.

Efetividade e fatores associados ao Programa de Formação Gestão em Saúde

Resumo: Este estudo avaliou a efetividade e os fatores associados do Programa de Formação Gestão em Saúde, na perspectiva dos profissionais egressos, por meio de modelagem de equações estruturais. Foi realizada a caracterização dos 334 profissionais egressos e, na perspectiva deles, quanto melhor a avaliação do programa maior será o efeito sobre a Efetividade da formação profissional.

Palavras-chave: Gestão em Saúde; Educação a Distância; Efetividade.

Eficacia y factores asociados al Programa de Formación en Gestión Sanitaria

Resumen: Este estudio evaluó la transitoriedad y los factores asociados del Programa de Formación en Gestión en Salud, en la perspectiva de profesionales egresados, a través de modelos de sobrevivencia. Se realizó la caracterización de los 384 profesionales egresados y, en su perspectiva, cuanto mejor sea la evaluación del programa, mayor será el efecto en la Eficacia de la formación profesional.

Palabras clave: Gestión en Salud; Educación a Distancia; Eficacia

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1 INTRODUCTION

Distance Education (EaD) has been widely used in the context of Permanent Health Education (EPS), as it allows courses to be operationalized and health workers to be reached on a large scale (MARIN *et al.*, 2017). In addition, this modality provides knowledge sharing, learner autonomy, and improved teamwork through the exchange of experiences using digital educational resources (GOMES, 2019).

In this context, the Unified Health System (SUS) has offered training courses in this modality to health professionals. The SUS Open University (UNA-SUS) is a well-established institution that offers this type of training. This institution was designed to work as a collaborative network of academic institutions and health services for training and continuing education in the Brazilian public health system (MARIN *et al.*, 2017).

The educational services provided by the institutions that are part of the UNA-SUS network involve the time and commitment of the professionals who work on the projects, as well as the financial investment of SUS. It is therefore essential to evaluate the results achieved, as studying their impact can lead to improvements in educational provision (KIRKPATRICK; KIRKPATRICK, 2007).

In addition, one of the concerns in the evaluation of training provision is to ensure the effectiveness of training and to know which factors are associated with it and which can contribute to it. Although it has been studied by Kirkpatrick and Kirkpatrick (2007), Moreira *et al.* (2015), Bressemer *et al.* (2016), and Gomes *et al.* (2020), effectiveness still does not have a consensual definition in the scientific community. Considering it as a reflection of the ability of distance education to meet the demands of society is one of the most recent definitions (GOMES, 2019; GOMES *et al.*, 2020).

Based on this definition, it is possible to evaluate the professional training offered through distance education, using the tools developed by Kirkpatrick and Kirkpatrick (2007) and Gomes (2019), as well as the related factors, since this evaluation helps to characterize the aspects that influence the performance, evaluation and scope of educational offerings (BORGES-ANDRADE, 2002; MOURÃO; ABBAD; ZERBINI, 2014; GOMES *et al.*, 2020).

In this context, this study evaluated the effectiveness and factors associated with an educational program in health management offered by the Federal University of Maranhão, linked to the UNA-SUS network (UNA-SUS/UFMA), from the perspective of graduates.



2 METHODOLOGY

2.1 Design of the study

This is an evaluative study. The Health Management Training Program (PFGS) offered by the UNA-SUS/UFMA was evaluated. The program consists of three self-study courses of 45 hours each, for a total of 135 hours.

The courses offered from May 2021 were: 1) Organization of the SUS; 2) Organization of Health Care in the SUS; and 3) Changes in the Financing of the Unified Health System.

2.2 Data collection

The sample consisted of all PFGS graduates who completed the three courses of the program and agreed to participate by signing the Free and Informed Consent Form (TCLE).

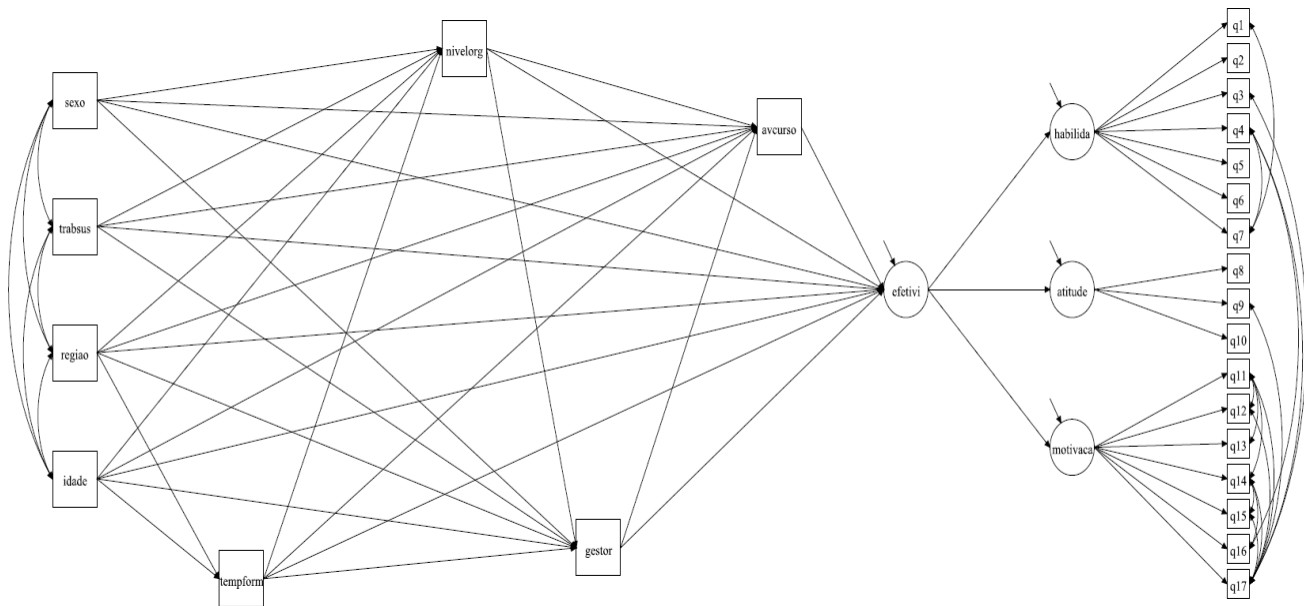
The data were collected using three structured questionnaires. The first and second were developed by researchers from the Health, Innovation, Technology, and Education (Saite) research group, based on the LORI model (NESBIT; LI, 2004). The third was based on the instrument for evaluating the effectiveness of vocational training developed and validated by Gomes *et al.* (2020).

2.3 Theoretical approach

A theoretical model was adopted that considered the outcome, the effectiveness of the PFGS (Efetivi), perceived by the professionals who graduated from the program, as a multidimensional latent derived from the shared variances between the variables skills (Habilida), attitudes (Atitude) and motivation (Motivaca) (GOMES *et al.*, 2020). To assess possible associations with the graduates' perception of the effectiveness of the PFGS, the demographic and professional characteristics of graduates were studied: gender (sexo), age (idade); training time (tempoform), region of work (regiao), SUS worker (trabsus), level of health organization (nivelorg) and managerial role in the SUS (gestor); and the course: general evaluation of the course by graduates

(avcurso) (Figure 1).

Figure 1 - Theoretical model of the effects of demographic, professional, and program course evaluation variables on the perceptions of graduating professionals regarding the effectiveness of the PFGS offered by UNA-SUS/UFMA. Brazil. 2022.



Source: Elaborated by the authors (2022).

2.4 Variables of the study

The outcome variable was the effectiveness of the PFGS perceived by the professionals who graduated from the program, considered as a multidimensional latent derived from the shared variances between the variables Habilidades, Atitudes and Motivação.

The explanatory variables were categorized as follows: Gender (male; female), Age (20 to 29 years; 30 to 39 years; 40 to 49 years; 50 to 59 years; 60 years or more), Duration of training (up to 4 years; 5 to 9 years; 10 years or more), SUS employee (no; yes), Level of health care organization (primary health care; medium complexity; high complexity; not applicable), Region of work (north; northeast; central-west; southeast; south), Management role in SUS (no; yes), Course evaluation (scores from 1 to 5 points).

2.5 Statistical analysis



Descriptive analysis with relative and absolute frequencies was performed using STATA software, version 14.0. Structural equation modeling (MEE) was used to assess efficacy and associated factors. Because there were categorical variables in the model, the robust weighted least squares mean and variance adjusted (WLSMV) estimator was used. The THETA parameterization was used to control for differences in residual variances.

To determine whether the model was a good fit, the following index values were considered: a) for chi-square (χ^2), p-value > 0.05 ; b) for root mean square error of approximation (RMSEA), p-value < 0.05 and an upper limit of the 90% confidence interval (90%CI) < 0.08 ; c) for the comparative fit index (CFI) and the Tucker-Lewis index (CFI / TLI), values > 0.95 ; and d) for the standardized root mean square of the residuals (SRMS), values < 0.08 . The significance level was 5% ($\alpha < 0.05$) (KLINE, 2011). The software used in these phases was Mplus version 8.

The *modindices* command was used to suggest changes in the model's fit, with the value of the modification index greater than 10 suggesting a change in the model. In the final model, the effects of the observed variables on the perceptions of graduate professionals regarding the effectiveness of the PFGS offered by UNA-SUS/UFMA were evaluated..

2.6 Ethical aspects

The Ethics Committee of the University Hospital of the Federal University of Maranhão (HUUFMA) approved the research project under CAAE: 08686819.2.0000.5086 and approval number 3.897.554.

3 RESULTS

Among the graduates eligible for this study (1062), 334 (31.5%) agreed to participate in the survey. The majority were female (71.1%), between 30 and 39 years old (39.5%), with 10 or more years of education (38.9%), and SUS employees (66.5%), working mainly in primary health care (36.8%). In addition, 29.3% of the graduates reported having a managerial role in the SUS (Chart 1).



Chart 1 - Demographic and professional characteristics of graduates of the PFGS, offered by UNA-SUS/UFMA. Brazil. 2022.

Variables	n	%
Sex*		
Male	96	28,9
Female	236	71,1
Age*		
20 to 29	101	30,4
30 to 39	131	39,5
40 to 49	66	19,9
50 to 59	29	8,7
60+	5	1,5
Professional group		
Technical level professional	16	4,8
Higher education professional	311	93,1
Others	7	2,1
Length of Formation		
Up to four years	129	38,6
From 5 to 9	75	22,5
10 or more	130	38,9
SUS worker		
No	112	33,5
Yes	222	66,5
Level of Health Care Organization		
Primary Health Care	123	36,8
Medium Complexity	40	12,0
High Complexity	43	12,9
Not applicable	128	38,3
Region of Work**		
North	57	17,2
Northeast	121	36,6
Midwest	31	9,4
Southeast	91	27,5
South	31	9,4
Management role in the SUS		
Area coordinator	43	12,9
Health Secretary	3	0,9



Others	52	15,6
No	236	70,7
Total	334	100,0

Source: Elaborated by the authors (2022). * due to lack of data, n = 332. ** due to lack of data, n = 331.

The overall evaluation of the course by the graduates reached an average score of 4.9 points (standard deviation ± 0.6 points) (data not shown in tables). The goodness of fit indices of the structural equation model to assess the factors associated with the effectiveness of the training showed values indicating good model fit, with values < 0.006 for RMSEA and > 0.95 for CFI and TLI (Chart 2).

Chart 2 - Adjustment indicators of the structural equation model that evaluates the factors associated with the graduates' perception of the effectiveness of the PFGS offered by UNA-SUS/UFMA. Brazil. 2022.

Setting indicators	
χ^2 (p-value)	410,200 (< 0,001)
RMSEA (p-value and lower and upper limit of the 90% CI)	0,049 (0,041 – 0,056)
CFI	0,975
TLI	0,968
SRMR	0,052

Source: Elaborated by the authors, 2022.

Description: χ^2 - chi-square; RMSEA (Root Mean Square Error of Approximation); CFI (Comparative Fit Index); TLI (Tucker-Lewis Fit Index); SRMR (Standardized Root Mean Square Residual).

Efetividade formed a good multidimensional latent variable, with all dimensions ("Habilidades", "Atitudes" and "Motivação") having factor loadings greater than 0.5 and significant (< 0.001). Course evaluation (PC = 0.133; p = 0.014) was associated with Effectiveness, showing that the better the course evaluation, the greater the effect on the graduates' perception of the effectiveness of their professional training (Chart 3).



Chart 3 - Standardized Coefficients (CP) of the structural equation model of the analysis of factors associated with the perception of graduates on the effectiveness of the Health Management Training Program (PFGS) offered by UNA-SUS/UFMA. Brazil. 2022.

	Standardized coefficients	Standard error	p-value
Habilidade BY			
Q1. After the course, I began to use what I learned frequently.	0,602	0,032	< 0,001
Q2. I taught my coworkers new skills developed during the course.	0,655	0,028	< 0,001
Q3. The skills I developed on the course have meant that I make fewer mistakes in my current job.	0,557	0,032	< 0,001
Q4. I remember the contents of the course well.	0,456	0,034	< 0,001
Q5. The quality of my work has improved in activities directly related to the course content.	0,765	0,023	< 0,001
Q6. I acquired knowledge that improved my individual performance at work.	0,772	0,024	< 0,001
Q7. I recognize work situations in which it is appropriate to apply the content learned in the course.	0,781	0,024	< 0,001
Atitude BY			
Q8. After the course, I began to suggest changes to work routines more often.	0,550	0,034	< 0,001
Q9. After taking the course, I started looking for up-to-date content related to my area of work.	0,552	0,038	< 0,001
Q10. I have taken advantage of the opportunities to put into practice what I was taught on the course.	0,673	0,030	< 0,001
Motivação BY			
Q11. After taking part in the course, I feel like a	0,716	0,027	< 0,001



more motivated professional than before.			
Q12. After taking the course, I have more confidence in my ability to do my job successfully.	0,675	0,038	< 0,001
Q13. I'm interested in continuing to share what I've learned on the course with my colleagues.	0,807	0,023	< 0,001
Q14. I'm interested in reading content related to the subject of the course.	0,724	0,032	< 0,001
Q15. I'm interested in applying the content learned on the course at work.	0,767	0,026	< 0,001
Q16. I feel able to share the knowledge I've acquired on the course with others.	0,623	0,031	< 0,001
Q17. I feel motivated to take part in another distance learning course.	0,526	0,034	< 0,001
Efetividade BY			
Habilidade	1,000	0,012	< 0,001
Atitude	1,061	0,026	< 0,001
Motivação	0,947	0,014	< 0,001
Efetividade ON			
Sex	-0,021	0,060	0,722
Age	0,112	0,076	0,143
Region of Work	0,034	0,064	0,591
Length of Formation	-0,136	0,080	0,089
SUS worker	-0,146	0,102	0,152
Level of Organization	-0,179	0,095	0,059
SUS manager	0,014	0,101	0,890
Course evaluation	0,133	0,054	0,014

Source: Made by the authors, based on the adaptation of the instrument by Gomes *et al.* (2020).

4 ANALYSIS

The Effectiveness of the PFGS was found to be a good multidimensional latent variable with

attributes that are not directly observable. In addition, program evaluation was associated with Effectiveness.

The demographic and professional characteristics of the sample in this study show that the profile of the participants consists of female professionals, aged between 30 and 39 years, working in the SUS within the APS. This profile confirms that of other formations, such as the one analyzed in a study conducted by Oliveira et al. (2016) with professionals from the Family Health Strategy (ESF), in a state in the central-western Brazilian macro-region (OLIVEIRA *et al.*, 2016).

The evaluation of the program was related to effectiveness. The average rating was 4.9 out of 5, indicating a high level of satisfaction with the program. The high level of satisfaction among professionals who graduated from the PFGS is associated with a greater perception of the program's ability to meet the demands of society (MOREIRA *et al.*, 2015).

Student satisfaction in distance learning courses can be influenced by factors such as the content offered, instructional design, and personal motivation for professional improvement (GIASIRANIS; SOFOS, 2020; DINH *et al.*, 2022). Having more experience with online courses or with computers/notebooks also influences satisfaction, as it allows for familiarity and comfort in using digital technologies, allowing for greater engagement in learning (MOURÃO; ABBAD; ZERBINI, 2014).

Design is a factor that can increase motivation to complete educational offerings and reduce dropout rates because, if well designed, it can facilitate learning and directly affect student satisfaction (GIASIRANIS; SOFOS, 2020). Course content plays an essential role in learning satisfaction and perceived learning. Among the reasons for this satisfaction is the possibility for students to participate in the programs with the main objective of expanding their knowledge and skills, which leads to learning and social interaction through the course (DINH *et al.*, 2022).

The positive course evaluations in the study by Ribeiro *et al.* (2018) showed a high level of student satisfaction, indicating the presence of effectiveness. This implies that some aspects of the course were successful, such as learning. Thus, in the evaluation of professional development in educational settings, satisfaction is used as an important construct of learning outcomes (DINH *et al.*, 2022).

In their research, Mourão, Abbad and Zerbini (2014) relate the positive evaluation of a course by its graduates to the acquisition of skills and their application at work. This satisfactory result may



Indicate that the training contributed to the learning, promoting the acquisition of the competences

foreseen in the course. This fact shows the relationship between the learning obtained and the impact of the training on the job, pointing to the effectiveness of the course evaluated.

When evaluating the attributes that make up the effectiveness of the PFGS (Habilidade, Atitude and Motivação), it was possible to observe high factor loadings, demonstrating good performance and confirming the relationship between these attributes. Among them, the Attitude component stands out, having a higher factor load than the others. Attitude is understood as the willingness to change behavior in the way one works. It is also considered a dimension of willingness to know how to do, related to the affective and social aspects of work (SANTOS; MENDES; MARTINS, 2021).

The questions for the three attributes had different factor loadings, most with values above 0.5. However, the question "I am interested in continuing to share what I have learned in the course with my work colleagues" (motivação) stands out, with the highest value among the others. Professional motivation is influenced by managerial and organizational factors and can contribute to job satisfaction (FERREIRA; REIS NETO; NUNES, 2021). These results indicate that, after the course, there was an interest in sharing what they had learned, highlighting its importance in their professional lives.

The skill dimension is emphasized with factor loadings above 0.7 through the questions: the quality of my work has improved in activities directly related to the course content; I have acquired knowledge that has improved my individual performance at work, and I recognize work situations in which it is appropriate to apply the content learned in the course. This indicates the ability to apply the knowledge acquired in work actions and to use it to achieve a specific goal since competence is related to "knowing how to do things" (GOMES *et al.*, 2020).

It is worth noting that about a third of the professionals who completed the course reported that they were working in management in the SUS. Santos, Mendes and Martins (2021), in their research on the evaluation of the results of the Distance Learning Program for Quality in Health Care and Patient Safety (CQSSP), found that 62% of the graduates who took the course had a managerial role and were seeking the training to improve their role. This reinforces the importance of offering courses to educate this specific audience.

The training of managers in the SUS is necessary, given the complexity of managerial



activities in the sector. In addition, with the National Policy for Permanent Education in Health (PNEPS), an increase in investment in initiatives for professional training has already been noted (MARIN *et al.*, 2017).

Among the strengths of this study are: the use of MEE, an analysis that aims to minimize errors in the measurement of the outcome variable through the joint estimation of variables in the model with all the usual regression assumptions. MEE produces results that are easy to interpret (GAMBORG *et al.*, 2009); the pioneering analysis of the characteristics that make up the effectiveness and the factors associated with the PFGS offered in distance learning; and the possibility of generalizing the results, with caution, considering the objective of the course, other teaching modalities and other educational platforms.

5 CONCLUSION

Atitude, Habilidade and Motivação are points that should be considered in an analysis of the effectiveness of professional training since they are part of its structuring. Course evaluation is also highlighted as an important aspect in the perception of the effectiveness of a distance learning program.

The evaluation of the course was associated with the effectiveness of the PFGS, showing that the better the evaluation of the course, the greater the effect on the effectiveness of the professional training, from the perspective of the professionals who graduated from the program. This confirms the importance of proper planning and instructional design in the production of distance learning programs, as they can influence the attributes involved in effectiveness.

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