Exploring the influence of nursing diagnosis education on Romanian nurses' intention, attitudes, and behavior: a cross-sectional study

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Abstract

Background and aims. The introduction of accreditation criteria for hospitals has generated increased interest in applying the nursing process to clinical practice and developing nursing care plans. Nursing diagnosis plays a pivotal role in the formulation of these care plans.

The objective of the study is to investigate the correlation between nursing diagnosis education and nurses' intentions, attitudes toward the use of nursing diagnosis and the behavior in using it in practice; to explore the differences between nurses' intentions, attitudes and behavior, considering nurses' socio-demographic and professional data.

Methods. A cross-sectional design was used. A web-based survey was applied to gather data. A sample of 664 hospital nurses was recruited from five Romanian hospitals.

Results. Education on nursing diagnosis showed significant results in relation to nurses' intentions ($F(2,126.35) = 23.99$, $p < 0.001$), attitudes ($\chi 2\ (2,N = 664) = 44.62$, $p < 0.001$) and behavior ($F(2,167.69) = 29.53$, $p < 0.001$) in using it in clinical practice. Nurses with education highly focused on nursing diagnosis have significantly stronger intention to use it, more positive attitudes and higher behavior in using it in clinical practice compared to nurses whose education simply had included a nursing diagnosis course, or nurses without any education on the topic. Significant differences were identified in intention ($t\ (83.86) = -4.49$, $p < 0.001$) and attitudes ($U = 12697.50$, $z = -3.99$, $p < 0.001$, $r = -0.0006$) of management nurses compared to clinical nurses.

Conclusion. Nursing education on nursing diagnosis significantly impacts nurses' intentions, attitudes, and behavior in their daily practice. Romanian nurses display slightly positive intention and attitudes toward nursing diagnosis but need more training for effective/practical clinical application.

Keywords: nursing diagnosis, intention, attitudes, behavior, nursing education

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Background and aims

The quality of healthcare services is reflected by the current values and progress applied in patient care. How care is provided is one factor that quantifies and controls the actions of healthcare service providers [1]. Whether electronic or paper-based, patient documentation contains relevant standardized data from healthcare professionals, such as nurses and physicians, aimed at improving the quality and efficiency of patient care [2].

Nursing documentation is essential to describe the multifaceted aspects of patient care [3].

Registered nurses are responsible for the nursing process and its documentation within care plans. The nursing process is the scientific method that helps nurses organize their activities,

guide their decision-making, and develop individualized, evidence-based nursing care plans [4]. The nursing diagnosis (ND) is the core phase of the nursing process and is equally important as medical diagnosis for physicians [5]. A nursing diagnosis represents the clinical judgment nurses make regarding how individuals, families, or communities respond to health conditions or life processes. It serves as the foundation for choosing nursing interventions aimed to achieve outcomes for which nurses bear responsibility [3].

Various studies underscored the advantages of using ND in clinical practice. These benefits encompass standardized data collection across different settings and patient groups [6], improved nurses' communication [7], and enhanced patient safety to continuous care [8]. Moreover, some studies suggest that the number of standardized nursing diagnoses could influence the length of hospital stays [9] and the hospital mortality rate [2].

Despite the benefits of implementing the nursing process in clinical practice, the implementation speed varies from one country to another due to different social, economic, and cultural realities [10]. For instance, in Europe, Switzerland introduced the practice of recording the nursing process in nursing documentation in the 1980s, and the transition to an electronic format has been an ongoing process in Switzerland for a considerable period [11]. In contrast, in Romania, implementation in clinical practice is still in its early stages. Paper-based nursing documentation implementation began just six years ago, and standardized nursing languages still need to be implemented [12]. However, regardless of the varying degrees of adoption of the nursing process in Europe, there is an increasing demand for nursing to gain new insights from data to provide evidence-based care [13]. The need for global data sharing, accurate data collection, and documentation reuse was also underscored during the COVID-19 pandemic [14].

Many factors may influence the practice of ND. However, the impact of nurses' attitudes on ND is an important factor to be assessed, especially in countries where the implementation is in incipient phases. Attitude is essential/critical in determining whether a behavior will occur [15]. Another significant factor influencing the use of ND is education. Several interventional studies have demonstrated that after participating in educational training programs, nurses make more accurate ND, and the overall quality of the nursing process in nursing documentation significantly improves [7,11,16,17].

In response to new standards established by the National Authority of Quality Management in Health (NAQMH), Romanian health institutions started to put into practice the nursing process [18]. Given that the nursing process implementation has recently commenced in Romania, evaluating nurses' attitudes towards ND and their education on this topic is necessary to understand how effectively nurses apply the nursing process in clinical practice six years after its mandatory implementation. This study is the first in Romania to evaluate these critical factors that strongly influence the successful implementation of the nursing process in nursing documentation.

The objectives of this study were: to investigate the correlation between nursing diagnosis education and nurses' intentions, attitudes toward the use of ND and behavior in using it in practice; to explore the differences between nurses' intention, attitudes, and behavior considering nurses' socio-demographic and professional data.

Methods

A cross-sectional design was used. Clinical and management nurses from five Romanian hospitals were invited to participate in this study using a non-probabilistic, multistage sampling technique. The sample selection was done in two stages: stage one, the purposeful selection of the hospitals, and stage two, the recruitment of the nurses. In stage one, five hospitals from three different developmental regions of Romania (North-East, Centre, and South-Muntenia) were included in the study. Three hospitals were tertiary hospitals, and two were secondary. Two of the healthcare institutions were also academic hospitals. In stage two, all nurses working in different specialties / wards of the included hospitals were invited to participate in the study. The resulting sample consisted of 664 nurses and was obtained through a convenience sampling method.

Data were collected from March to July 2022 using a survey edited in an online format. The nurse director from each hospital sent the survey by email or messaging applications to all nurses under their jurisdiction who deliver care using nursing care plans. Nurses who did not provide direct care to the patient or those who did not use nursing care plans in daily practice were excluded. The invitation contained the link to the web-based survey with an information letter including the study's aims, the expected time required to complete the survey, and ethical issues considerations. The survey required up to 15-20 minutes to complete.

The data collection instrument is based on the scales developed by D'Agostino et al [19].

Participants completed a survey that included the following:

- Socio-demographic (age and gender) and professional data (nursing education, postgraduate training, professional experience, current position).
- Education on ND included familiarization with ND, training on ND, and self-training.
- The intention scale contains a single item that measures nurses' intention to use ND in daily practice. The score ranges from 0 (unfavorable) to 10 (favorable).
- Attitude scale: a 9-item scale uses a semantic differential method for assessing nurses' attitudes about nursing diagnoses. Each item consists of a pair of opposite characteristics (useless/useful, advantageous/disadvantageous, difficult/easy, unpleasant/pleasant,

obstacle/aid, uncomfortable/comfortable, unrewarding/rewarding, unimportant/important, irrelevant/relevant) which represent opposite poles of the diagnostic activity, separated by an Osgood scale of 11 points. The respondent is asked to select the score that best expresses his feelings toward the expressed concept. The score ranges from 0 to 10, where "0" represents the most negative attitude and "10" is the most positive attitude.

Behavior scale: A single item was used to measure nurses' actual behavior regarding the use of ND in practice. The item asks about the frequency with which diagnoses are used in clinical practice. The score ranges from 1 (never) to 5 (always).

Ethical consideration

Ethical approval was obtained from each Research Ethics Committee of all the organizations included in the study (approval no. 5998/9.03.2022; approval no. 2320/8.03.2022; approval no. 1580/22.03.2022; approval no. 14.705/22.03.2022; approval no. 16.758/10.03.2022). The respondents were informed about the study's aim. Participants were guaranteed confidentiality and anonymity. Submission of a completed questionnaire was considered as consent to participate.

Statistical analysis

Descriptive statistics, such as absolute and relative frequencies for categorical variables and means and standard deviations for continuous variables, were used to summarize data.

The parametric independent T-test was applied for qualitative variables with two categories, and one-way ANOVA was used to compare qualitative variables with more than two categories, followed by the Games-Howell post-hoc test. The non-parametric Kruskal-Wallis test was applied for comparisons involving a qualitative variable with more than two categories. A Mann-Whitney U test was used to compare qualitative data with two categories.

To assess differences in continuous variables, Spearman's rho correlation coefficients were used since the data were not normally distributed. Analyses were performed using IBM SPSS Statistics for Windows, version 23. Statistical significance was set at $p < 0.05$.

Results

The total number of questionnaires collected from all five hospitals included in the study was 664. All questionnaires had complete data.

Socio-demographic and professional data

The sample consisted mainly of persons who identified as female gender (91.7%), with an average age of approximately 44 years (43.53 ± 7.99). The participants had an average of 16.52 ± 8.86 years of nurse experience. Regarding the education level, approximately two-thirds of the sample (68.4%) were educated in nursing colleges, while over a quarter (27.7%) had graduated from university programs. Most participants (90.8%) held positions as clinical registered nurses, with slightly less than 10% occupying management roles (Table I); 73 nurses (10.9%) had pursued postgraduate education, with only one respondent holding a doctoral degree.

Education on nursing diagnosis (ND)

Table II presents characteristics describing nurses' familiarity, training, and self-training in ND; 424 (63.9%) of the participants had knowledge about ND and applied it in clinical practice, while slightly over a quarter of nurses (32.7%) did not utilize their knowledge in clinical practice. A small percentage, less than 5% (3.5%), had yet to learn about ND.

Regarding training in ND, more than half of the sample (64.9%) received education that included ND. Nurses who had education primarily focused on ND and those who did not receive any ND-specific education represented 14.5% and 20.5% of the sample, respectively. In response to the open-end question "other answers" in this category, only one response was received, which indicated that the education was insufficient.

The nurses' interest in further education on this topic was assessed based on the number of self-training hours. Half of the sample did not engage in self-training on ND, while 20.6% allocated a maximum of 3 hours per month to self-training; 16.1% of respondents invested more than 8 hours per month in self-training.

Table I. Socio-demographic and professional data.

		Mean (SD)	N (%)
Gender	Female		609 (91.7)
	Male		55 (8.3)
Age		43.53±7.99	
Experience as a nurse (years)		16.52±8.85	
Education level	Nursing high school		26 (3.9)
	Nursing college		454 (68.4)
	University		184 (27.7)
Current nursing position	Clinical nurse		603 (90.8)
	Management nurse		61 (9.2)

Table II. Education on nursing diagnosis.

		N (%)
Familiarization with ND	I use nursing diagnosis in clinical practice	424 (63.9)
	I have knowledge but I do not use ND in clinical practice	217 (32.7)
	I do not know anything about ND	23 (3.5)
Training on ND	Education highly focused on ND	96 (14.5)
	Education included ND	431 (64.9)
	Education did not include ND	136 (20.5)
	Others (education was not sufficient)	1 (0.1)
Self-training	At least 3 hours / month	137 (20.6)
	4-7 hours / month	88 (13.3)
	More than 8 hours /month	107 (16.1)
	No self-training	332 (50)

Table III. Correlation between intention, attitudes and behavior.

Correlation					
			Intention	Behavior	Attitudes
Spearman rho	Intention	Coefficient correlation	1		
	Behavior	Coefficient correlation	0.296**	1	
	Attitudes	Coefficient correlation	0.796**	0.345**	1

Note: ** Correlation significant at the 0.01 level (2-tailed).

Intention, attitudes, behavior

The results indicated that more than half of the respondents (63.3%) favored using ND in nursing practice, while 16.3% opposed its implementation. A percentage of respondents (20.5%) remained undecided.

The nurses' attitudes towards ND were measured on a scale from 0 to 10, with a total mean score of 6.39±3.03. There were no significant mean differences among the items, ranging from 6.10±3.05 for the item "difficult/easy" and 6.72±3.19 for the item "useless/useful."

The behavioral scale was utilized to evaluate the frequency of ND usage in clinical practice. Most respondents (64.5%) reported using ND only occasionally, while slightly over 10% (10.8%) never used it. In contrast, almost a quarter of nurses (24.7%) said they always use ND daily.

The statistical analysis revealed significant correlations among nurses' intention, attitudes, and behavior. The Spearman's rho correlation coefficients showed a strong positive and statistically significant relationship between nurses' intention to make ND and their attitude ($r = 0.796$, $p < 0.01$), a positive and statistically significant relationship between nurses' intention and behavior ($r = 0.296$, $p < 0.01$), and a positive and statistically significant relationship between nurses' attitude and behavior ($r = 0.345$, $p < 0.01$) (Table III).

Education on nursing diagnosis (ND) and intention, attitude, behavior

To identify the associations between the nurses' education and intention, attitudes, and behavior, various inferential statistical tests were conducted as shown in table IV.

Regarding nurses' intention to use ND, a one-way between-groups ANOVA was applied to examine the relationship between nurses' familiarity with ND and their intention to make ND. The results showed a significant difference in familiarity with ND and the nurses' intention to use it; $F(2,64.04) = 20.47$, $p < 0.001$. Post-hoc analysis using the Games-Howell test revealed that nurses who used ND in practice had a significantly higher intention to use it in clinical practice than nurses who have knowledge about ND, but do not use it and nurses without knowledge about ND. Moreover, nurses who have knowledge about ND but do not use it exhibited a significantly higher intention to use ND than nurses without knowledge about ND. Nurses with no knowledge about ND had a significantly lower intention to use it than the first two groups.

Another one-way between-groups ANOVA was conducted with nurses' training on ND as the independent variable and their intention to make nursing diagnoses as the dependent variable. The analysis revealed a significant difference in nurses' training on ND and their intention to use it; $F(2,126.35) = 23.99$, $p < 0.001$. Post-hoc analysis using the Games-Howell test indicated that nurses with education highly focused on ND had a significantly higher intention to use it in clinical practice compared to nurses whose education included ND and nurses whose education did not include ND. Moreover, nurses with education about ND showed a significantly higher intention to use ND than nurses without education about ND. Nurses without education about ND had a substantially lower intention to use it than the first two groups.

Regarding nurses' attitudes, a Kruskal-Wallis test was employed, and it demonstrated a statistically significant difference in nurses' attitudes across three conditions ($\chi 2$ $(2,N = 664) = 57.87$, $p < 0.001$). Nurses who use ND in practice exhibited a higher attitude compared to nurses who have knowledge about ND but do not use it in practice and those who know nothing about ND. Similarly, the Kruskal-Wallis test showed a statistically significant difference in nurses' attitudes across three conditions ($\chi 2$ $(2,N = 664) = 44.62$, $p < 0.001$), with nurses whose education was highly focused on ND having a higher attitude compared to nurses whose education included ND and nurses whose education did not include ND.

To reveal the behavior of nurses, one-way between-groups ANOVA was performed to explore the relationship between nurses' familiarity with ND and their behavior in making ND. The analysis revealed a significant difference in familiarization with ND and the nurses' use behavior; $F(2,83.96) = 263.04$, $p < 0.001$. Post-hoc analysis using the Games-Howell test indicated that nurses who use ND in practice had a significantly higher behavior in using it in clinical practice compared to nurses who have knowledge about ND but do not use it in practice and nurses with no knowledge about ND. Nurses with knowledge about ND, but do not use it in practice and those without knowledge were not significantly different from each other.

Similarly, the ANOVA test was run with nurses' training on ND and nurses' behavior in making ND. Results of the ANOVA showed a significant difference in nurses' training on ND and the nurses' use behavior; $F(2,167.69) = 29.53$, $p < 0.001$. Games-Howell post-hoc test revealed that nurses with education highly focused on ND have significantly higher behavior in using ND in clinical practice than nurses who had included education on ND and nurses with no education on ND. Moreover, nurses with education about ND have significantly higher intention to use ND than nurses without education about ND. Nurses without education about ND have a significant lower intention to use ND than the first two groups (Figure 1).

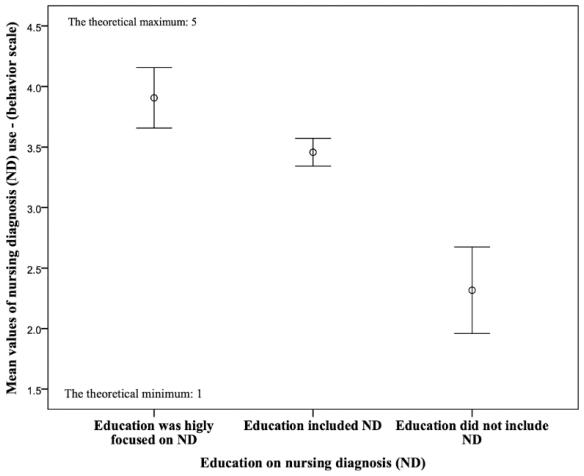

Figure 1. Comparison between nurses' education on ND and the use of ND.

Finally, a significant correlation was found between nurses' behavior in making nursing diagnoses and their self-training on ND (Spearman's rho correlation coefficient $r = 0.126$, $p < 0.01$).

Nurses' characteristics and intention, attitudes, behavior

Regarding gender, an independent sample T-test was conducted to compare the nurses' behavior of using ND for females (F) and males (M). There were significant differences ($t(61.68) = 3.56$, $p = 0.001$) in scores; the mean score for females ($M = 3.50$, $SD = 1.27$) was higher than for males ($M = 2.78$, $SD = 1.46$). The magnitude of the difference in means (mean difference = 0.72, 95% CI: 0.31 to 1.134) was significant. The intention and attitudes showed no significant differences (see Table IV).

One professional variable, the current nursing position, yielded statistically significant results when comparing the intention and attitudes. An independent sample T-test was conducted to compare the nurses' intention of making ND for clinical and management nurses. There were significant differences ($t(83.86) = -4.49$, $p < 0.001$) in scores; the mean score for management nurses ($M = 8.16$, $SD = 2.32$) was higher than clinical nurses ($M = 6.71$, $SD = 3.13$). The magnitude of the difference in means (mean difference = - 1.45, 95% CI: -2.102 to -0.813) was significant. A Mann-Whitney U test revealed that nurses' attitude scores were significantly higher in the management nurses group ($Md = 8.33$, $n = 603$) compared to the clinical nurses group ($Md = 7.00$, $n = 61$), $U = 12697.50$, $z = - 3.99$, $p < 0.001$, with a large effect size $r = - 0.0006$. No significant differences were revealed in terms of behavior.

Non-significant results were obtained between the intention, attitudes, behavior and age, work experience, and education level, as shown in table IV.

Table IV. Comparisons between the nurses' education related to nursing diagnosis (DN), socio-demographic and professional characteristics, and intention, attitudes, behavior.

Variables	Intention			Attitudes			Behavior		
	statistic	*df*	p-value	statistic	*df*	p-value	statistic	*df*	p-value
Education on nursing diagnosis (ND)									
Familiarization with ND	F = 20.47[1]	2	< 0.001	χ^2 = 57.87[3]	2	< 0.001	F = 263.04[1]	2	< 0.001
Training on ND	F = 23.99[1]	2	< 0.001	χ^2 = 44.62[3]	2	< 0.001	F = 29.53[1]	2	< 0.001
Self-training	r = 0.039[2]			r = 0.079[2]			r = 0.117*[2]		0.05
Socio-demographic and professional characteristics									
Gender	t = -0.080[4]	63.79	0.937	U = 16345.50[5]		0.768	t = 3.56[4]	61.68	0.01
Age	r = 0.021[2]			r = 0.024[2]			r = -0.018[2]		
Experience as a nurse (years)	r = -0.040[2]			r = -0.059[2]			r = -0.038[2]		
Education level	F = 37.50[1]	2	0.142	χ^2 = 1.01[3]	2	0.603	F = 4.58[1]	2	0.262
Current nursing position	t = -4.49[4]	83.86	< 0.001	U = 12697.50[5]		<0.001	t = 0.036[4]	70.30	0.972

Note*: df* – degree of freedom; [1]one-way ANOVA; [2]Spearman's rho correlation coefficient; [3]Kruskal-Wallis; [4] t-test ; [5] Mann-Whitney; *correlation is significant at the 0.05 level.

Discussion

The findings of this study provide the first empirical data in Romania about the nurses' profile, their education focused on ND, and its connection to nurses' intention to use ND in clinical practice, as well as their attitudes and behavior towards ND. This paper is part of a larger research project investigating nurses' beliefs about ND [20] and evaluating the implementation of the nursing process in nursing documentation [12].

Considering that the nursing process implementation in clinical practice has recently started in Romania, it is reasonable to evaluate nurses' intention to use ND, attitudes, and behavior about ND. According to Romero-Sanchez et al. [21], while external factors such as institutional support are crucial for the successful implementation of ND in clinical practice, attitudes must also be considered as a determinant to maximize its adoption [15,21]. The results of this study indicated that Romanian nurses exhibit mildly positive attitudes towards ND, which supports the findings in other studies where nurses' attitudes were explored [15,22,23]. Additionally, our study revealed that an increase in intention was associated with a higher attitude towards using ND, and a higher attitude was linked to greater adoption of ND behaviors. Moreover, an increase in intention also correlates with a higher frequency of nurses using ND in their practice. This result supported the findings of a study with cluster analysis, which included two different populations, Spanish and Italian [19]. However, regarding intention, a significant percentage was observed among the nurses who remained undecided. The larger group of undecided nurses could be attributed to the recent mandatory introduction of the nursing process in Romanian practice.

The findings of this study strongly suggest that education plays a pivotal role in the successful implementation of ND in clinical practice. When comparing nurses' training in ND with their intentions, attitudes, and behaviors, significant differences were observed across all three variables. Nurses who received education highly focused on ND displayed significantly higher intentions to use ND, more positive attitudes, and greater adherence to ND in clinical practice compared to those whose education included ND only partially or those without any education on ND. Furthermore, a significant difference was also found between nurses who received an education with some ND information and those who did not receive any information. The latter group exhibited the lowest intention, attitude, and behavior levels regarding applying ND in their daily practice. A similar pattern emerged when nurses were examined for their familiarity with ND and their intentions, attitudes, and behavior.

In addition, several studies emphasized that nurses participating in formal educational programs were more likely to document ND [24] and improved the accuracy of nursing diagnoses [25]. Moreover, as Darmer et al. [26] concluded, educational programs positively shift nurses' attitudes toward nursing documentation and the nursing process. The authors also suggested educating all nurses simultaneously, rather than a few key persons, and expecting them to effect the desired changes [26]. Another variable that yielded statistically significant results is nurses' self-training on ND. The significant positive correlation between self-training and nurses' behavior in using ND provides further evidence that education on ND could increase clinical practice utilization. This positive correlation could be a favorable aspect of implementing ND successfully in Romanian clinical practice.

The results of nurses' training on ND, showed that many nurses received knowledge about ND. This result is most probably attributed to the inclusion of the nursing process in the Romanian National Nursing Curricula by Lucreția Titircă more than 25 years ago [27].

When assessing the number of hours nurses spend on self-training in ND, the results indicated a particular interest among nurses included in our sample to enhance their knowledge about ND. The increased interest in training could be the result of the mandatory implementation of the nursing process as a framework to organize nurses' activities in all Romanian hospitals six years ago to achieve the accreditation criteria [18]. This idea was also supported by significant number of nurses who declared that they used the ND in daily practice.

Regarding nurses' socio-demographic and professional characteristics, the current nursing position is a variable worth discussing. The intention and attitudes of management nurses towards making ND are significantly higher than those of clinical nurses. Similar findings regarding the attitudes of managers were reported in other studies, which are considered positive aspects of healthcare organizations [15,28]. However, in terms of behavior, no significant differences were found in the Romanian sample. One possible explanation could be that the intention and attitudes of management nurses are influenced, on the one hand, by the fact that ND implementation is compulsory by Romanian law and, on the other hand, because they do not directly work with ND but rather apply the existing legislation. To conclude, external factors might influence intention and attitudes toward ND.

Study limitations

The present study has some limitations. First, the fact that nurse directors who recruited the nurses in each hospital studied could have influenced their willingness to complete the questionnaire. Second, the use of self-assessment instead of objective measurements should be considered, especially in the actual behavior of using ND in clinical practice.

Conclusion

The findings of this study revealed that nursing education on ND is a factor significantly correlated to the nurses' intention, attitudes and behavior toward using it in daily practice. The results indicate that Romanian nurses exhibit a generally positive intention, attitude, and behavior toward nursing ND. However, training programs are needed for its successful implementation in clinical practice. Additionally, there is a noticeable interest among nurses in enhancing their knowledge about ND, and nurse managers support its implementation in practice.

Although the implementation of the nursing process in clinical practice is still in its early stages in Romania, the new regulation regarding hospital accreditation standards creates favorable premises for its successful implementation. Nevertheless, managers and educators should develop training programs to promote up-to-date knowledge about ND, including standardized nursing language, for nurses.

Finally, further research is required to assess the effectiveness and outcomes of ND implementation in the Romanian hospital setting.

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