#nursing. What Nurses Do on Instagram— A Mixed Methods Study

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Abstract

Background: Social media use is increasing every year, and nurses use social media to connect with each other. As Instagram was the most downloaded application in 2022 worldwide, this study focused on nurses' use of Instagram in the context of the development of a professional identity and in support of the professionalization of nursing.

Objectives: The aim of the study was to find out how nurses use their Instagram profiles to influence their followers' professional identity and support the professionalization of nursing. Therefore, nurses' Instagram posts and the hashtags they used were analyzed.

Methods: A visual content analysis to analyze different Instagram posts using a hierarchical cluster analysis, an ANOVA, and a qualitative content analysis were conducted. The most frequently used nursing-related hashtags were analyzed to include different Instagram profiles ($n = 15$) in the study.

Results: This study identified three different clusters of Instagram profiles, which can be characterized as "*Show me what you do*," "*Let's do education*," and "*The things we believe in*." Consequently, it can be stated that nurses who display their values and beliefs in Instagram reels, half in nursing settings and half at home, have the highest number of followers and significantly more comments per post. The cluster that showed significantly more knowledge-based posts had the lowest number of followers and significantly the lowest number of comments. The content analysis of the hashtags used suggested that nurses who identify themselves as such want to attract attention from other nurses who use nursing-related hashtags.

Conclusions: The results reveal that there is a possible benefit of the use of social media in the development of the nursing profession and professional identity. Followers and interactions can be generated when Instagram users identify with the profile and wish to discuss professional beliefs and values.

Introduction

In total, 5.18 billion people use the Internet worldwide (DataReportal et al., 2023). Of this 5.18 billion, as of April 2023, 4.8 billion people have been reported to use social media (DataReportal et al., 2023). Further, the daily time spent on social media is reported to have increased from 145 min in 2020 to 151 min in 2023 (We Are Social et al., 2023). This indicates the increasing relevance of social media use in daily life.

In this study, social media is understood as "*[…] web-based services that allow individuals, communities, and organizations to collaborate, connect, interact, and build community by enabling them to create, co-create, modifies, share, and engage with user-generated content that is easily accessible*" (McCay-Peet & Quan-Haase, 2016, p. 17).

Based on data from January 2023, Instagram was the most downloaded application (547 million downloads) worldwide in 2022, followed by WhatsApp (424 million), Telegram (310 million), and Facebook (298 million) (Apptopia, 2023). Approximately 30.8% of Instagram users worldwide are aged between 18 and 24 years, 30.3% are aged between 25 and 34 years, 15.7% are aged between 35 and 44 years, and 8.4% are aged between 45 and 54 years (We Are Social et al., 2023). Approximately 22% of all social media users aged between 18 and 65 years use social media for work-related networking and research (GWI et al., 2023). Further,

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in the nursing profession, younger nurses use social media more often than older nurses (Lefebvre et al., 2020).

Review of Literature

Professionalization

In this study, a profession is defined as "*[…] a disciplined group of individuals who adhere to ethical standards and who hold themselves out as, and are accepted by the public as possessing special knowledge and skills in a widely recognized body of learning derived from research, education, and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interest of others*" (Australian Council of Professions, 2003). The process of professionalization consists of discipline-related aspects (development of professional knowledge and skills), personal aspects (including members in the profession), and the general theory of action (dealing with practical problems; Obrecht, 2013). In this case, professional actions include professional knowledge and skills required to solve practical problems (Obrecht, 2013); professional knowledge and skills are fundamental to the process of professionalization (Ferguson & Ramsay, 2010).

Professional Identity

Professional identity describes nurses' perceptions of self and is defined as "*who they are, their logics of action, how they act, their vocabularies of motive, and what language is salient*" (Thornton et al., 2012, p. 54). This perception of self consists of knowledge, skills, values and beliefs, and actions (Fitzgerald, 2020).

Social Media as an Influencing Factor for Professional Identity and Professionalization

According to Lefebvre et al. (2020), approximately 60% of nurses included in their study used social media platforms, such as Instagram. It can be expected that nurses will display high levels of social media interaction and connectivity in the future (Lefebvre et al., 2020). This implies that they will be able to exchange knowledge or advice and connect with others or with their workplaces (Oksa et al., 2021). Kung and Oh (2014) indicated that the use of social media is an effective and substantial tool to reach and educate a large number of nurses worldwide with quick information in nursing education, nursing practice, and nursing research. Social networking platforms can significantly influence the development of professional identity (Kasperiuniene & Zydziunaite, 2019; O'Regan et al., 2018), and social media use "enables professional identity expression, exploration, and experimentation" (Kasperiuniene & Zydziunaite, 2019, p. 9). Since professional identity is part of the professionalization process (e.g., enrolling members into the profession;

Obrecht, 2013), it can be stated that social media tools have a growing importance in the development of professional identity (Kasperiuniene & Zydziunaite, 2019).

The Social Media Theory

As a theoretical framework, this study employs the casual-chain framework of social media research. This framework includes antecedents, moderators, mediators, and outcomes (Ngai et al., 2015). The antecedents comprise social factors (e.g., social influence and social capital), user attributes (user perception, user experience, and user personality), and organizational attributes (customer orientation and marketing organization; Ngai et al., 2015). The moderators include user characteristics (demographics, user personality, and cultural differences) and social factors (social influence and social capital). The mediators include platform attributes (choice of tools and tool integrity), social factors (social influence and social capital), and user attributes (user perception and user behavior). The outcomes include the personal context (user intention and user behavior) and the organizational context (brand equity and customer relationship) (ibid.). Moderators, mediators, and outcomes are characterized as output variables and antecedents are characterized as input variables of social media (ibid.). "*In the casual-chain framework, antecedent is a stimulus that precedes a behavioral outcome and is always positioned at the input side of the framework*" (Ngai et al., 2015, p. 36).

Method

Design

This study is based on the casual-chain framework, which includes the variables (a) antecedents, (b) mediators, (c) moderators, and (d) outcomes (Ngai et al., 2015). As the study focuses on the social media profiles of nurses, the included posts were seen as (a) input variables and the intended professional identity as the (d) outcome. Before the study began, the authors chose (b) Instagram as the mediator/tool for the analysis. As (c) moderators, the hashtags used in the included posts were analyzed using a qualitative content analysis. Figure 1 presents the study design.

To analyze the Instagram posts, a visual content analysis was conducted (Rose, 2001). The visual content analysis includes four steps: (a) finding images, (b) devising categories for coding, (c) coding the images, and (d) analyzing the results (Rose, 2001). The aim of the study was to analyze nurses' Instagram posts to obtain information on their contribution to the professionalization of nursing and the development of professional identity.

Data Collection

(a) The researchers used www.analisa.io to identify Instagram profiles by searching for nursing-related hashtags
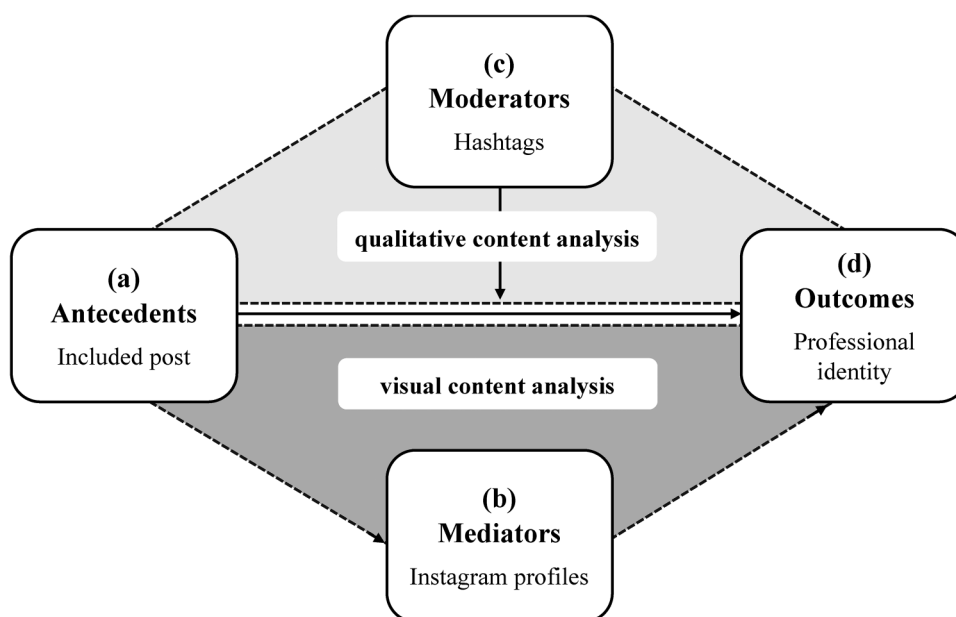
Figure 1. Study design.

Table 1. Instrument (Example).

Casual-chain framework (Ngai et al., 2015)	Professionalization (Obrecht, 2013)		Professional identity (Fitzgerald, 2020)	Operationalization (e.g., users' experience)
User attributes • User experience (share experiences)	Discipline-related aspects	Professional knowledge	Knowledge	Presentation of knowledge
		Skills	Skills	Presentation of skills
• User perception/ personality (share context)	Personal aspects	Creating profession members	Values/beliefs	Presentation of values and beliefs
	General theory of action	Practical problems	Actions	Presentation of one's own actions
Social factors • Social capital (built competence) • Social influence (built connection)				

in June 2023. After selecting 15 Instagram profiles for inclusion, the different posts were randomized. The inclusion criteria and the nursing-related hashtags utilized for identifying relevant Instagram profiles are described in the Sample and Inclusion criteria section. (b) In the next step, an instrument to conduct the data analysis based on the casual-chain framework (Ngai et al., 2015) was developed. (i) As the included posts were seen as input, the input variable (antecedents) of the framework was used to operationalize the items of the instrument. Because the aim of the search strategy was to find real persons, organizational attributes were excluded and social factors and user attributes were focused on. As the aim of the study was to ascertain how nurses influence the (iv) professional identity of their followers as outcomes, the study included the process of professionalization,

consisting of discipline-related aspects, personal aspects, and the general theory of action (Obrecht, 2013) in the instrument. Beyond this, the study included a few aspects of professional identity knowledge, skills, values and beliefs, and actions (Fitzgerald, 2020). The scale was dichotomous regarding whether an item fits (yes) or does not fit (no). The developed instrument is presented in Table 1.

Data Analysis

(c) Thereafter, the instrument was used to analyze the randomized posts of the included profiles, in the context of the criteria of professionalization and professional identity. In addition, the hashtags used in the included posts were documented (d). Then, a hierarchical cluster analysis to analyze

the data using SPSS version 29 was conducted. To identify clusters, Ward's method was used. Further, an ANOVA with a Tukey-HSD post-hoc test was performed to identify possible differences between the clusters. To analyze the documented hashtags, the study uses document analysis (Schmidt, 2017) using summarizing qualitative content analysis (Mayring, 2015).

Ethical Approval

As Instagram is an open and public platform on which posts and profiles are available for all users (according to the owner's profile settings), there is no ethical approval necessary for this study. Following Chretien and Kind (2013), the researchers anonymized the included Instagram profiles for the presentation of the results.

Aim and Research Question

As social media is a major platform for communication and interaction (Spasojevic et al., 2015), it has become an integral part of nurses' everyday lives. In their study, Lefebvre et al. (2020) showed that nurses commonly use social media. The use of social media among nurses depends on the purpose— for example, professional development, engagement with patients, marketing, or entertainment (Kung & Oh, 2014). In the nursing profession, social media use can provide an opportunity to communicate or share research with other nurses (Geraghty et al., 2021), as social media is a powerful tool for reaching audiences across the globe (Kung & Oh, 2014).

The study by Kazemi et al. (2022) revealed that social media is a significant tool in nursing education and can be used to promote professional skills. Because occupational socialization refers to identity development within the purview of occupational socialization conditions (Darmann-Finck & Duveneck, 2023), social media must be considered a relevant factor in developing a professional identity in nursing. Research reveals the significant potential of social media in developing a professional identity (O'Regan et al., 2018), but there is a research gap with regard to the connection between using educational interventions (in this study, Instagram posts) and the development of a professional identity in nursing (Darmann-Finck & Duveneck, 2023). Beyond this, there is little knowledge of how nurses use social media and how nurses perceive social media (Geraghty et al., 2021) and, thus, the study focuses on the impact of nurses' Instagram use on the development of the nursing profession. The main objective of the study was to identify how nurses use their Instagram profiles to influence their followers' professional identity and support the professionalization of nursing.

Therefore, the following research questions were developed:

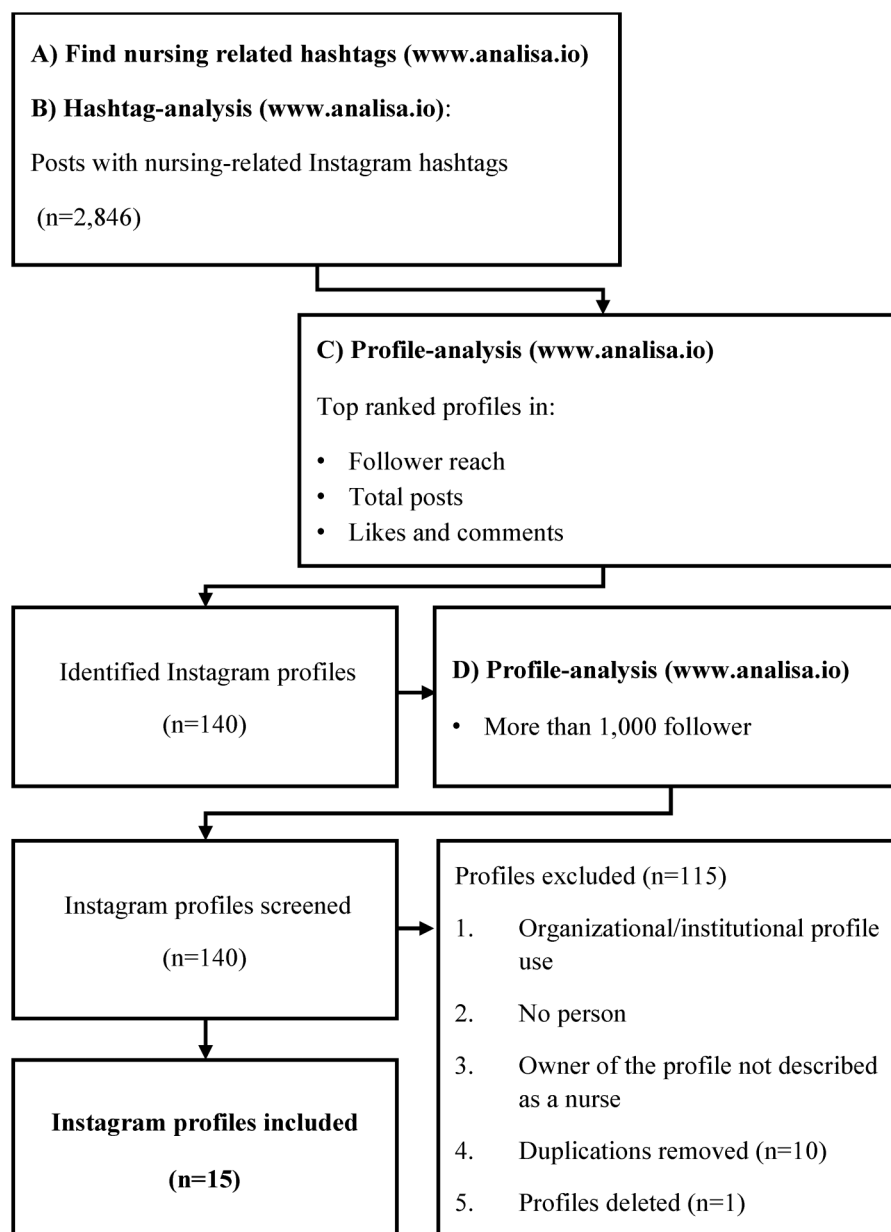- How do nurses' posts on Instagram influence the development of the nursing profession?

- How do nurses' Instagram posts influence the development of a professional identity for nurses?
- Which hashtags do nurses use to connect with their community?

Sample and Inclusion Criteria

The search strategy was developed and implemented by both researchers. Other social media research has identified relevant content by performing a hashtag search on Instagram (Kerr et al., 2020; Lucibello et al., 2021). The identification of relevant content was performed in a four-step process. (a) To include relevant Instagram profiles, the most frequently used nursing-related hashtags on Instagram using www.analisa.io were analyzed. The most frequently used hashtags on Instagram were #nursing, #pflege, #nurse, and #nurselife (www.analisa.io [5.7.23]). This step was necessary because "*[t]he selectivity paradigm of media effects theories states that […] individuals can only attend to a limited number of media messages out of the wealth of media messages that can potentially attract their attention, […] they select these media messages in response to dispositions, needs, and desires that differ from person to person, and […] only those media messages they select have the potential to influence them*" (Valkenburg, 2022, p. 40).

(b) To analyze these hashtags, another analysis using www.analisa.io was performed. The period for the analysis was from January 2019 to June 2023. A total of $n = 2,846$ Instagram posts using the hashtags #nursing ($n = 586$ posts), #pflege ($n = 409$ posts), #nurse ($n = 1294$ posts), and #nurselife ($n = 557$ posts) were found, among which relevant profiles were searched for. (c) In addition, Instagram was searched to find the top-ranked profiles in terms of follower reach, total posts, likes, and comments that used these hashtags (using www.analisa.io). In total, $n = 140$ Instagram profiles that used these hashtags were found. (d) To include the most relevant profiles, the authors used www.analisa.io to find influencers with over 1,000 followers for every hashtag. Furthermore, the following inclusion criteria were utilized: Because the objective of this study was to ascertain how nurses use their Instagram profiles, organizational or institutional profiles were excluded. The profiles had to show a person, and the owner of the profile had to be described as a nurse in the profile description. After excluding duplicates, 15 Instagram profiles were included in the study. Figure 2 presents the search strategy.

After selecting the profiles, the researchers selected different posts for analysis. To avoid confirmation bias, the authors decided to randomize the selection of the included posts. Therefore, 10 of the 20 most recent posts on every Instagram profile were included. To select the 10 posts, a random sampling strategy was used, numbering each post from 1 to 20 and using www.randomizer.org to select 10 posts from each of the included profiles. As one profile was deleted during the data collection process, $n = 150$

A) Find nursing related hashtags (www.analisa.io)

B) Hashtag-analysis (www.analisa.io):

Posts with nursing-related Instagram hashtags

 (n=2,846)

C) Profile-analysis (www.analisa.io)

Top ranked profiles in:

• Follower reach
• Total posts
• Likes and comments

Identified Instagram profiles

(n=140)

D) Profile-analysis (www.analisa.io)

• More than 1,000 follower

Instagram profiles screened

(n=140)

Profiles excluded (n=115)

1. Organizational/institutional profile use

2. No person

3. Owner of the profile not described as a nurse

4. Duplications removed (n=10)

5. Profiles deleted (n=1)

Instagram profiles included

(n=15)

Figure 2. Search strategy.

Instagram posts from $n = 15$ Instagram profiles were included in the study. The posts were analyzed to identify aspects of professionalism and professional identity as well as to document the used hashtags. The process of developing the instrument is presented in the following section.

Results

Quantitative Results

Sample Characteristics. Fifteen Instagram profiles were included in the analysis. Out of these, eight profiles were located in Germany, five profiles in the United States, one

in Indonesia, and one in Brazil. The analyzed languages were German ($n = 8$), English ($n = 5$), Indonesian ($n = 1$), and Portuguese ($n = 1$). Using the developed instrument, 150 randomized Instagram posts, consisting of selfies, pictures, reels, and carousels were analyzed.

Research Question Results

To analyze the data, a hierarchical cluster analysis using SPSS version 29 was performed. To identify the relevant cluster, Ward's method was used. The dendrogram shows three highlighted and defined clusters of the presentation of the nursing profession. In the next step, the cluster membership of the

Table 2. ANOVA.

	Sum of squares	df	Mean square	F	Sig.	Cluster 1 (M/SD)	Cluster 2 (M/SD)	Cluster 3 (M/SD)
Personal knowledge*	.60	2	.30	6.58	.01	M = 1.88 SD = 0.24	M = 1.37 SD = 0.29	M = 1.85 SD = 0.14
Developing knowledge*	.75	2	.37	81.71	.00	M = 2.00 SD = 0.00	M = 1.43 SD = 0.15	M = 2.00 SD = 0.04
Developing values*	.02	2	.01	4.45	.04	M = 2.00 SD = 0.40	M = 1.90 SD = 0.10	M = 2.00 SD = 0.00
Developing practical actions*	.02	2	.01	4.45	.04	M = 2.00 SD = 0.40	M = 1.90 SD = 0.10	M = 2.00 SD = 0.00
Professional knowledge*	1.32	2	.66	103.36	.00	M = 2.00 SD = 0.04	M = 1.20 SD = 0.00	M = 1.90 SD = 0.12
Professional values*	.38	2	.19	4.98	.03	M = 1.90 SD = 0.90	M = 1.60 SD = 0.30	M = 1.60 SD = 0.23
Professional actions*	.30	2	.15	4.42	.04	M = 2.00 SD = 0.50	M = 1.60 SD = 0.17	M = 1.80 SD = 0.26
Post engagement*	583447393.43	2	291723696.72	5.29	.02	M = 2.00 SD = 0.40	M = 1.9 SD = 0.10	M = 2.00 SD = 0.00
Likes**	566114677.57	2	283057338.78	5.20	.02	M = 3223.33 SD = 2211.75	M = 2538.67 SD = 1966.61	M = 15715.50 SD = 11219.74
Comments**	131496.40	2	65748.20	6.31	.01	M = 66.00 SD = 31.85	M = 135.67 SD = 18.77	M = 245.67 SD = 154.44
Video views**	310545634897.43	2	155272817448.72	5.77	.02	M = 27841.16 SD = 31165.82	M = 22567.33 SD = 29130.96	M = 319762.00 SD = 251517.45
Shown persons**	7.29	2	3.65	8.57	.00	M = 1.15 SD = 0.61	M = 0.70 SD = 0.54	M = 1.30 SD = 1.3

ANOVA = analysis of variance.
*dichotomous scale: 1 = yes; 2 = no.
**numerical value.

included profiles was identified. Cluster 1 includes six Instagram profiles, cluster 2 includes three, and cluster 3 includes six Instagram profiles. The differences between the clusters are presented in the description of clusters section. To compare the three clusters, an ANOVA was performed. To identify the clusters, which differed significantly, the Tukey-HSD test was performed as a post hoc test. The three clusters included 150 analyzed posts. A post-hoc power analysis using the Software G*Power Version 3.1 was performed to interpret the results. With three groups, a medium effect size of f = 0.25 (Cohen, 1988), and a significance level of $\alpha = 0.05$, the ANOVA achieved a large power of 0.80 (Sullivan & Feinn, 2012).

The ANOVA results (Table 2) reveal significant differences between the three clusters in the items personal knowledge, developing knowledge, developing values, developing practical actions, professional knowledge, professional actions, postengagement, likes, comments, video views, and the number of persons shown in the posts. The Tukey-HSD also revealed differences among the clusters, as presented in Table 3.

Description of Clusters

Three clusters that differed from each other significantly were identified. For each cluster, the authors chose a name that best

describes their characteristics. The different clusters and their characteristics are presented in Table 4.

Cluster 1: "Show Me What You Do". Cluster 1 included profiles from the United States (n = 3), Germany (n = 2), and Indonesia (n = 1). Approximately 36.7% of the posts were reels, 31.7% were selfies, 25% were carousels, and 6.7% were pictures. Approximately 36.7% of the nurses showed themselves in private contexts, 18.3% in outside activities, 18.3% on holidays, and 6.7% in a nursing setting. The mean number of followers was 87,127.17. At the time of data collection, the mean number of followed profiles was 2,982.83, and the mean value of total posts was 510.50 in the period analyzed by analisa.io. Compared to the other two clusters, the profiles in this cluster followed the maximum number of other Instagram profiles. Compared to the other clusters, Cluster 1 differed significantly in terms of the item "personal knowledge." The descriptive statistics revealed the highest value in this cluster (1 = yes; 2 = no). The highest value in this cluster indicated that it had the lowest number of posts.

Cluster 2: "Let's Do Education". Cluster 2 included profiles from Germany (n = 2) and Brazil (n = 1). Approximately

Table 3. Results Post-hoc Test.

Casual-chain framework	Dependent variable	(I) cluster no	(J) cluster no	Mean difference (I − J)	Std. Error	Sig.
User experience (share experiences)	Personal knowledge	1	2	**0.52***	**0.15**	**0.01**
			3	0.03	0.12	0.96
		2	1	**−0.52***	**0.15**	**0.01**
			3	**−0.48***	**0.15**	**0.02**
		3	1	−0.033	0.12	0.96
			2	**0.48***	**0.15**	**0.02**
Social capital (built competence)	Developing knowledge	1	2	**0.57***	**0.05**	**0.00**
			3	0.02	0.04	0.90
		2	1	**−0.57***	**0.05**	**0.00**
			3	**−0.55***	**0.05**	**0.00**
		3	1	−0.02	0.04	0.90
			2	**0.55***	**0.05**	**0.00**
	Developing values	1	2	0.08	0.03	0.08
			3	−0.02	0.03	0.83
		2	1	−0.08	0.03	0.08
			3	**−0.10***	**0.03**	**0.03**
		3	1	0.02	0.03	0.82
			2	**0.10***	**0.03**	**0.03**
	Developing practical actions	1	2	0.08	0.03	0.07
			3	−0.02	0.03	0.82
		2	1	−0.08	0.03	0.08
			3	**−0.10***	**0.03**	**0.03**
		3	1	0.02	0.03	0.82
			2	**0.10***	**0.03**	**0.03**
User perception/personality (share context)	Professional knowledge	1	2	**0.78***	**0.07**	**0.00**
			3	0.10	0.05	0.12
		2	1	**−0.78***	**0.06**	**0.00**
			3	**−0.68***	**0.06**	**0.00**
		3	1	−0.10	0.05	0.12
			2	**0.68***	**0.06**	**0.00**
	Professional values	1	2	0.30	0.14	0.12
			3	**0.33***	**0.11**	**0.03**
		2	1	−0.30	0.14	0.12
			3	0.03	0.14	0.96
		3	1	**−0.33***	**0.11**	**0.03**
			2	−0.03	0.14	0.97
	Professional actions	1	2	**0.37***	**0.14**	**0.04**
			3	0.22	0.11	0.15
		2	1	**−0.37***	**0.13**	**0.04**
			3	−0.15	0.13	0.50
		3	1	−0.22	0.11	0.15
			2	0.15	0.13	0.50
Profile characteristics	Post engagement	1	2	684.67	5,250.43	0.99
			3	**−12,492.17***	**4,286.96**	**0.03**
		2	1	−684.67	5,250.43	0.99
			3	−13,176.83	5,250.43	0.07
		3	1	**12,492.26***	**4,286.95**	**0.03**
			2	13,176.83	5,250.43	0.07
	Likes	1	2	654.33	5,215.98	0.99
			3	**−12,312.50***	**4,258.83**	**0.03**
		2	1	−654.33	5,215.98	0.99
			3	−12,966.83	5,215.98	0.07
		3	1	**12,312.50***	**4,258.83**	**0.03**
			2	12,966.83	5,215.98	0.07

Table 3. Continued.

Casual-chain framework	Dependent variable	(I) cluster no	(J) cluster no	Mean difference (I – J)	Std. Error	Sig.
	Comments	1	2	30.33	72.18	0.91
			3	−179.67*	58.93	0.03
		2	1	−30.33	72.18	0.90
			3	−210.00*	72.18	0.03
		3	1	179.67*	58.93	0.03
			2	210.00*	72.18	0.03
	Video views	1	2	5,273.83	115,984.72	0.99
			3	−291,920.83*	94,701.13	0.02
		2	1	−5,273.83	115,984.72	0.99
			3	−297,194.67	115,984.72	0.06
		3	1	291,920.83*	94,701.12	0.02
			2	297,194.67	115,984.71	0.06
			3	1,998.67	1,245.62	0.28
	Shown persons	1	2	0.45*	0.15	0.01
			3	−0.15	0.12	0.42
		2	1	−0.45*	0.15	0.01
			3	−0.60*	0.15	0.00
		3	1	0.15	0.12	0.42
			2	0.60*	0.15	0.00

*significant results between clusters.

Table 4. Cluster Description.

Cluster 1 (n = 6)	Cluster 2 (n = 3)	Cluster 3 (n = 6)
• Posts mostly reels (36.7%) in private contexts • Most profiles followed • Significantly lowest number of posts with personal knowledge	• Posts mostly pictures (53.3%) with no location or setting (73.3%) • Lowest number of followers, total posts, and followed profiles • Significantly most posts with personal knowledge, developing knowledge, and professional knowledge • Significantly lowest number of comments and people shown in posts • Significantly more posts with developing practical actions than Cluster 3 • Significantly more posts with professional actions than Cluster 1	• Posts mostly reels (70%) in nursing settings (28.3%) or private contexts (28.3%) • Highest number of followers and total posts • Significantly more comments per post • Significantly more posts with professional values than Cluster 1

53.3% of the posts were pictures, 26.3% were reels, and 20% were carousels. None of the posts were selfies. Approximately 73.3% of the posts had no location or setting because they were pictures with nursing-related statements or nursing-related information, 23.3% showed only a nursing setting, and 3.3% showed a private context. The mean value of followers was 65,538.67. At the time of data collection, the mean number of followed profiles was 545.33, and the mean value of total posts was 353.00 posts in the period analyzed by analisa.io. Compared to the other clusters, this cluster had the lowest number of followers, the lowest number of followed Instagram profiles, and the lowest number of total posts. The Tukey-HSD test revealed significant differences between this cluster and the other clusters in the items personal knowledge, developing knowledge, and professional knowledge. The descriptive statistics reveal the lowest score in cluster 2 (1 = yes; 2 = no). This implies that this cluster had significantly more posts regarding personal and professional knowledge and knowledge development. This cluster also had the significantly lowest number of comments and the lowest number of persons shown in the posts. The Tukey-HSD test shows significantly more posts regarding the item developing practical actions in this cluster compared with that in Cluster 3. Compared with Cluster 1, this cluster had significantly more posts in the item professional actions.

Cluster 3: "The Things We Believe in". Cluster 3 included profiles from Germany ($n = 4$) and the United States ($n = 2$). Approximately 70% of the posts were reels, 33.3% were pictures, 6.3% were carousels, and 1.7% were selfies. Approximately 28.3% of the nurses showed themselves in a nursing setting, and 28.3% showed themselves in a private context; 26.7% of the posts were pictures with no specific location or setting, 8.3% showed the nurses on holiday, and 3.3% showed them in outside activities. Moreover, the mean number of followers was 282,124.33. At the point of data collection, the mean number of followed profiles was 984.17, and the mean value of total posts was 548.17 posts in the period analyzed by analisa.io. Compared to the other clusters, this cluster had the highest number of followers and the highest number of total posts. Moreover, this cluster had significantly more comments per post than those in the other two clusters. Compared to Cluster 1, Cluster 3 had significantly more posts regarding the item professional values.

Qualitative Results

Sample Characteristics. To analyze the hashtags used in the included posts ($n = 150$), document analysis (Schmidt, 2017) was used. Therefore, the hashtags used were seen as extant documents (Döring & Bortz, 2016) that were not developed for scientific use.

Results Pertaining to the Research Questions. To categorize the hashtags, summarizing qualitative content analysis (Mayring, 2015) was conducted using Mayring's (2015) eight-step process. This process involved (a) determination of the material, (b) analysis of the creative situation, (c) formal characterization of the material, (d) determination of the direction of analysis, (e) theoretical differentiation of the research question, (f) determination of the analysis technique, (g) definition of the units of analysis, and (h) execution of the material analysis (Mayring, 2015).

(a) The first step was to define the hashtags used as material. (b) The next step was to reflect on the situation in which the material was created. In the context of this study, these are the hashtags that were used in the posts analyzed in Chapter 5.1. (c) In the third step, the material was characterized as a description of the included posts. (d) In the fourth step, the direction of the analysis was determined. This study aims to describe which hashtags nurses use to connect with their community, (e) therefore the research question formulated in chapter aim and research question. (f) Based on this research question, a summarizing content analysis was selected as the analysis technique; the (g) units of analysis were the individual hashtags. (h) Based on the 1,742 hashtags used by the nurses. Six inductive categories were created. Following Mayring (2015), the material that had already been processed was viewed and coded again using the revised category system after a new category had been

Table 5. Results of Hashtags.

Category	Subcategory
Nursing ($n = 828$)	Nurse ($n = 399$)
	Emotions ($n = 153$)
	Setting ($n = 99$)
	Health system and criticism ($n = 46$)
	Persons ($n = 35$)
	Medicine ($n = 33$)
	Work ($n = 30$)
	After the shift ($n = 25$)
	Shift ($n = 19$)
	Commercials ($n = 8$)
Departments and education ($n = 295$)	Nursing education ($n = 111$)
	Gynecology ($n = 62$)
	Critical care unit ($n = 46$)
	Emergency room ($n = 14$)
	Vocational training ($n = 7$)
Descriptions ($n = 266$)	Attitude ($n = 77$)
	Locations ($n = 72$)
	Activities ($n = 51$)
	Weather ($n = 50$)
	Clothes ($n = 14$)
	Animals ($n = 2$)
Characteristics ($n = 168$)	Relationship ($n = 75$)
	Self-description ($n = 32$)
	Hair ($n = 29$)
	Tattoos ($n = 20$)
	Eyes ($n = 12$)
Social media ($n = 103$)	Post description ($n = 31$)
	Pictures ($n = 28$)
	Video ($n = 25$)
	Media ($n = 19$)
Finances ($n = 82$)	
Total #: $n = 1,742$	

created. The categories of nursing ($n = 828$), departments and education ($n = 295$), descriptions ($n = 266$), characteristics ($n = 168$), social media ($n = 103$), and finances ($n = 82$) were identified. All categories, subcategories, and frequencies are presented in Table 5.

The category of nursing included the most frequently used hashtags. The subcategories nurse ($n = 399$), emotions ($n = 153$), setting ($n = 99$), health system and criticism ($n = 46$), persons ($n = 35$), medicine ($n = 33$), work ($n = 30$), after shift ($n = 25$), shift ($n = 19$), and commercials ($n = 8$) were created. The category of departments and education contained the subcategories nursing education ($n = 111$), gynecology ($n = 62$), critical care unit ($n = 46$), emergency room ($n = 14$), and vocational training ($n = 7$). The category of descriptions included the subcategories of attitude ($n = 77$), locations ($n = 72$), activities ($n = 51$), weather ($n = 50$), clothes ($n = 14$), and animals ($n = 2$). The category of social media contained the subcategories of post description ($n = 31$), pictures ($n = 28$), video ($n = 25$), and media ($n = 19$). There were no subcategories in the category of finances.

Discussion

This study focuses on how nurses' Instagram profiles present the process of the professionalization of nursing and create a professional identity. With regard to the first research question, "How do nurses' posts on Instagram influence the development of the nursing profession?," the study reveals significant differences among the three clusters of Instagram profiles. Cluster 2 shows significant differences in the disciplinary aspect items (Obrecht, 2013) regarding knowledge (personal knowledge, developing knowledge, and professional knowledge). This identifies Cluster 2 as the cluster that transmits knowledge in personal contexts. This cluster had the lowest number of followers, total posts, and followed profiles as well as the lowest number of comments per post, which indicates that nurses do not want to follow profiles that transmit knowledge as much as they want to follow the profiles in Clusters 1 and 3. In addition, the results indicate that discussions did not begin in the comments. In contrast, Cluster 3 is the cluster with the highest numbers of followers, the highest numbers of posts, and significantly more comments per post than the other two clusters. Kerr et al. (2020) showed that nurses (with over 10,000 followers) engage and interact with users and generate an interpretation of the nursing profession. It had significantly more posts containing personal values than Cluster 1. These personal aspects (Obrecht, 2013) were presented mostly in reels in nursing or private settings. Merging public and private identities is one of the core topics of professional identity (Kasperiuniene & Zydziunaite, 2019). Oksa et al. (2021) revealed positive associations between work-and private-related communication via social media and work engagement. As creating profession members/professional identity (Obrecht, 2013) is a part of the professionalization process, this appears to be an important aspect of this study. Cluster 1 revealed significant results regarding a lack of posts with knowledge-based content. In this study, Cluster 1 was identified as one that did not influence the development of the nursing profession.

With regard to the second research question—"How do nurses' Instagram posts influence the development of a professional identity?"—the results reveal a similar picture. Cluster 2 can be described as significantly more related to professional aspects than the other two clusters. Cluster 2 shows a significantly greater number of actions than Cluster 1. In their systematic review, Kasperiuniene and Zydziunaite (2019) showed that professional identity constructions on social media consist of the representation of the professional self. Based on the data, Cluster 1 did not create any content supportive of the development of professional identity.

To answer the third research question—"Which hashtags do nurses use to connect with their community?,"—a document analysis of the hashtags used in the included posts was conducted. The results revealed that the category of nursing ($n = 828$) was the most frequently used category, containing, for example, descriptions of the nurses themselves ($n = 399$), showing emotions ($n = 153$), or describing the setting ($n = 99$) in which the nurses work. The second most frequently used category was departments and education ($n = 295$), which included different departments, such as the critical care unit ($n = 46$) or nursing education ($n = 111$). The third most frequently used category includes descriptions of the posts ($n = 266$), such as the attitude ($n = 77$), locations ($n = 72$), or activities ($n = 51$) displayed in the posts. Kasperiuniene and Zydziunaite (2019) revealed that belonging to a group is one aspect of professional identity construction. It appears that nurses who identify themselves as nurses on their Instagram profiles may want to attract the attention (Valkenburg, 2022) of other nurses using nursing-related hashtags.

Strengths and Limitations

The strength of this study is that the researchers collected data on Instagram posts by nurses for the first time. This generated practical implications for Instagram profiles used by nurses to develop the professional identity from other nurses. However, this study has a few limitations. The authors selected the Instagram profiles using hashtag analysis, which led to the profiles of specific nurses; there may be other relevant profiles that were not included in the study. The authors focused on 20 Instagram posts per included profile, which may have limited the results. Furthermore, this study did not include the status function of Instagram, which may have caused relevant nursing-specific content to be overlooked. Furthermore, the study included Instagram as the only social media platform. Based on this, the study has limited validity for other social media platforms. As social media content is available for everyone, this study did not focus on nursing practice policies and guidelines. Thus, recommendations to nurses using social media platforms must be developed (Kerr et al., 2020; Lefebvre et al., 2020).

Implications for Practice

The findings reveal, how nurses' Instagram profiles could reach a bigger audience and create more discussions per post. Based on these findings a model for social media implications for nurses was developed. Because there is a need for educational interventions (Darmann-Finck & Duveneck, 2023), this might be beneficial as a tool for the development of nurses' professional identity. The model is depicted in Figure 3.

Using the casual-chain model of social media research, the following aspects can be recommended. The (a) antecedents as input variable consist of the following aspects: perception, experience, and influence (Ngai et al., 2015). The user attribute perception must present personal values, and the user
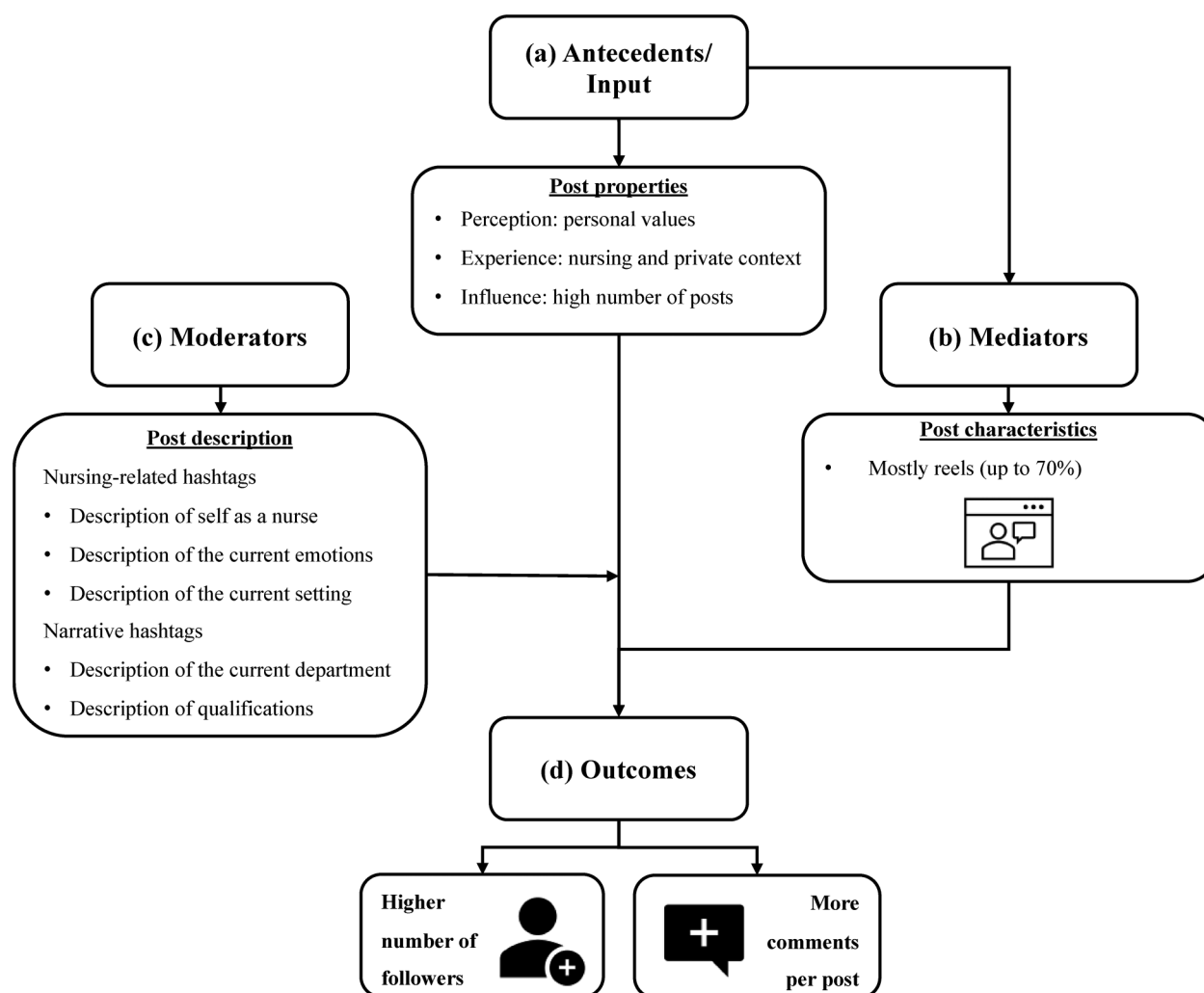
Figure 3. Social media implications for nurses.

experience must show the nurses in private and nursing contexts. As social factors, nurses must create a large number of posts. As (b) mediators, nurses should choose mostly reels to show their content. To engage other nurses and describe the content of the posts, nurses should use narrative hashtags as (c) moderators. Further, it is recommended to use nursing-related hashtags, including the description of self, emotions, and the setting of the post. Furthermore, nurses should use descriptive hashtags, describing their current department (e.g., #emergencyroom, #criticalcareunit) and education (e.g., #nursingstudent, #newgradnurse). The results of this study imply that these aspects lead to (d) outcomes such as a higher number of followers and more comments per post.

While the focus of this study was on nurses who create content, future research must focus on the consumers of this content and the influence of this on the individual's professional identity. Although the study analyzed data from Instagram, there are other possible and prominent social media platforms that would enable the analysis of data from nurses. Future research must develop training modules to educate nurses in using social media to avoid risks like losing accountability, unprofessional behavior, or facing legal consequences (Vukušić Rukavina et al., 2021).

Conclusions

The study reveals that nurses use Instagram to connect with each other. The use of nursing-related hashtags plays an important role in facilitating this connection. Three different clusters with different characteristics were identified. Cluster 1 did not include any content that would support the professionalization of nursing or the development of a professional identity. Cluster 2 contained knowledge-themed posts, and Cluster 3 focused on personal values or showing the profile owner in a nursing setting. Based on the analysis, it appears that nurses follow other nurses less than the other cluster and do not want to discuss the topics related to the posts in the comments section when the content of posts is nursing-related knowledge. It also appears that nurses want to follow other nurses when they show themselves, their

values and their actions. Their followers want to discuss the topics they post about with them. As the study focuses on the impact of nurses' Instagram use on the development of the nursing profession, the findings lead us to a model for Instagram profiles for nurses, as depicted in Figure 3. This could influence the professional identities of numerous nurses and could help to professionalize the field of nursing itself. These findings could also be used to improve the social media profiles of educational institutions to acquire future nurses in different settings.

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