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## Article

# Transfer of Learning of New Nursing Professionals: Exploring Patterns and the Effect of Previous Work Experience

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**Abstract:** While numerous studies have focused on the learning transfer of in-company training in past decades, relatively few have explored the transfer of knowledge from university studies to the workplace, particularly in the context of nursing. Moreover, profile variables tend to be used to describe the sample but not to explore its effect on learning transfer. This article explores the effect of previous work experience—in health—on the learning transfer factors model among new nurses during their first year of work. A total of 196 nurses with six months to one year of experience, representing various healthcare services in Catalonia, participated in this study. We administered a 53-item questionnaire based on the Model to Evaluate Transfer in Nursing Professionals. Using cluster analysis, we identified three distinct groups: Cluster #1 (Academically unprepared with low self-competence), Cluster #2 (Academically unprepared but moderately self-competent), and Cluster #3 (Highly academically prepared and highly self-competent). Nurses in Cluster #3 exhibited a higher degree of learning transfer. However, we also found an interaction between previous work experience and learning transfer. To analyse these interactions, we applied non-traditional analysis techniques, including network analysis, which revealed significant differences between the models with and without work experience. This study highlights the importance of exploring transfer beyond the traditional in-company training context and identifies previous work experiences as one of the key variables that needs to be carefully examined.

**Keywords:** higher education; new nurses; learning transfer; previous work experience



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## 1. Introduction

For new nurses, the first year at work is usually a period of adaptation. During this period, new nurses must adapt to the unit, the service, the new work environment [1] and, at the same time, they must develop new competencies in their new role [2].

The transition from student to nurse is a complicated process [3]. There are many studies that explore the difficulties, stress, and problems perceived by new professionals in the first year of employment [4,5]. Among the perceived problems, one in particular constantly stands out: the gap they experience between what they learned at university and what they really face in the workplace [6]. This gap is defined as the discrepancy between what nursing students acquired through classroom learning during their degree and what they experience in a work environment [7].

This gap can influence learning transfer, the extent to which trainees effectively apply and generalise the knowledge, skills, and attitudes learned throughout their degree in the workplace and the extent to which they are maintained over a certain period of time [8], as well as a student's employment opportunities [9].

In an in-company training context, there are various studies identifying what kind of factors might influence learning transfer [10–12]. However, there is a lack of studies that explore learning transfer and its factors in a complex setting: how the learning acquired during a university degree is transferred to the workplace. Moreover, the literature suggests that previous work experience might influence this process [13]. Thus, in this paper, we try to respond to the following research questions: What patterns are identified when looking at the learning transfer factors of new nurses? To what extent does the previous work experience of new nursing professionals facilitate learning transfer? How can this information help both scientists and practitioners to determine the best way to improve learning transfer, while reducing the abovementioned gap? In order to accomplish this, the aims of this paper are: (1) to identify how new nursing professionals group based on their learning transfer factors; (2) to analyse the effect of the emerging groups on the learning transfer degree; and (3) to explore the effect of previous work experience of new nurses on the learning transfer factors.

## 2. Learning Transfer and Its Factors during the First Year of Employment

Traditionally, learning transfer factors are divided into three broad categories: learner characteristics, training design and content, and work environment [10,14]. The international literature [15–17] has focused on on-the-job learning transfer because the transfer process was easier to identify when employees were asked to apply what they learned in training to their workplace. However, it is difficult to find studies about learning transfer happening in other contexts, such as learning acquired in university and applied to the workplace. Salmerón [18] explains that learning transfer usually occurs from a specific set of experiences, which, in the case of higher education, usually happens a long time after the learning is acquired [19].

Cautaert, Brans, and Ferraro [20] found that, in general, master students were prepared and had the confidence to undertake new initiatives and transfer new skills, with students with work experience being more capable of transferring the new knowledge into practice. Indeed, working students perceived a higher content validity, which authors suggest might be linked to the fact that students with work experience can easily transfer what they see in class to their workplace.

Wang, Zhang, and Yao [21] analysed the effects of using service learning as a learning strategy to enhance the learning transfer of Chinese university students. Based on their results, students expressed having learning transfer situations of more quality when using service learning than students using traditional learning approaches. Basically, using teaching and learning strategies that provide students with real and situated opportunities to transfer facilitates transferring the learning acquired.

Tseng et al. [22] show that students with higher levels of soft skills tend to transfer learning to real-world problems more easily. While Reginato et al. [23] found that accounting students transfer better when they use business game software, allowing them to deal with real-world issues right after learning the main competencies in class.

## 3. Learning Transfer Factors in Nursing Professionals

Nursing students acquire knowledge, skills, and attitudes throughout their academic career. Once they have completed their studies, it is important to have the ability to transfer the acquired learning to their job right after graduation, taking into account that multiple factors can influence learning transfer. Some of these factors include unclear connections between course content, peer support, and gaps in evidence [24].

In nursing, there are studies about learning transfer factors in different contexts, such as the workplace [25], in-company training [26], and in non-traditional classroom

training [27]. Among these factors, prior work experience has not been comprehensively tackled. Marrero and Garcia [13] introduced previous work experience as a variable that influences nurses' perceptions in relation to their incorporation to the workplace. Many nursing students work during the entire university degree, usually in jobs related to their future job as nurses. However, the impact of this previous work experience on their education, and therefore their future job, differs according to the kind of job (e.g., related or not to the nursing profession) and its duration [28].

Allen and Van der Velden [29] found that many students work and study at the same time; this is the reason why many countries include work experience in their curricula in the form of clinical practice. Pool and Swell [30] considered that working is a valuable experience, but it must be related to the studies students are enrolled in to be meaningful. This is why De Groof et al. [31] recently confirmed that workplace learning allows students to acquire competences directly related to their job while working. Along the same lines, Nebot [32] found, in his study on the perceptions and experiences of nursing students before the clinical practice performed during the degree, that there are differences between students with previous work experience and those who do not have it; for example, students with previous experience are not as afraid of using their technical skills compared to students who have no work experience. Likewise, age and previous work experience in health care settings are significant variables; both variables reduce students' stress and concern during internships.

Zeilenikova et al. [33] state that previous work experience in healthcare has a positive relation with the self-assessed competence in senior students. The study suggests that previous work experience is a variable that positively affects both students and new professionals in the improvement of certain competencies.

Even with these pieces of evidence, more studies are needed to investigate the impact of previous work experience of nursing students in their transition from higher education to work. The aims of this paper are: (1) to identify how new nursing professionals group based on their learning transfer factors; (2) to analyse the effect of the emerging groups on learning transfer degree; and (3) to explore the effect of the previous work experience of new nurses on the learning transfer factors.

Indeed, we hypothesise that having prior work experience in the health sector enhances nursing students' learning transfer when they become nursing professionals.

## 4. Materials and Methods

### 4.1. Design

This study follows a transversal design using a quantitative methodology; specifically, we used an online questionnaire as a technique. Data were collected during 2019 through social media. The design of the study was approved by the Ethics Research Committee of the Universitat Autònoma de Barcelona (ref.4136-28/9/2019), as part of a larger study framed within a doctoral thesis. Participants were informed of the research aim and were invited to participate anonymously; they consented to be part of the research.

### 4.2. Sample

We used a two-stage non-probabilistic sampling technique. The first stage consisted of an intentional ( $n = 80$ ) sampling technique by contacting the Col·legi Oficial d'Infermeres i Infermers in Barcelona (COIB), who posted the study on their website and encouraged their members to participate; their lack of response caused us to apply a second stage in our sampling process. Thus, we used a snowball sampling technique through social media ( $n = 116$ ). In the end, we obtained a total sample of 196 nursing professionals (89% females), with an average age of 25 years ( $SD = 4.79$ ), and 66% of them had previous work experience in health environments. To be included in the study, nurses had to have more than 6 months of work experience as nurses after finishing their university degree but no more than 1 year in this role. (see Table 1).

**Table 1.** Sample description by previous or no previous work experience.

	Total Sample = 196	No Previous Work Experience (n = 130)	Previous Work Experience (n = 66)
Gender	Male	13 (10%)	9 (14%)
	Female	117 (90%)	57 (86%)
Age	Mean	24.19 years	26.89 years
	(Standard Deviation)	(4.62 years)	(4.31 years)
Work setting	Hospital	102 (87%)	51 (88%)
	Primary care	6 (5%)	4 (7%)
	Mental health	4 (3%)	2 (3%)
	Other	5 (5%)	1 (2%)
Work region	Barcelona	117 (90%)	63 (95%)
	Tarragona	0 (0%)	0 (0%)
	Lleida	7 (5%)	2 (3%)
	Other	6 (5%)	1 (2%)
Tenure as a nurse after graduation	Mean	9.14 months	8.64 months
	(Standard Deviation)	(1.79 months)	(2.00 months)

#### 4.3. Tools

We applied the questionnaire developed from the Model to Evaluate Transfer in Nursing Professionals (METEnf in its Spanish acronym) [34] composed of 53 items, 14 of them related to nurses' characteristics.

Thirty-nine of the items were scored on a Likert scale (1 to 5) and represented a total of 9 factors: job satisfaction, knowledge, skills, mentor, communication, support, motivation to learn, confidence, training, and learning transfer. The questionnaire is still an exploratory tool, as the sample size does not allow for conducting statistical analyses related to construct validity. Therefore, after ensuring the factors' reliability using Cronbach's alpha, we confirmed that all factors had adequate to good internal consistency (above 0.70), following Nunnally's [35] recommendations. Table 2 provides specific information about the factors and learning transfer.

**Table 2.** METEnf questionnaire: definitions, descriptive statistics, and Cronbach's alpha. Extracted from Roig et al. [12].

	Definition	Number of Items	Mean (Standard Deviation)	Cronbach's Alpha
Job satisfaction	Individual's wellbeing at work	5	4.65 (0.41)	0.709
Knowledge	Information acquired during training	5	3.12 (0.75)	0.889
Skills	Abilities developed during training	5	3.27 (0.71)	0.843
Mentor	Degree in which a very trained and experienced professional is responsible to orient and coach to the new professional in their professional development	5	2.98 (0.92)	0.886

Table 2. *Cont.*

	Definition	Number of Items	Mean (Standard Deviation)	Cronbach's Alpha
Communication	Ability to communicate or interact with the work team	5	3.84 (0.72)	0.865
Support	Perceived support on behalf of the work team	5	4.17 (0.62)	0.756
Motivation to learn	Intensity and persistence that the students have when conducting activities aimed at learning, whether it is during or after a training activity itself	5	4.65 (0.41)	0.797
Confidence	Believing in one's job performance	5	3.85 (0.53)	0.754
Training	Systematic and planned acquisition of concepts, skills, knowledge, and attitudes	5	2.93 (0.82)	0.928
Learning transfer	Extent to which trainees effectively apply and generalise the knowledge, skills, and attitudes learned throughout training in the workplace, as well as their maintenance during a certain period of time	4	3.12 (0.89)	0.888

#### 4.4. Data Analysis

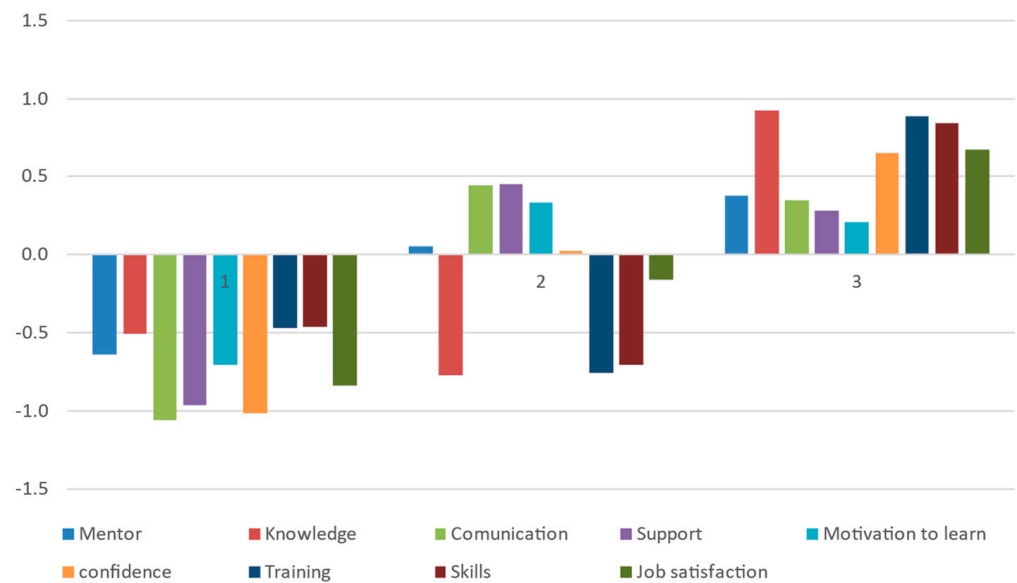
The data were processed and analysed using Jasp 0.17.01.0. We used descriptive, ANOVA, and correlation tests using nurses' characteristics as independent variables: work experience (yes or no) and years of work experience (job experience tenure), and transfer factors, as well as learning transfer, as dependent variables. To ensure the normality of the data, a transformation to z-scores was performed. This approach makes it possible to compare scores between inter and intra-subjects.

To analyse the relationships between the learning transfer factors, we conducted an exploratory graph analysis. In the network visualisation, nodes represent the factors, and edges represent the partial correlations between the factors, after controlling for all other factors in the network [36]. Therefore, the generated network represents all the statistical relationships between the transfer factors.

## 5. Results

In order to reach our aim, we first conducted a cluster analysis based on the METEnf [12] model using a K-means technique. To determine the optimal number of clusters we used the elbow method. We found three cluster groups based on the nine factors of the METEnf (K-means, three iterations): Mentor  $F = 19.808$ ;  $p < 0.001$ ; Knowledge  $F = 150.292$ ;  $p < 0.001$ ; Communication  $F = 69.930$ ;  $p < 0.001$ ; Support  $F = 51.593$ ;  $p < 0.001$ ; Motivation to learn  $F = 22.291$ ;  $p < 0.001$ ; Confidence  $F = 80.623$ ;  $p < 0.001$ ; Training  $F = 128.476$ ;  $p < 0.001$ ; Skills  $F = 100.936$ ;  $p < 0.001$ ; and Job satisfaction  $F = 60.971$ ;  $p < 0.001$ . Figure 1 shows the nurses grouped in three cluster profiles: Cluster #1 Academically unprepared with low

self-competence; Cluster #2 Academically unprepared but moderately self-competent; and Cluster #3 Highly academically prepared and highly self-competent.



**Figure 1.** Three profiles are characterised by their METEnf patterns.

There is a significant effect of clusters on the learning transfer degree itself ( $F_{(2,183)} = 40.782$ ;  $p < 0.001$ ;  $\eta^2 = 0.338$ ). Indeed, post hoc tests show that nurses from cluster #3 ( $M = 3.78$ ;  $SD = 0.70$ ) report higher levels of learning transfer than those from cluster #1 and #2. We did not find significant differences between clusters #2 and #1 (see Table 3).

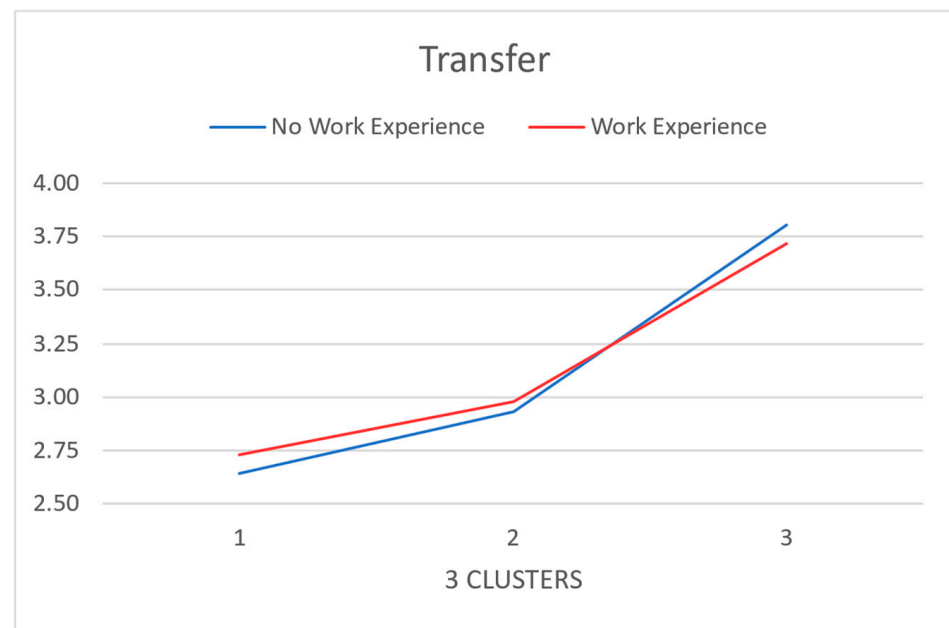
**Table 3.** Multiple comparisons post hoc of the cluster effect on learning transfer.

(I) Three Clusters		Mean Difference (I-J)	Error Deviation	Sig.	95% Confidence Interval	
					Lower Limit	Upper Limit
1	2	−0.28	0.12	0.07	−0.58	0.02
	3	−1.1047 *	0.12	0.000	−1.39	−0.82
2	1	0.28	0.12	0.07	−0.02	0.58
	3	−0.8213 *	0.11	0.000	−1.09	−0.55
3	1	1.1047 *	0.12	0.000	0.82	1.39
	2	0.8213 *	0.11	0.000	0.55	1.09

Note: Bonferroni comparison; Dependent Variable: Transfer; \* significant at  $p < 0.001$ .

The analysis of the effect of the previous work experience of new nurses on different learning transfer factors shows that there is no direct effect on the interaction between previous work experience in health and learning transfer ( $F_{(2,183)} = 0.276$ ;  $p = 0.759$ ) (see Figure 2).





**Figure 2.** Interaction between previous work experience and learning transfer through METEnf profiles.

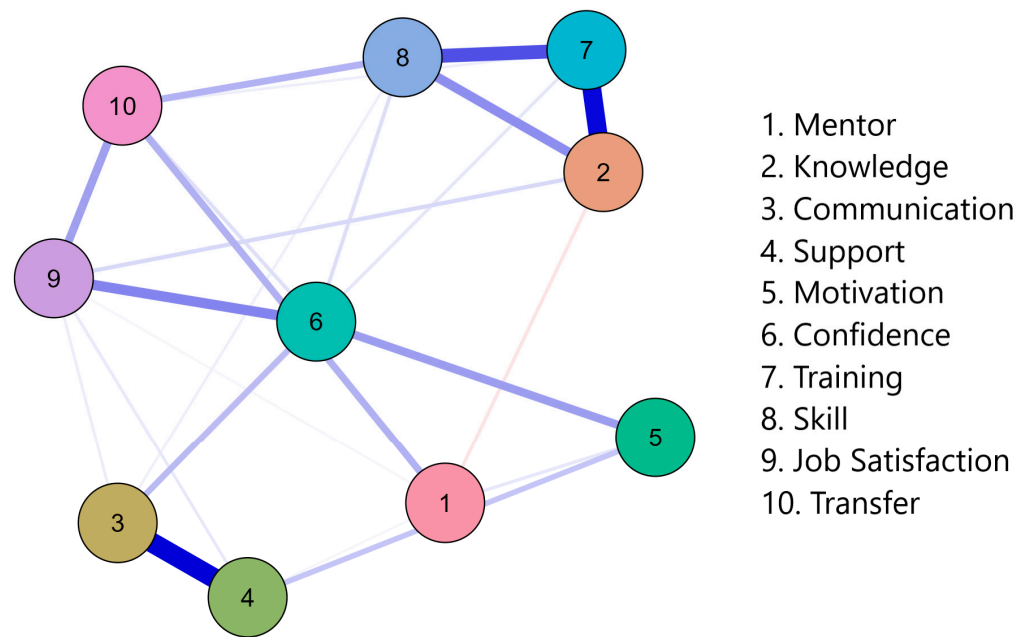
In addition, the analysis of the interaction between the job experience tenure and cluster profile was found to have no significant effect on the transfer ( $F_{(4,180)} = 0.474$ ;  $p = 0.755$ ) (see Figure 3). However, there was a significant low correlation between job experience tenure and transfer ( $r = 0.145$   $p < 0.05$ ).



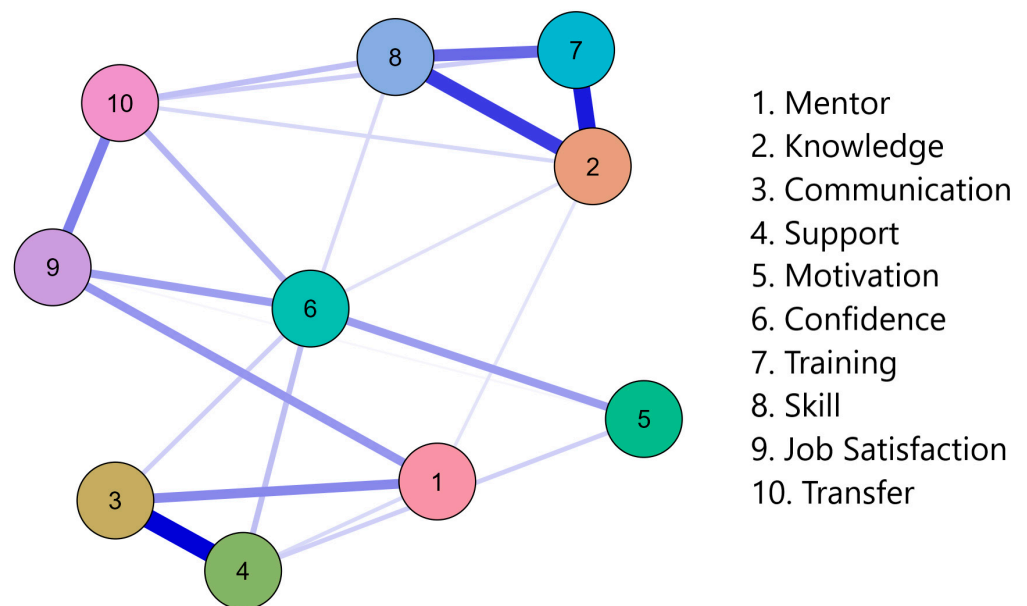
**Figure 3.** Interaction between job experience tenure and METEnf profile.

Nonetheless, with a non-traditional analysis, the network analysis revealed notable differences between the two models under study, one with work experience (Network 1—Figure 4) and one without it (Network 0—Figure 5). In terms of the network structure, Network 1 exhibited a higher density of connections with 23 non-zero edges compared to Network 0's 22, suggesting that work experience might influence the interaction among factors related to transfer.





**Figure 4.** Visual NA pattern Model 1—Experience. Network 1.



**Figure 5.** Visual NA pattern Model 0—No experience. Network 0.

When examining the importance measures of variables, Confidence stood out in both networks with betweenness values of 1.20 and 1.91, respectively, indicating its significant influence on the transfer process. Additionally, Training showed a substantial difference between the networks, with strength values of 0.44 in Network 0 and 1.27 in Network 1, suggesting that training may be a critical factor in the work-experience model (see Table 4).

**Table 4.** Centrality measures per variable.

	0				1			
Variable	Betweenness	Closeness	Strength	Expected Influence	Betweenness	Closeness	Strength	Expected Influence
Mentor	0.69	0.34	−0.87	−0.87	−0.89	−0.84	−1.79	−2.07
Knowledge	−1.10	−1.00	1.30	1.30	−0.89	−0.51	0.91	0.44
Communication	−0.33	−0.35	0.44	0.44	0.26	−0.74	0.27	0.35
Support	−0.59	−0.61	0.28	0.28	−0.73	−1.07	0.15	0.24
Motivation	−1.10	−0.84	−2.24	−2.24	−0.89	−0.41	−1.50	−1.29
Confidence	1.20	0.99	0.66	0.66	1.91	1.12	0.44	0.51
Training	−1.10	−1.06	0.44	0.44	−0.89	−0.60	1.27	1.28
Skills	−0.08	−0.42	0.63	0.63	0.59	0.06	0.81	0.85
Job Satisfaction	0.94	1.59	−0.41	−0.41	0.92	1.62	−0.24	−0.12
Transfer	1.46	1.37	−0.23	−0.23	0.59	1.39	−0.32	−0.20

Furthermore, we observed distinct clustering patterns in two models, one representing individuals without work experience (Network 0) and the other with work experience (Network 1). In Network 0, the variables exhibited disassortative clustering tendencies, with the “Transfer” variable displaying a negative Barrat coefficient (−0.26) and a negative Zhang coefficient (−0.31), suggesting that the variables related to the transfer processes tend to connect with dissimilar variables. Conversely, in Network 1, which represents individuals with work experience, we observed assortative clustering, notably exemplified by the positive Barrat coefficient for “Transfer” (0.54) and the highest positive Zhang coefficient for “Knowledge” (1.51) (see Table 5).

**Table 5.** Clustering Measures.

	0				1			
Variable	Barrat	Onnella	WS	Zhang	Barrat	Onnella	WS	Zhang
Transfer	−0.26	0.02	0.31	−0.31	0.54	0.07	0.46	−0.35
Mentor	−1.75	−1.51	−1.74	−0.63	−0.86	−1.00	−0.53	−0.59
Knowledge	0.44	0.14	0.31	0.61	−0.55	0.67	−1.19	1.51
Communication	0.81	1.15	0.65	−0.64	0.13	−0.09	0.46	−0.68
Support	−0.01	0.08	−0.20	−0.42	−0.30	−0.71	0.46	−0.82
Motivation	0.88	−0.33	0.65	−0.02	−1.42	−1.14	−1.19	−0.90
Confidence	−1.02	−1.02	−1.06	−0.90	−0.57	−0.36	−0.53	−0.56
Training	0.97	0.79	0.65	1.94	1.88	2.11	2.12	1.36
Skill	1.04	1.64	1.50	1.38	1.29	0.96	0.46	1.41
Job Satisfaction	−1.09	−0.96	−1.06	−1.02	−0.14	−0.50	−0.53	−0.39

## 6. Discussion

Our study offers a first look at the effect of the previous work experience of new nurses on their learning transfer process, specifically how they transfer the learning acquired during their university degree. This is a step forward in understanding how to prepare university degree curricula for a clearer transfer process to the workplace [37]. Firstly, we aimed to identify how new nursing professionals are grouped according to their learning transfer factors. Three clusters emerged, stating that not only are knowledge and skills important but feeling competent also matters. However, contrary to our expectations, we found no evidence that new nurses with previous work experience score higher in transfer factors or learning transfer.

We did find though that new nurses from Cluster #3 (highly academically prepared and highly self-competent) transfer to a higher degree than nurses from the other clusters. From a theoretical point of view, this lines up with De Groof et al. [31] when stating that students with previous work experience in health are more mature when facing the job for

which they have been preparing themselves. However, many of the students with previous work experience completed previous study too; so, the question is whether this relation is based on the previous work experience in health of the new nurses or whether it is caused by their previous study in the field [38]. Future research should explore this from a path analysis perspective and explore different variables and their role in the METEnf model, or, using a more sophisticated approach, a machine learning approach like Pessach et al. [39] could be developed to produce a model that mathematically predicts the successful transfer into the workplace of new nurses based on the METEnf model.

In response to our second objective, we analysed the effect of the emergent groups on the degree of learning transfer. We found a positive relationship between job experience tenure and transfer; this result can relate to how the work can be useful in learning and as a curricular component [40]. It could be helpful to study the perception of health organisations on the usefulness of this previous work experience of new nursing professionals, such as the study of Zehr and Korte [41] in engineering studies.

A surprising result was the emergence of Cluster #2: Academically unprepared but moderately self-competent. Its creation might be caused by the numerous clinical trials and placements and internships that students carry out during their degree. These clinical placements allow the student to link the knowledge acquired throughout the degree to a real situation very quickly [42]. These opportunities to learn by experience (learning by doing) comprise half of their training, which facilitates students to face reality sooner, called 'near transfer' [43].

Our third objective was to explore the effect of the previous work experience of new nurses on learning transfer factors. Findings of a holistic perspective of transfer using network analysis underscore the importance of work experience and training in the transfer process. Therefore, we confirmed the hypothesis that nursing students with prior work experience in health have enhanced learning transfer when becoming nursing professionals [44].

In addition, the network analysis cluster results indicate that the variables associated with transfer processes and knowledge tend to cluster with similar variables in the presence of work experience. These findings underscore the potential influence of work experience on the interrelatedness of variables within the transfer process network, implying different dynamics and relationships between the two scenarios [38]. However, these results highlight the need for further detailed analysis to better understand the previous work experience variable. Further research is warranted to delve deeper into the underlying mechanisms and implications of these clustering patterns.

Two of our research questions have been addressed so far: "What patterns are identified when looking at learning transfer factors of new nurses?" and "To what extent does the previous work experience of new nursing professionals facilitate learning transfer?" However, "How can this information help both scientists and practitioners to determine the best way to improve learning transfer, while reducing the above-mentioned gap?" remains unanswered. Advances in this field will allow health organisations to establish specific induction programs to provide specific training and experience to new nurses with no previous work experience in health environments. Here, we specifically address nurses who feel academically unprepared with low self-competence (cluster #1); these nurses will benefit from a more detailed mentorship during their first years of working [45].

It is possible that asking why they feel unprepared involves reviewing what kind of activities are being carried out in the classroom and assessing whether they are sufficient and effective in promoting the transfer of learning. Along the same lines, there is a growing interest in other fields in understanding how prior learning fosters better learning transfer for students once at work [46], in placements [47,48], as well as how to design learning activities to foster learning transfer [18]. Moreover, the work of Aluoch [49] suggests that simulation settings are great learning activities to help healthcare students practise their skills along with placements; that said, simulation design, to foster transfer, should

concentrate on accurately representing reality while challenging learners' critical thinking in the actual clinical situation.

In summary, our study contributes in different ways to the learning transfer of transition processes. First, and as far as the authors have determined, our study is the first one to explore the transfer of learning in the transition processes of new nurses, which will encourage other colleagues to further develop it. Second, our results point out that having previous experience in health environments benefits new nurses, as the uncertainty of a new professional experience might not be as stressful as for the new nurses with no previous experience in health environments. Third, the clustering approach is little used in learning transfer even though it provides a lot of person-centred information, which allows scientists and practitioners to uncover patterns underlying the different ways of how people transfer their higher education learnings into their first year of work. Indeed, new nurses in Cluster #1 (academically unprepared with low self-competence) emerged as a red flag that higher education institutions must address long before they end their studies and enter into the job market. From a practitioner's perspective, health institutions can try to address the issues related to new nurses of Cluster #1 by mentoring and induction programs after being hired.

Finally, the study we present had some limitations. A two-stage non-probabilistic sampling technique is not the best approach for generalisation purposes, but when preparing the collection data of the study, the new LPD was implemented in Spain, and the access we had to new nurses was suddenly restricted. That meant that we could not contact them directly; so, social media was our chosen channel to collect data. One way to address the issue is to ensure higher education institutions keep alumni personal email years after they graduate—after obtaining their permission—so they can be contacted directly by the institution. On the other hand, the final sample size did not allow for collecting evidence of the tool's construct validity through statistical analysis. Future studies must also help increase the sample size so confirmatory factor analysis, or at least exploratory factor analysis, is a possibility.

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