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The nurse teacher's pedagogical cooperation with students, the clinical learning environment and supervision in clinical practicum: a European cross-sectional study of graduating nursing students

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Abstract

Background: A supportive clinical practicum experience may enhance the successful transition and socialization to working life of graduating nursing students. Nurse teachers have the main responsibility of supporting and guiding nursing students with their pedagogical expertise during the students' clinical practicum. Thus, the clinical role of nurse teachers is seen as an essential part of a high-quality clinical practicum. Nursing students appreciate the nurse teacher's cooperation with students, but it is often reported to be unattainable. The aim of this study was to explore and compare graduating nursing students' experiences of the nurse teacher's pedagogical cooperation with students, the clinical learning environment and supervision in their final clinical practicum, and to analyze factors associated with these experiences in six European countries.

Methods: A cross-sectional comparative international survey design was used. The modified Clinical Learning Environment, Supervision and Nurse Teacher (CLES+T) Scale, with a new subscale measuring the nurse teacher's pedagogical cooperation with students, was used. A convenience sample of graduating nursing students in Finland, Germany, Iceland, Ireland, Lithuania and Spain completed the online survey in 2018–2019. The data were analyzed using a Chi-Square test, Pearson's correlation coefficients, and linear models.

Results: A total of 1796 (response rate 49%) nursing students completed the survey. Overall, students had positive experiences of the nurse teacher's pedagogical cooperation, the clinical learning environment and supervision in their final clinical practicum. Students in Spain had the most positive experiences. Educational background factors appeared to be associated with the students' experiences of the nurse teacher's pedagogical cooperation with students, the clinical learning environment and supervision. The relationships between the subscale Nurse teacher's pedagogical cooperation with students and the Clinical Learning Environment and Supervision Scale were perceived as weak to strong depending on the country.

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Conclusions: This study reveals that nurse teachers play an essential role in supporting and guiding nursing students' final clinical practicum. In this light, researchers, educators, and leaders should collaborate seamlessly between educational institutions and healthcare organizations to establish the nurse teachers' pedagogical cooperation role within the clinical learning environment.

Keywords: Clinical learning environment, Cross-sectional study, Final clinical practicum, Graduating nursing student, Mentor, Nurse teacher, Supervision

Background

The final clinical practicum experiences of graduating nursing students (hereafter GNSs) are found to be important for the development of the nursing identity, motivation for nursing as a career [1] and its successful start [1–4]. Nursing students' clinical practicums are dispensed under the supervision of a mentor from the clinical practice and pedagogical cooperation of a nurse teacher (hereafter NT) from the educational institution [5, 6]. The pedagogical cooperation of an NT refers to the cooperation between the students and teacher during the clinical practicum, which aims to support students clinical learning [7]. Therefore, graduating students' experiences of the NT's pedagogical cooperation with students in promoting the clinical learning of students [7] (hereafter NT cooperation), the clinical learning environment (hereafter CLE) in terms of pedagogical atmosphere, leadership style of the ward manager and premises of care on the ward as well as mentor supervision in their final clinical practicum are essential contributors toward ensuring sufficiency and adequacy of the future nursing workforce [8, 9].

A supportive and safe CLE as well as socialization are seen as key elements for GNSs in their successful transition to working life as well as for young nurses in their first work environments [2, 10]. Raising the quality of nursing education, especially the quality and supportive elements of the CLE [11, 12], may also contribute toward higher student pass rates of nursing degree studies [13]. These conditions of the CLE place new demands on nursing education, particularly on NTs. Among students, NTs are valued as key persons in providing student learning evaluations, integrating theoretical and practical knowledge, helping students to understanding their roles as students, and providing emotional support during the clinical practicum [14, 15]. Thus, a high frequency of NT cooperation is seen to be associated with students' positive clinical practicum experiences [16, 17]. By providing constructive feedback and supporting the students' confidence and competence achievement, NTs may also strengthen the motivation of students to pursue nursing as a career [13, 18]. This study focuses on final clinical practicum experiences, with particular emphasis on NT cooperation from the perspective of GNSs.

As already stated in the European Union directive in 2005 [5], NTs have the main responsibility of the student supervision in clinical practicum [5, 15, 17], albeit the clinical role of NTs has been ill-defined over the years and varies across European countries and clinical placements [8, 19, 20]. However, European nursing students commonly appreciate the cooperation they have with their NTs [14, 17, 20–23], despite having reported a lack of support from NTs [14, 19, 21, 22, 24].

Supervising mentors i.e., assigned Registered Nurses (RNs) from the nursing students' practicum ward, together with supervising NTs, play an important role in ensuring a supportive clinical practicum experience and promoting opportunities for the learning of students [18, 25]. As such, mentors are considered to be essential professional role models for students by supporting their professional development [26]. The mentor supervision relationship, commonly conducted as a named, individualized, one-to-one relationship, has been reported as being the most important component of a student's clinical practicum experience [8, 18, 24, 27]. When comparing the group and one-to-one supervision models, the most satisfying supervision model for nursing students has been the one-to-one model [8, 27, 28]. Moreover, the high frequency of this mentor relationship [6, 24, 28] and private unscheduled mentor-student discussions [24] are seen to be associated with a student's positive clinical practicum experience.

There are several student-related individual factors that may positively impact on the clinical practicum experiences of students. The first career choice when entering a nursing program [13, 29] and prior work experience in healthcare have been reported to be associated with good clinical practicum experiences [30]. Therefore, although a student's higher study motivation [19], higher emotional intelligence [31], better clinical practicum experience and the reality of nursing practice play an important role toward the completion of studies and career intent [13, 29], there remains a lack of evidence in these areas [11].

Despite the Bologna process [32] and the requirements for clinical practicum [5, 33], and the common labor market in Europe, there are repeatedly reported disparities in educational factors, such as the implementations of the clinical practicum, i.e. the length and amount of

clinical practicum periods [6, 19, 34–36]. However, a short or perfunctory clinical practicum may not enhance the socialization of students to the practicum placement [37]. Therefore, a long clinical practicum [6, 24, 34, 38] and high-quality theoretical pre-practicum studies [19] are of essential importance. Furthermore, the leadership style of the ward manager in the practicum placement [24, 25, 39] and students' self-reported theoretical knowledge and practical skills at the beginning of the clinical practicum [8] are seen to be associated with a positive clinical practicum experience.

The GNSs represent a critical part of the nursing workforce in solving the nursing shortage in Europe [40]. It is evident that good experiences of the final clinical practicum enhance a successful transition and socialization toward working life, which may have a long-lasting effect on professional commitment and avoiding nurses' intentions to leave the profession [2, 10, 41]. In this light, it becomes evident that students require a student-centric [3, 24], positive and supportive CLE [3]. In general, European nursing students have reported clinical practicum as being a positive experience [8, 24]. Despite this, there are several studies reporting variations in students' clinical practicum experiences between countries, especially NT cooperation and factors associated with it, which remain underexposed in the literature [8, 17, 24, 36]. Therefore, the aim of this study was to explore and compare GNSs' experiences of NT cooperation, the CLE and supervision in their final clinical practicum, and to analyze factors associated with these experiences in six European countries.

The following research questions were addressed:

- (1) What kind of experiences do GNSs have of NT cooperation?
- (2) What kind of experiences do GNSs have of the CLE and supervision?
- (3) What factors are associated with the GNSs' experiences of NT cooperation, and the CLE and supervision?

Methods

Design

The study used a cross-sectional international comparative survey design and is a part of the European Professional Competence of Nursing (PROCOMP Nurse)-project aiming to assess the level of competence of GNSs at the transition period in six European countries. The study describes the clinical role of the NT, whereas the academic role of the NT is already published from this data elsewhere [42]. STROBE cross-sectional reporting guidelines were used in this study [43].

Sample and setting

A convenience sample of GNSs ($N = 3675$, $n = 1796$) from 45 educational institutions in Finland, Germany, Iceland, Ireland, Lithuania and Spain was recruited. These countries were included because their nursing studies are provided either in higher education institutions (HEIs i.e., universities and university of applied sciences) or in nursing colleges or nursing schools [35]. The length of the nursing degree programmes varies from 3 to 4 years and from 210 to 240 European Credit Transfer and Accumulation System (ECTS) credits between the participating countries. Nursing students were eligible for the study if they (1) studied in a nursing degree programme based on European Union directives [5, 33] leading to a qualification as an RN, (2) took their final clinical practicum at the stage of graduation, and (3) conducted the clinical practicum in adult patient units.

The sample sizes, as determined by power analysis, showed that 156 nursing students per country were needed [44]. The number of the total GNS population per year is different in each partner country, thus the sample sizes varied nationally. National geographical representativeness was considered when applicable.

Data collection

The data were collected between May 2018 and March 2019. The online survey was performed with REDCap (<https://www.project-redcap.org/>) electronic software via a shared link during a class or via email and with a reminder email 2 weeks later. A paper-based version with data collection during a class was used in cases where the online version was not possible to use. The national research team and the contact persons for each educational institution were responsible for the identification and recruitment of potential student participants, distributing the questionnaires in their organization and ensuring that it was available to all GNSs meeting the inclusion criteria.

A modified version of the Clinical Learning Environment and Supervision and Nurse Teacher (hereafter CLES+T) Scale [16] was used for the first time in this study to assess GNSs' experience of the NT cooperation, the CLE and supervision in their final clinical practicum. The original CLES+T Scale [16] was modified together with the copyright holder of the CLES+T Scale to make it suitable for this study. This modification was made to explore the diverse and changed clinical role of NTs in the European arena in more detail. For this purpose, the original T -subscale with 9 items was replaced with a new subscale, NT's pedagogical cooperation with students (hereafter T -cooperation), with 5 items assessing: Individual supervision, Relieving stress, Promoting learning,

NT's response time and Ease of cooperation [7]. GNSs' experiences of the CLE and supervision were examined in this study with the following original 4 subscales (25 items) forming the CLES Scale: Pedagogical atmosphere (9 items), Leadership style of the ward manager (4 items), Premises of the care of ward (4 items) and Content of the supervisory relationship (8 items). A five-point Likert scale from 1 (fully disagree) to 5 (fully agree) was used. The internal consistency measured with the Cronbach's alpha was 0.96 for the CLES Scale and 0.88 for the T-cooperation subscale and ranged from 0.83 to 0.85 for the items of this subscale. Moreover, the internal consistency of the T-subscale ranged between countries from 0.85 to 0.91 (Table 2).

The structured questionnaire consisted of two parts. The first part consisted of individual background factors (gender, age, nursing as a first study option, work experience in healthcare, current nursing program) and educational background factors (satisfaction with theoretical studies in their current program, satisfaction with clinical practicum, NT's involvement in supervision, main form of the supervisory relationship) shown to be associated with the nursing students' positive experience of the clinical practicum [17]. The second part consisted of the modified Clinical Learning Environment and Supervision (CLES+T) Scale (Table 1). As there were no previous translations, the T-subscale was translated into national languages (German, Icelandic, Irish, Lithuanian, Spanish) and, in addition, the CLES Scale was translated into Icelandic using the backtranslation method [45]. The national questionnaires were piloted before data collection to ensure their comprehensibility and clarity.

Analyses

To present the data, frequencies (n) and percentages, or mean and standard deviation (SD), were calculated depending on the nature of the variable. A Chi-Square test was conducted to analyze differences between countries both in the categorized total mean T-cooperation scores and in the categorized total mean CLES scores. The association between the total mean T-cooperation score and the total mean CLES score and individual background factors (country, nursing as first study option, work experience in healthcare, current nursing program) and educational background factors (satisfaction with theoretical studies, satisfaction with clinical practicum, meeting with NT, main form of the supervisory relationship) were analyzed with the linear model, including the country and one individual or educational background factor. Only significant factors were left in the final model. Assumptions of normal distributions were checked from studentized residuals (e.g. using a normal quantile plot). A Kruskal-Wallis test was used

to compare item levels of the T-cooperation subscale between the countries while assumptions for the parametric test were not met. After the overall test, pairwise comparisons were adjusted using the Stoll-Dwass method. Mean values are presented despite nonparametric testing to be able to present the differences between the countries. Dependencies between the T-cooperation subscale and CLES Scale were examined with Pearson's correlation coefficient.

Model-based means were estimated to describe the association between the T-cooperation subscale or CLES Scale and the background variable. Cronbach's alpha was used to assess the internal consistency of the scales used in this study. The statistical significance level was set at values of $p < 0.05$ (two-tailed). Moreover, 95% confidence intervals (CIs) were calculated. All analyses were performed using SAS version 9.4 for Windows software (SAS Institute Inc., Cary, NC, USA).

Ethics

Ethical principles [46–48] were complied with throughout the study. The study was approved by the Ethics Committee of the University of Turku (Statement 62/2017, 11.12.2017) and national ethical approvals were received when needed. Permission to conduct the study was obtained from the local educational institution according to national and organizational standards. Permissions to use and translate the original CLES Scale and the T-cooperation subscale were received from the copyright holders. The study was conducted on a voluntary basis and the GNSs were informed orally and in writing about the study and their right to withdraw at any time. Participating GNSs gave their written informed consent before completing the survey.

Results

Participants

Out of 3676 recruited GNSs, a total of 1796 GNSs (total response rate = 49%, range 36–88%) from 45 educational institutions in six countries responded to the questionnaire (Table 1). The GNSs were predominantly female ($n = 1563$, 88.0%) and the median age was 23, ranging from 18 to 60 years. The majority ($n = 1254$, 73.5%) were studying at an HEI and the rest either at a university college in Lithuania or at a nursing school in Germany. More than half of the GNSs ($n = 1079$, 60.7%) reported prior work experience in healthcare, ranging from 0 to 360 months. Half of the GNSs ($n = 826$, 53.2%) had an NT involved in their supervision and more than half had a named individual mentor in their last clinical practicum ($n = 736$, 54.8%). Significant differences were found between countries regarding all background factors, both individual and educational (Table 1).

Table 1 Background factors and significant associations with GNSs' experiences of NT cooperation, the CLE and supervision

	Total N= 1796	Background factors							T-cooperation subscale				CLES Scale	
		Finland n = 514	Germany n = 304	Iceland n = 64	Ireland n = 399	Lithuania n = 272	Spain n = 240	p-value ^a	Model based mean estimate	95% CI	p-value ^b	Model based mean estimate	95% CI	p-value ^b
individual factors														
	Nursing as a first study option													
	Yes	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	< 0.0001			0.51			0.052
	1262 (70.9)	447 (88.3)	177 (58.8)	40 (62.5)	280 (70.5)	163 (60.2)	155 (64.6)							
	No	517 (29.0)	59 (11.7)	124 (41.2)	24 (37.5)	117 (29.5)	85 (35.4)							
Current nursing program								< 0.0001			0.30			0.58
	HEI degree (uni- versity or university of applied sciences)	1254 (73.5)	504 (100.0)	63 (100.0)	361 (99.5)	87 (32.3)	239 (100.0)							
	College or nursing school degree	453 (26.5)	269 (100.0)		2 (0.6)	182 (67.7)								
Educational factors														
Satisfaction with theoretical studies								< 0.0001			< 0.0001			< 0.0001
	Very satisfied	430 (27.0)	21 (4.4)	20 (6.9)	8 (16.7)	39 (11.0)	52 (20.2)	33 (19.8)	4.4	4.2-4.5		3.9	3.8-4.0	
	Satisfied	889 (55.9)	223 (46.7)	144 (49.3)	37 (77.1)	212 (59.7)	164 (63.6)	102 (61.1)	4.0	3.9-4.0		3.8	3.7-3.9	
	Unsatisfied	225 (14.2)	202 (42.3)	106 (36.3)	3 (6.3)	91 (25.6)	36 (14.0)	28 (16.8)	3.5	3.4-3.7		3.7	3.6-3.8	
	Very unsatisfied	46 (2.9)	32 (6.7)	22 (7.5)	0 (0.0)	13 (3.7)	6 (2.3)	4 (2.4)	3.2	2.9-3.5		3.6	3.3-3.6	
Satisfaction with clinical practicum								< 0.0001			< 0.0001			< 0.0001
	Very satisfied	430 (27.0)	155 (32.6)	45 (15.4)	12 (25.5)	86 (24.4)	79 (30.9)	53 (31.7)	4.2	4.1-4.3		4.2	4.1-4.3	
	Satisfied	889 (55.9)	274 (57.6)	160 (54.8)	33 (70.2)	197 (56.0)	136 (53.1)	89 (53.3)	3.9	3.8-4.0		3.8	3.8-3.9	
	Unsatisfied	225 (14.2)	39 (8.2)	72 (24.7)	2 (4.3)	59 (16.8)	33 (12.9)	20 (12.0)	3.6	3.4-3.8		3.4	3.3-3.5	
	Very unsatisfied	46 (2.9)	8 (1.7)	15 (5.1)	0 (0.0)	10 (2.8)	8 (3.1)	5 (3.0)	3.5	3.1-3.9		3.4	3.2-3.6	
NT cooperation with student								< 0.0001						< 0.0001

Table 1 (continued)

	Total N = 1796	Background factors					T-cooperation subscale			CLES Scale	
		Finland n = 514	Germany n = 304	Iceland n = 64	Ireland n = 399	Lithuania n = 272	Spain n = 240	p-value ^a	Total mean	Model based mean estimate	95% CI p-value ^b
Yes	826 (53.2)	269 (56.4)	88 (32.5)	36 (75.0)	101 (30.0)	187 (73.6)	145 (87.9)			3.8	3.7-3.9
No	726 (46.8)	208 (43.6)	183 (67.5)	12 (25.0)	236 (70.0)	67 (26.4)	20 (12.1)			3.6	3.5-3.7
Main form of the supervisory relationship								< 0.0001			< 0.0001
Named individual mentor	736 (54.8)	352 (78.4)	129 (50.2)	11 (25.0)	94 (49.2)	64 (26.8)	86 (52.8)		4.0	3.8	3.7-4.0
Group supervision	111 (8.3)	18 (4.0)	8 (3.1)	4 (9.1)	4 (2.1)	41 (17.2)	36 (22.1)		3.7	3.7	3.5-3.8
Changing supervision	341 (25.4)	69 (15.4)	116 (45.1)	28 (63.6)	44 (23.0)	56 (23.4)	28 (17.2)		3.7	3.6	3.5-3.7
Named clinical placement coordinator or equivalent	155 (11.5)	10 (2.2)	4 (1.6)	1 (2.3)	49 (25.7)	78 (32.6)	13 (8.0)		4.0	3.7	3.6-3.9

GMSs Graduation nursing students, NT Nurse teacher, CLE Clinical learning environment, T-cooperation Nurse teacher's pedagogical cooperation with students, CLES Clinical Learning Environment and Supervision, CI Confidence interval, HEI Higher education institution

^a p-values are calculated using a chi-square test

^b p-values are calculated using with the linear model

Table 2 GNSs' final clinical practicum experiences of the NT cooperation, and the CLE and supervision

	Total n Mean (SD) range	Finland n Mean(SD) range	Germany n Mean (SD) range	Iceland n Mean (SD) range	Ireland n Mean (SD) range	Lithuania n Mean (SD) range	Spain n Mean (SD) range	p-value	Cronbach's α
The nurse teacher's pedagogical cooperation with students									
	823	269	88	36	99	187	144	< 0.0001 ^a	0.88
	3.9 (0.9)	3.8 (0.9)	3.8 (0.9)	4.0 (0.6)	3.7 (1.0)	4.0 (0.8)	4.3 (0.8)		
	1.0-5.0	1.0-5.0	1.6-5.0	2.8-5.0	1.0-5.0	1.6-5.0	1.4-5.0		
Individual supervision	823	269	88	36	99	85	144	< 0.0001 ^b	0.85
	4.2 (0.9)	4.3 (0.9)	4.1 (0.9)	4.2 (0.6)	4.0 (1.2)	4.3 (0.8)	4.4 (0.9)		
	1.0-5.0	1.0-5.0	2.0-5.0	3.0-5.0	1.0-5.0	2.0-5.0	1.0-5.0		
Relieving stress	821	269	88	36	99	86	143	< 0.0001 ^b	0.85
	4.1 (1.0)	4.1 (1.0)	3.9 (0.9)	4.2 (0.6)	3.9 (1.2)	4.2 (0.9)	4.4 (1.0)		
	1.0-5.0	1.0-5.0	2.0-5.0	3.0-5.0	1.0-5.0	2.0-5.0	1.0-5.0		
Promoting learning	822	269	88	36	99	85	143	< 0.0001 ^b	0.83
	4.0 (1.0)	3.8 (1.0)	3.9 (1.1)	4.1 (0.8)	3.8 (1.1)	4.0 (1.0)	4.3 (0.9)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0		
Teacher's response time	821	269	87	36	99	85	143	< 0.0001 ^b	0.85
	3.5 (1.2)	3.2 (1.3)	3.3 (1.1)	3.5 (1.2)	3.5 (1.2)	3.8 (1.2)	3.9 (1.1)		
	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0		
Ease of cooperation	819	269	88	36	99	87	143	< 0.0001 ^b	0.87
	3.7(1.2)	3.5 (1.2)	3.7 (1.2)	3.9 (1.3)	3.1 (1.3)	3.8 (1.2)	4.3 (0.9)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0		
Cronbach's α	0.86	0.86	0.88	0.85	0.91	0.87	0.89		
The learning environment and the content of the supervisory relationship									
Pedagogical atmosphere	1607	480	299	48	358	259	163	< 0.0001 ^a	0.84
	4.0 (0.8)	4.1 (0.8)	3.7 (0.9)	3.9 (0.6)	3.9 (0.8)	4.0 (0.8)	4.2 (0.8)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.3-5.0	1.2-5.0	1.0-5.0	1.4-5.0		
Leadership style of the ward manager (WM)	1603	479	299	47	357	258	163	< 0.0001 ^a	0.85
	3.9 (0.9)	3.8 (0.9)	3.6 (1.0)	4.0 (0.9)	4.0 (1.0)	4.0 (0.8)	3.9 (1.0)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0		
Nursing care on the ward	1603	478	300	47	357	258	163	< 0.0001 ^a	0.85
	3.9 (0.8)	3.9 (0.8)	3.4 (0.9)	4.0 (0.7)	3.9 (0.8)	4.1 (0.8)	4.2 (0.7)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.3-5.0	1.3-5.0	1.5-5.0	2.0-5.0		
The content of the supervisory relationship	1598	478	297	47	356	257	163	< 0.0001 ^a	0.84
	4.0 (0.9)	4.2 (0.9)	3.8 (1.1)	4.2 (0.6)	3.9 (0.9)	4.1 (0.8)	4.3 (0.9)		
	1.0-5.0	1.0-5.0	1.0-5.0	2.4-5.0	1.0-5.0	1.0-5.0	1.0-5.0		
Total mean ^c	1648	514	302	48	362	259	163	< 0.0001 ^a	0.96
	4.0 (0.7)	4.1 (0.7)	3.7 (0.8)	4.0 (0.6)	3.9 (0.7)	4.1 (0.7)	4.2 (0.7)		
	1.1-5.0	1.1-5.0	1.2-5.0	2.9-5.0	1.1-5.0	1.1-5.0	1.8-5.0		

A five-point Likert scale from 1 (fully disagree) to 5 (fully agree) was used

GNSs Graduation nursing students, NT Nurse teacher, CLE Clinical learning environment, SD Standard deviation

^a p-values are calculated between countries using a Chi-square test

^b p-values are calculated between countries using a Kruskal-Wallis test

^c Total mean consists of CLES+T scale, where the original T -subscale is replaced with a T -cooperation subscale

Students' experiences of NT cooperation

Overall, the GNSs had positive experiences of NT cooperation (total mean 3.9, SD 0.9, range 1.0–5.0). GNSs in Spain showed the highest subscale mean score of 4.3 (SD 0.8), while GNSs in Ireland had the lowest subscale mean score of 3.7 (SD 1.0). At the item level, mean scores

varied between 3.5 and 4.4, with the highest means in items assessing the individual supervision of NTs (mean 4.2, SD 0.9) and relieving stress (mean 4.1, SD 1.0). GNSs in Spain reported the highest item mean scores, ranging from 3.9 to 4.4 in all items, while GNSs in Ireland reported the lowest, ranging from 3.1 to 4.0 (Table 2).

Between the countries, there were statistically significant differences both on the subscale level ($p < 0.001$) and item levels of the T-cooperation subscale ($p < 0.004$). On the subscale level, the highest statistically significant between-country difference was detected between GNSs in Spain and Ireland with a difference of 0.6 (CI 95% from 0.8 to 0.4, $p < 0.001$), while the lowest was between Germany and Lithuania with a difference of 0.2 (CI 95% from 0.0 to 0.4, $p = 0.04$) (Table 2).

Students' experiences of the CLE and supervision

Overall, the GNSs had positive experiences of the CLE and supervision (total mean 4.0, SD 0.74, range 1.1–5.0). Between the countries, there were statistically significant differences both in the total mean CLES ($p < 0.001$) and at all subscales ($p < 0.0001$). GNSs in Spain showed the highest total mean CLES score of 4.2 (SD 0.7), while GNSs in Germany had the lowest total mean score of 3.7 (SD 0.8) (Table 2). The highest statistically significant between-country difference was detected between GNSs in Spain and Germany with a difference of 0.5 (CI 95% from 0.7 to 0.4, $p < 0.001$). The lowest statistically significant between-country difference was detected between Finland and Spain with a difference of 0.1 (CI 95% from 0.3 to 0.01, $p = 0.03$).

At the subscale level of the CLES, total means varied between 3.9 and 4.0, with the highest means in subscales Pedagogical atmosphere (mean 4.0, SD 0.8) and Supervisory relationship (mean 4.0, SD 0.9). GNSs in Spain reported the highest total mean scores, ranging from 4.2 to 4.3 in all subscales except in the subscale Leadership style of the ward manager. GNSs in Germany reported the lowest total mean scores, ranging from 3.4 to 3.7 in all subscales (Table 2).

Factors associated with NT cooperation, the CLE and supervision

Statistically significant associations were detected between students' background factors and students' experiences of NT cooperation, the CLE and supervision. GNSs in Spain ($p < 0.0001$), GNSs with a named individual mentor ($p < 0.0001$), and those who were very satisfied with the theoretical studies ($p = 0.02$), reported higher total mean scores of the T-cooperation subscale than others. GNSs in Spain, GNSs with a named individual mentor, nurse teacher involvement in student supervision, and those who were very satisfied with the theoretical studies, reported higher total mean CLES scores (all $p < 0.001$) than others.

The association between the T-cooperation subscale and the CLES scale

In the total sample, a statistically significant moderate positive correlation was detected between the T-cooperation subscale and the CLES Scale ($r = 0.40$, $p < 0.0001$). A statistically significant moderate positive correlation was detected between all five items of the T-cooperation subscale and all four subscales of the CLES Scale. Pearson Correlation Coefficients ranged from 0.19 to 0.36 (all $p < 0.0001$) indicating a weak to moderate positive linear correlation between the T-cooperation subscale and the CLES Scale (Table 3).

In all countries, a statistically significant positive correlation was found between the T-cooperation subscale and the CLES Scale. Pearson Correlation Coefficients ranged from 0.28 to 0.70 (p values ranged from 0.0023 to < 0.0001), indicating a weak to strong positive linear correlation between NT cooperation, the CLE and supervision in the final clinical practicum of GNSs.

Discussion

The overall results of this study are promising for European nursing education and clinical practice. In all participating countries, the GNSs' experiences of NT cooperation, the CLE and supervision were rated highly, indicating positive experiences. This is in line with earlier European studies with students in different stages of their studies [8, 24, 36]. The final clinical practicum of GNSs should provide them with positive experiences and opportunities to face both the reality of nursing practice and the role of the nurse [2]. Such a strategy encourages GNSs to become clinically confident and competent and has the potential to boost the transition of students to the role of the professional nurse [1, 9] and to remain in their newly graduated profession [2].

Table 3 Pearson's correlation coefficients between the T-cooperation subscale and the CLES Scale

Subscales of the CLES Scale	NT's pedagogical cooperation with students	
	R^a	p -value
Pedagogical atmosphere	0.33	< 0.0001
Leadership style of the ward manager	0.28	< 0.0001
Premises of the care on the ward	0.28	< 0.0001
The content of the supervisory relationship	0.39	< 0.0001
Total CLES	0.40	< 0.0001

T-cooperation NT's pedagogical cooperation with students, CLES Clinical Learning Environment and Supervision, NT Nurse teacher

^a The Pearson's correlation coefficient was interpreted as follows: 0.10 to 0.39 weak, 0.40 to 0.69 moderate, 0.70 to 0.96 strong

This study deepened the knowledge base of European NT cooperation, which has been rarely investigated [7]. As the results show, NT cooperation varies both between European countries and on the national level. NT cooperation appeared to influence the GNSs' final clinical practicum experiences positively; those GNSs who had an NT cooperating with them reported more positive experiences than GNSs without this cooperation. This finding is supported by earlier studies [14, 23] and may indicate the importance of the student-centric [3, 24] and supportive CLE [3]. However, NT cooperation has been a priority, especially in Iceland and Spain, where the NT has been assigned with a clear clinical role: In Iceland, a nurse NT (called Clinical Instructors, CIs) consistently meets students on a weekly basis during the clinical practicum, i.e. provides feedback on clinical work, engages in clinical reasoning, encourages independence, and fosters critical thinking based on evidence [49]. In Spain, NTs (called Academic Mentors) act as a "bridge" between the university and the clinical institution, helping students to integrate concepts and guide their reflection during mentoring sessions. Academic Mentors meet both students and nurses in clinical settings and take part in the students' learning and assessing process. Conversely, Ireland is in a unique position with both a Clinical Placement Coordinator (CPC) and an NT involved in the supervision of nursing students, albeit the NT is without any clear clinical role. According to the Nursing and Midwifery Board of Ireland, [50] the CPC is a registered nurse who promotes the CLE by supporting, facilitating and monitoring the clinical learning of students. The CPC's role is highly valued as a form of Practice-Based Teachers who support both the mentors and students in clinical practice. Moreover, the clinical role of the NT is diverse in Ireland; some HEIs have a clear NT role while other HEI teachers attend the clinical placements when there is a need to offer support in relation to the assessment of a clinical practicum or when a student fails a clinical practicum.

Significant differences in GNSs' experiences of NT cooperation in the final clinical practicum were identified between the countries. In Spain, GNSs had the most positive experiences, both of NT cooperation and the CLE and supervision. This may be because the image of nurses in Spanish society has improved in recent years [51], and therefore a larger number of students enter nursing in Spain. In addition, there are good employment opportunities after graduation, and there are vacancies in various clinical settings, such as private and public health centers, hospitals, and nursing homes. However, this may be partly explained with the legal document [52] regulating the rights and duties of students, mentors, and

NTs during the clinical practicum in Spain, thus providing more structure for the supervision of nursing students. The presence of an NT who meets students during clinical practicum maintains a connection between academic and clinical learning and helps students integrate practical and theoretical content. It is evident that these country differences need further research to ensure that European nursing education has a uniform implementation to enhance the quality and adequacy of the future nursing workforce [2, 40].

The results are in line with earlier studies indicating that GNSs highly value the individual supervision from their NT [14, 22], even though it is often reported by students to be unattainable [14, 18]. Moreover, this study reveals that GNSs value the individual supervision of the NT as well as support of the NT for promoting learning and relieving clinical practicum-related stress, even when there are challenges in the NT's response time to the GNSs' requests for cooperation and in the ease of cooperation. It appears that GNSs' expectations of their NT do not fully reflect the actual implementation of the NT cooperation. Thus, new evidence-based cooperation methods with novel alternatives need to be developed. In future, rigorous research is needed to evaluate the usability and utility as well as effectiveness of digital technologies in NT cooperation to enhance the high-quality clinical practicum of nursing students. As a result, the NT's competence in cooperation and technology literacy should also be assessed to enable a full potential of digital technologies in NT cooperation. There is also a need to update the European Union directives to more clearly define the clinical role of NTs in Europe to enable them to have the main responsibility for student supervision in clinical practicum.

Significant differences in GNSs' experiences of CLE and supervision were identified between the countries. These differences may be due to national disparities in the implementations [36] between educational institutions and between the countries involved. It is noteworthy that Ireland was the only country where the length of the last clinical practicum was constant, set to a long period of 36-weeks by the Nursing and Midwifery Board of Ireland's (NMBI) Standards and Requirements [50].

The subscales Supervisory relationship and Pedagogical atmosphere on the ward were rated highest among GNSs, as is also seen in several earlier studies [6, 22, 39, 41]. Thus, the finding highlights the importance of the mentor supervisory relationship [8, 24] and the pedagogical atmosphere in the ward [8]. However, GNSs in Germany studying at a diploma level at nursing school generally rated their experiences poorly when compared to students in other countries studying at HEIs. These

experiences of GNSs in Germany may be due to the common shortage of staff in the practicum settings [53], leading to a situation where students are scheduled as full workers on the practicum ward and with an overworked mentor having limited resources to supervise the student. Moreover, there is a lack of both official guidelines and mentor training of clinical practicum in Germany which may impact the quality of the CLE [54–56].

In this study, GNSs' individual background factors did not affect the students' experiences, albeit some educational background factors were shown to be significantly associated with GNSs' experiences of NT cooperation, the CLE and supervision. First, this study reveals the importance of the NT's role in the final clinical practicum, which is not supported with earlier evidence [8]. Second, the student satisfaction with their learning processes during the degree studies seem to be important in positively affecting GNSs' final clinical practicum experiences. Those satisfied with theoretical studies reported more positive experiences of both NT cooperation, the CLE and supervision, confirming earlier evidence [7]. Moreover, GNSs with a named individual mentor reported more positive experiences of the CLE and supervision, which gives a reason to continue an individualized, one-to-one supervisory relationship in clinical practicums in Europe [6, 33]. However, it should be noted that there is also a growing shortage of clinical practicum placements in Europe, and the supervision of students is increasingly organized by models of supervision in student-dedicated units [26, 57, 58], albeit this model requires further research.

Strengths and limitations

The individual country subsamples collected in this study may not be representative of the national GNS population. However, the electronic survey that was enabled to conduct data collection in several European countries, and the sample of this study, represents a European cohort gathered from several educational institutions in six countries. The total response rate was moderate for the electronic survey, less than half (49%) of the total sample, which is better than the common low response rate associated with electronic surveys [59]. On the European level, the sample may be considered representative; student gender and age distribution were rather similar to European nursing students in general [19, 36]. GNSs in Spain had the lowest response rate at 36%, which should be taken into account when considering the findings of this study. It is possible that those Spanish GNSs who responded to the survey had the most positive

experiences or might have answered in a socially desirable manner. Those who had worse experiences might not have answered the survey. However, this was not possible to control in authentic learning environments; GNSs' clinical placement settings and the pedagogical solutions used in theoretical and clinical studies were not included in the data collection protocol. In the future, these aspects are recommended to be included in international comparative studies in order to be able to interpret country variations in the above-mentioned aspects more deeply.

Conclusion

Overall, NT cooperation, the CLE and supervision were rated at a good level in all participating countries. This study reveals the importance of the clinical role of NTs in supporting and guiding the GNSs' final clinical practicum, but the cooperation is not always optimal. Therefore, more attention should be paid to the unique NT cooperation when designing the clinical practicum implementations, methods of cooperation and NT resources. Moreover, an emphasis on seamless collaboration between educational institutions and healthcare organizations is needed in establishing NT cooperation that is beneficial for the success of nursing students in their clinical practicum, which thus may alleviate the existing nursing shortage. In the future, international longitudinal comparative research throughout all nursing degree studies to the working life of the student is required. In addition, it should be examined whether student learning outcomes and quality of care are associated with positive student experiences of NT cooperation, the CLE and supervision.

Abbreviations

CI: Confidence interval; CLE: Clinical Learning Environment; CLES Scale: Clinical Learning Environment and Supervision Scale; CLES+T Scale: Clinical Learning Environment, Supervision and Nurse Teacher Scale; GNS: Graduating nursing student; HEI: Higher education institution; NT: Nurse teacher; SD: Standard deviation.

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Authors' contributions

C.S.-L., L.S., S.K. and H.L.-K. were responsible for the conception and design of the study. E.L. had overall responsibility for the statistical analyses carried out and assisted with the interpretation of data. C.S.-L. and A.S. were responsible for drafting the manuscript and interpretation of data. All authors made substantial contributions to acquisition of data, drafted the manuscript, or revised

it critically for important intellectual content. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the University of Turku (Statement 62/2017, 11.12.2017). All methods were carried out in accordance with relevant guidelines and regulations. Participants gave their written informed consent before completing the survey.

Consent for publication

Not applicable.

Competing interests

The authors have no competing interests to declare.

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