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Participatory learning to enhance leadership competence in nursing students: a feasibility study

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Abstract

Background Clinical leadership is an important skill for nurses to acquire. This process should begin during undergraduate nurse training. The purpose of this study was to evaluate whether the intervention of enhancing the self-perceived leadership competence of nursing students by incorporating a series of participatory learning activities is implementable into a nursing degree programme.

Methodology Feasibility study, with undergraduate nurse training programme in two Spanish universities, were conducted between autumn 2015 and July 2021 in three phases: design, acceptability and implementation, and expansion. Pre-post intervention study with control groups to examine change in self-perceived leadership skills and satisfaction in both the implementation and expansion phases. The two intervention groups (implementation and expansion phases, respectively) comprised nursing students from two consecutive cohorts at our university ($n = 136$). The two control groups ($n = 132$) were also students from two consecutive cohorts, one enrolled in our university, the other from the nursing degree programme offered by another university. Data were analyzed using: chi-square test for comparisons of dichotomous qualitative variables; Student's t test for unpaired data or the Mann-Whitney U test (depending on the normality); The general linear model with calculation of p values for within- and between-groups differences, with post-hoc Bonferroni correction, to evaluate the effect of the intervention.

Results In general, the results suggest the feasibility of the intervention due to the participatory learning activities were well-received by both students and academic tutors (satisfaction ratings above 80%), and importantly, they enhanced the self-perceived leadership skills of students who received the intervention (increase of 18% compared with 11% and 7% in the two control groups).

Conclusions The results support the feasibility of enhancing the self-perceived leadership competence of nursing students through participatory learning initiatives of this kind, but do not establish the effectiveness of the intervention, because further studies are required to corroborate these findings both within similar contexts and

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across diverse educational and cultural settings. Incorporating leadership training into nursing degree programmes could help to provide the foundational skills that students will need if they are to show clinical leadership in their professional careers. This is important as clinical leadership by nurses can have a positive impact on patient care and is also associated with greater professional satisfaction and resilience to workplace pressures.

Clinical trial number Not applicable.

Keywords Nursing, Students, Clinical leadership, Feasibility studies, Participatory learning initiative, Transformational leadership

Background

Nursing as a clinical profession and academic discipline is underpinned by a specific body of knowledge and skills set. A key task for universities with responsibility for nurse training is therefore to enable students to acquire the competences they will need to become successful professionals [1]. One such competence is clinical leadership, which implies the ability to show initiative in relation to patient care, contributing to sound decision-making and motivating other team members to work together in achieving shared goals [2].

In order to prepare nurses for adopting such a role in professional practice, it is important that they acquire, during their initial training, key competences such as teamwork and decision-making skills, good communication and emotion management, and the ability to plan and solve problems [3]. However, research suggests that new graduates are often unprepared to assume leadership responsibilities [4], due, among other things, to a self-perceived lack of knowledge and experience [5]. It is crucial, therefore, that nurse training institutions incorporate participatory learning activities and approaches to assessment [7, 8] that can foster the development of leadership skills – and an awareness of their importance – among students [5].

There is evidence that clinical leadership by nurses can have numerous benefits both for patients and nurses themselves. Page et al. [9] highlighted the importance of effective leadership for high-quality patient care, while also noting that more needs to be understood about how nurse leadership education may lead to changes in practice. Conroy et al. [10] found that professional nurses who had received some kind of leadership training showed greater resilience to workplace pressures, as well as being more satisfied with their role, including as regards working as a team.

Nursing leadership is often aligned with a transformational style, which prioritizes motivation, inspiration, and collaborative work, enhancing both job satisfaction and clinical outcomes. However, various leadership styles can be effective depending on the context. For example, transactional leadership focuses on supervision and task completion through rewards and penalties. Other styles, such as situational, authentic, servant, or charismatic leadership, bring flexibility, trust, or team cohesion. Effective nurse leaders often combine several approaches to adapt to the needs of the team and the healthcare setting [11, 12].

Broadly speaking, the aim of transformational leadership is to inspire others to reflect on and, potentially, change their values, attitudes and beliefs [13, 14]. Nurses who are capable of acting as transformational leaders would seek to work collaboratively with other professionals while remaining aware of the needs, opportunities and abilities of all those involved, which includes ensuring that the patient's voice is heard [15, 16]. This collaborative aspect means that the role of leader may be occupied by different professionals, depending on the situation and the particular skills or expertise that are required at any given moment [15].

Although some studies [5] have found that the self-perceived leadership competence of nursing students appears to increase slightly merely as a result of following a nurse training programme, we are unaware of any research that has examined whether this competence can be further enhanced by incorporating specific activities into the nursing degree curriculum.

In light of the above, the aim of the present study was to evaluate whether the intervention of enhancing the self-perceived leadership competence of nursing students by incorporating a series of participatory learning activities is implementable into our nursing degree programme.

Methods

Design

This was a feasibility study in which we developed and tested a participatory learning initiative aimed at enhancing the self-perceived leadership competence of nursing students enrolled in a four-year degree programme at a Spanish university. The study was conducted between autumn 2015 and July 2021 and comprised three phases (Design; Acceptability and implementation; Expansion), as in the model described by Bowen et al. [17]. The intervention was implemented in two consecutive cohorts of students and was evaluated using a pre-post design with control groups.

Study phases, participants and setting

Phase I: Planning and design

The intervention was planned based on the three criteria proposed by Bowen et al. [17], namely perceived demand, intention to use and real possibility of implementation in practice. Perceived demand within the nursing community was identified through a series of meetings with a group of experts comprising nursing and medical directors, hospital managers and policy makers. The conclusions reached were: (1) The complex and evolving nature of society is posing constant challenges in terms of healthcare provision; and (2) adequate leadership by professional nurses is important for responding to these challenges, not only because of the size of the nursing profession but also because their presence 24/7 makes them ideally placed to coordinate patient care.

To address the question of intention to use, the degree programme coordinators, in collaboration with academic tutors, drew up a five-year strategic plan in which leadership was identified as a key competence to develop among students. This plan was then submitted to our university's Vice-Rectorate for Academic Affairs and Department of Human Resources for approval, which was duly granted. The real possibility of its implementation in practice was then ensured by securing the necessary funding and resources from within the university.

The process of designing the participatory learning initiative began during the 2015-16 academic year with the establishment of a leadership committee comprising five senior staff members from our university's Department of Nursing. Their mission was: (a) to conduct a detailed review of the literature on leadership competence among nurses, (b) to review the content of the degree programme and to identify where and how to incorporate learning activities aimed at developing students' leadership skills, and (c) to identify a published tool for assessing students' leadership competence. Subsequently, and in collaboration with the Department of Human Resources, the committee designed an 80-hour training course addressing both the theory and practice of leadership and aimed at all academic tutors with responsibility for more than 30 h of teaching during the four-year degree programme. The 80 h were distributed across eight five-hour sessions, one per month. The first four sessions addressed theoretical aspects, and the remaining four applied participatory methodologies aligned with each of the dimensions (Supplementary Material 1). This training course was first offered during the 2016-17 academic year and was attended by 17 academic tutors, who mainly taught students in years one and two. The course was then repeated with a further 13 academic tutors with responsibility for teaching students in years three and four. The ultimate goal of the training was to enable the academic tutors to modify their teaching so as to place greater emphasis on the development of leadership, doing so through the incorporation of specifically designed participatory learning activities.

During the 2017-18 academic year, the leadership committee carried out the transcultural adaptation and validation of the Self-Assessment Leadership Instrument (SALI) [8], the tool chosen to assess students' self-perceived leadership competence giving rise to the valid and reliable version Es-SALI [6]. At the same time, work began on designing learning activities on leadership that could be incorporated into the degree programme and which would begin to be implemented with year 1 students in 2018-19 (the first intervention cohort). To this end, we designed a series of new participatory teaching methods and activities aimed at developing the four aspects of leadership that are addressed by the Es-SALI [6], namely emotional intelligence, strategic thinking, impact and influence (communication), and teamwork skills. A brief description of the activities that were developed is shown in Supplementary Material 1.

Phase II: Acceptability and implementation

This phase of the study began in 2018, with data being collected through to the end of the 2020-21 academic year. In order to evaluate the impact of the new learning activities aimed at enhancing students' self-perceived leadership competence, we conducted a pre-post intervention study with control groups. The intervention group comprised students from the 2018-19 cohort at our university (hereinafter, IG-1), who were the first to receive specific teaching on leadership from the outset of their degree studies. Two control groups were also created. One consisted of students from the previous 2017-18 cohort at our university (hereinafter, CG-A), who followed the standard nursing degree curriculum throughout their studies (i.e. they did not receive any of the new participatory learning activities). This option was chosen as it was not possible, from an organizational point of view, to split the 2018-19 cohort into two groups for the duration of their training (intervention and control). However, we were conscious that although the 2017-18 cohort of students did not engage in any specific learning activities aimed at developing their leadership skills, their academic tutors had taken part in the aforementioned training course, and hence they may have unwittingly introduced certain elements related to leadership into their teaching. In order to address this possible bias, we also used a second control group (hereinafter, CG-B) comprising nursing undergraduates from the 2018-19 cohort at another university in our region. The degree programme offered by this university was comparable to that of our own prior to introduction of the leadership intervention, insofar as its content and structure reflected national standards for nurse training established by the Spanish government [18]. The key difference, therefore, was that students at this second university received no specific teaching on leadership.

For all students (IG-1 and both CG-A and CG-B), self-perceived leadership competence was assessed by administering the Es-SALI at baseline and at the end of each academic year as they progressed through their studies. In order to evaluate acceptability of the participatory learning activities focused on leadership, we obtained satisfaction ratings from students in IG-1, as well as from their academic tutors.

Further details on the evaluation process are given below in the *Measures and Data collection* sections.

Phase III: Expansion

The aim of this phase of the study was to examine the extent to which the leadership intervention was transferable and able to produce comparable outcomes in a different population. To this end, we created a new intervention group (hereinafter, IG-2) comprising students from the 2019-20 cohort at our university. These students received the same specific teaching on leadership as their peers in IG-1, and were likewise assessed using the Es-SALI at baseline and at the end of each academic year (up until July 2021, when data collection for the present study ended). The results obtained were compared with those of the same two control groups (CG-A and CG-B). As in the case of IG-1, we also obtained satisfaction ratings from students in IG-2, as well as from their academic tutors. A timeline of the three study phases is depicted in Fig. 1 (Timeline of the three study phases).

Estimation of sample size

The sample size calculation was based on data from a previous study of leadership behaviour among nursing students. Morales [7] found that students' scores on the SALI ranged between 121 and 150, a difference of 29 points between those scoring lowest and highest on self-perceived leadership. We decided to take this difference as a benchmark for an acceptable degree of improvement following our leadership intervention. Given that the present study required both the comparison of independent groups (intervention vs. control) and paired measures within groups, the calculation indicated that a sample size of at least 60 students would be required to detect a change in SALI score of 29 points (equivalent to 18.1%) with power (1-beta) of 80% and statistical significance (alpha) of 5%. Assuming an attrition rate of 20% across the study period, a total of 74 students per group would therefore be required at the outset.

Measures and instruments

The primary study variable was student ratings of self-perceived leadership competence, measured using the Es-SALI [6]. The Es-SALI comprises 40 self-report items, each rated on a 5-point Likert-type scale from 0 ("I don't usually behave in this manner) to 4 ("I almost always behave in this manner"), and thus the total score ranges from 0 to 160. The 40 items are distributed across four dimensions of leadership: Strategic Thinking (11 items), Emotional Intelligence (8 items), Impact and Influence (7 items) and Teamwork Skills (14 items). Higher scores indicate better self-perceived competence. For each application of the Es-SALI [6] we calculated both the total score and subscale scores. In the present sample, reliability (internal consistency) based on Cronbach's alpha was as follows: Total scale: .87; Strategic Thinking: .732; Emotional Intelligence: .765; Impact and Influence: .781; Teamwork Skills: .688. Regarding the temporal stability of scale scores, which we assessed by re-administering the Es-SALI [6] to a sub-sample of 30 students after 15 days, the intraclass correlation coefficient (ICC) of .929 (p = .000) indicates high test-retest reliability.

The other study variables measured were as follows:

(a) *Satisfaction with the participatory learning activities on leadership among students in the two intervention groups*. This was assessed using a non-validated instrument, although approved and accepted by the Catalan University Quality Agency (AQU), comprising 9 items, each rated on a 5-point Likert-type scale from 1 (Not at all satisfied) to 5 (Highly satisfied). Scores therefore range from 9 to 45, although for the present analysis this was transformed into a scale of 0 to 100. This instrument is a general satisfaction survey used in our university, and it was not designed specifically for the present study. It explores satisfaction with the planning and organization of course modules, the teaching methods used and the clarity of explanation by academic tutors. This survey was also administered to students in CG-A, those attending the same university as students in the two intervention groups. Higher scores indicate better student satisfaction.

(b) *Satisfaction among academic tutors who delivered the leadership intervention to students in the two intervention groups*. This was assessed using a non-validated instrument designed specifically for the present study and based on surveys used in previous studies [19]. It comprises 8 items, each rated on a 5-point Likert-type scale from 1 (Not at all satisfied) to 5 (Highly satisfied). Scores therefore range from 8 to 40, although for the present analysis this was transformed into a scale of 0 to 100. Higher scores indicate better tutors' satisfaction.c) *Sociodemographic and training-related variables for students.* These data were collected through an ad hoc questionnaire.

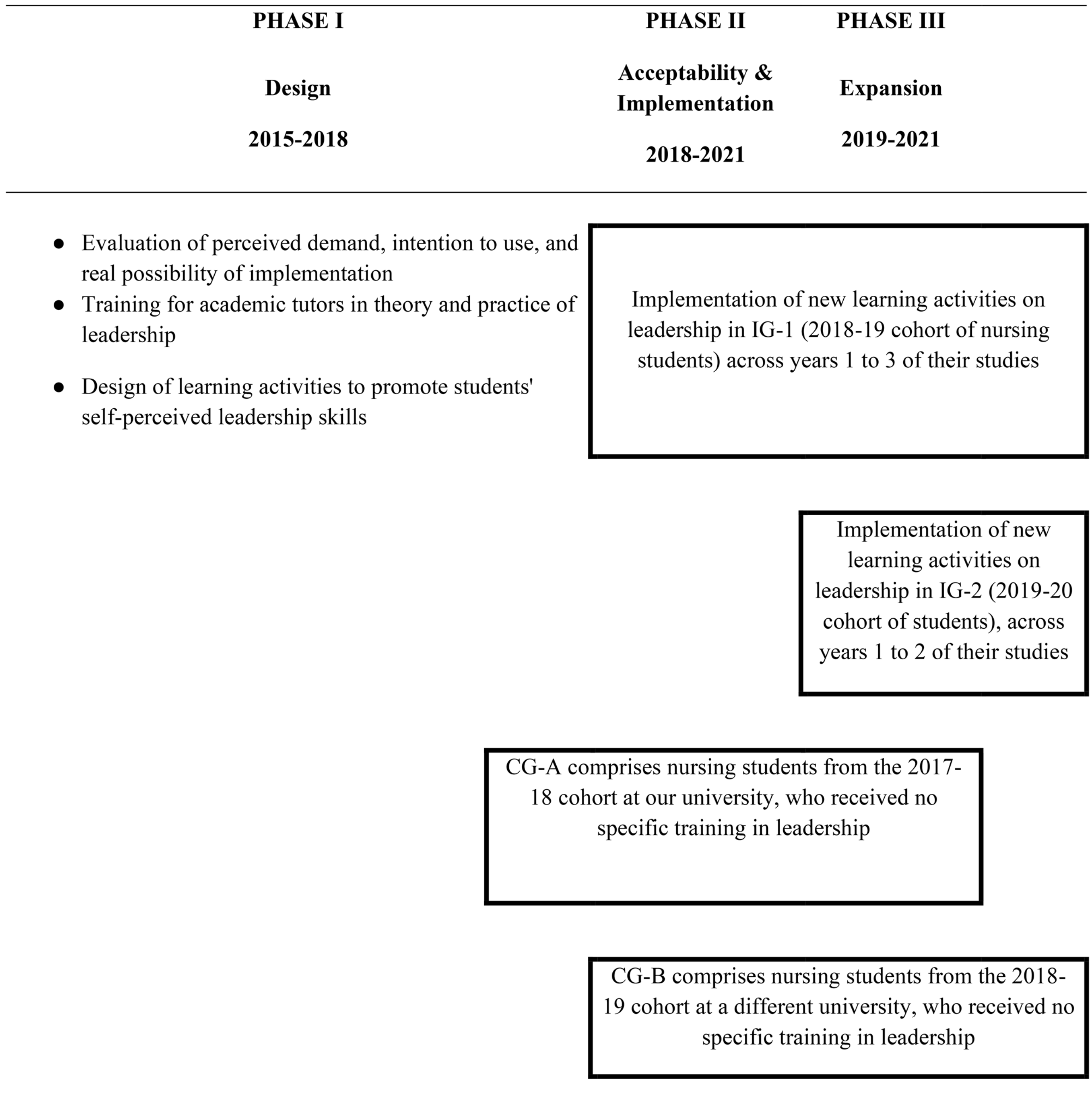

Fig. 1 Timeline of the three study phases

Data collection

Students in all groups (IG-1, IG-2, CG-A and CG-B) completed the Es-SALI and the questionnaire gathering sociodemographic and training-related data at the start of their degree programme, thus providing baseline data (T0). The Es-SALI was then administered again at the end of each academic year, up until the end of the study period in July 2021. For students in IG-1 and the two control groups (CG-A and CG-B), this yielded Es-SALI data at the end of years 1, 2 and 3 of their degree studies (T1, T2 and T3). Because students in IG-2 came from the 2019-20 cohort, Es-SALI data could only be obtained at baseline and at the end of years 1 and 2 (T1 and T2) of their degree studies (data collection ended in July 2021). In all cases, students completed the Es-SALI in the presence of an academic tutor so as to ensure individual responses and to address any queries they had.

Students in both the intervention groups (IG-1 and IG-2) and their academic tutors also completed the respective satisfaction surveys at the end of each academic year. Among controls, satisfaction data was only obtained from students in CG-A, those attending our university. This was because the other university (from where students in CG-B were recruited) used a different tool to assess student satisfaction, and hence the data would not have been comparable.

Data analysis

We began by computing descriptive data for students in the two intervention and two control groups. Qualitative variables were expressed as absolute and relative frequencies. Quantitative variables were described as either mean and standard deviation or median and interquartile range, depending on the test of normality (Kolmogorov-Smirnov). To facilitate the interpretation of results, data for non-parametric variables are occasionally reported as mean (SD) in the body of a table, with the median (interquartile range) being reported in a footnote to the table.

We then conducted a bivariate analysis to compare the results obtained in the two intervention groups with those in the control groups. For comparisons of dichotomous qualitative variables we used the chi-square test. When comparing dichotomous qualitative variables with dichotomous quantitative variables, we used either the Student's t test for unpaired data or the Mann-Whitney U test, depending on the normality of data.

To evaluate the effect of the intervention on the level of self-perceived leadership and the level of each of its dimensions (dependent variables) we analysed differences between the intervention and control groups at the different time points, as well as changes in self-perceived leadership within groups. Due to the large number of comparisons this implied, in the present paper we only report data for the comparison between T0 and T3 for IG-1 vs. CG-A and CG-B, and between T0 and T2 for IG-2 vs. CG-A and CG-B. This analysis was based on the general linear model with calculation of p values for within- and between-groups differences, with post-hoc Bonferroni correction. The percentage difference between groups at the same time point for non-parametric variables was calculated using the following equation: Value of variable A – Value of variable B / Value of variable A * 100. The percentage change for paired comparisons of the same variable was calculated using the following equation: Value of variable A at end time point – Value of variable A at baseline) / Value of variable A at end time point * 100 [20].

For the analysis of satisfaction we compared ratings of students in each of the intervention groups (IG-1 and IG-2) with those of control students from the same university (CG-A). A comparison was not performed with respect to the other control group (CG-B), as the university from which this group was recruited uses a different tool to assess student satisfaction, and hence the comparison would not have been meaningful. Regarding academic tutors, only those who were responsible for delivering the leadership intervention completed the satisfaction survey, and hence no comparison with controls was possible.

All analyses were performed using SPSS 26.0.

Results

Results from phase II: acceptability and implementation

The number of students from whom data were collected at all assessment points was above the minimum required in all cases: IG-1, $n=66$; CG-A, $n=68$; CG-B, $n=64$ (see Supplementary Material 2). Sample attrition was due to students abandoning the degree programme or switching to another university.

It can be seen in Table 1 that the median profile of students in IG-1 was an unmarried woman (84.8%) aged 19 (IQR = 4) with no children. There were no significant differences between IG-1 and CG-A in any of the sociodemographic or training-related variables. However, some differences were observed with respect to CG-B. Specifically, students in IG-1 were significantly more likely to be working alongside their degree studies (40.9% vs. 18.7% of students in CG-B; $p=.006$), and to be working in the health sector (21.2% vs. 6.2% in CG-B; $p=.014$). Differences were also observed between these two groups in relation to previous training on teamwork (IG-1: 54.5% vs. CG-B: 73.4%; $p=.025$) and emotional intelligence (IG-1: 36.9% vs. CG-B: 18.8%; $p=.021$).

Regarding acceptability of the leadership intervention, it can be seen in Table 2 that students' satisfaction ratings (on a scale of 0–100) were high and on a par with those of control students who followed the standard nurse training programme (IG-1: 87.6 (0.27) vs. CG-A: 88.4 (0.28); mean difference: -0.8; $p=.601$). Satisfaction was also high among academic tutors who delivered the participatory learning activities on leadership to students in IG-1 [80.11 (14.19)].

Table 3 shows data for student ratings of self-perceived leadership (total and subscale scores on the Es-SALI) at two time points: at the start of the degree programme (T0) and at the end of year 3 (T3). The table is split into two blocks: the upper block shows data for the comparison between the intervention group (IG-1) and controls from within the same university (CG-A); the lower block shows data for the comparison between the intervention group (IG-1) and controls from a different university (CG-B).

Results from the intergroup comparisons suggest that the intervention was effective in enhancing students' self-perceived leadership skills, both overall and on each of the four dimensions considered. Prior to the intervention (T0), scores among students in IG-1 were on a par with or lower than those obtained in the two control groups (CG-A and CG-B). However, by the end of year 3, the total Es-SALI score among students in IG-1 was

Table 1 Sociodemographic and training-related data for students in the two intervention groups (IG-1 and IG-2) and two control groups (CG-A and CG-B)

Variable	Phase II: Implementation					Phase III: Expansion				
	IG-1 %	CG-A %	P value IG-1 vs. CG-A	CG-B %	P value IG-1 vs. CG-B	IG-2 %	CG-A %	P value IG-2 vs. CG-A	CG-B %	P value IG-2 vs. CG-B
Gender (female)	84.8	79.4	0.412	92.2	0.190	90	79.4	0.083	92.2	0.658
Age (years, median [IQR])	19 [4]	18 [3]	0.362	18 [0]	**0.000**	19 [4]	18 [3]	0.604	18 [0]	**0.003**
Spanish (yes)	93.9	92.6	0.765	98.4	0.182	94.3	92.6	0.697	98.4	0.205
Married (yes)	4.5	0	0.075	3.1	0.674	0	0	-	3.1	0.136
Children (yes)	1.5	0	0.308	0	0.323	2.9	0	0.160	0	0.173
Working (yes)	40.9	27.9	0.114	18.7	**0.006**	34.3	27.9	0.421	18.7	**0.043**
Working in health sector (yes)	21.2	20.6	0.929	6.2	**0.014**	32.9	20.6	0.104	6.2	**0.000**
Stable job (yes)	15.6	16.2	0.870	7.8	0.190	12.9	16.2	0.580	7.8	0.340
Financially independent (yes)	13.6	17.6	0.523	9.4	0.447	24.3	17.6	0.339	9.4	**0.022**
Previous training										
Critical thinking (yes)	27.3	32.4	0.521	28.1	0.914	32.9	32.4	0.950	28.1	0.553
Teamwork (yes)	54.5	39.7	0.085	73.4	**0.025**	52.9	39.7	0.121	73.4	**0.014**
Communication (yes)	43.1	30.9	0.145	42.2	0.919	37.1	30.9	0.438	42.2	0.551
Emotional intelligence (yes)	36.9	26.5	0.195	18.8	**0.021**	34.3	26.5	0.319	18.8	**0.043**

In the implementation phase the number of participants in each group was: IG-1, n = 66; CG-A, n = 68; CG-B, n = 64. IG1 and CG-A are from the same university, CG-B from a different one. In the expansion phase the number of participants in each group was: IG-2, n = 70 (2019-2020 cohort); CG-A, n = 68 (2017-2018 cohort); CG-B, n = 64 (2018-2019 cohort). IG-2 and CG-A are from the same university, CG-B from a different one. Categorical variables: chi-squared analysis. **In bold**: p < .05

Table 2 Satisfaction ratings (on a scale of 0–100) of nursing students and academic tutors in phase II (implementation) and phase III (expansion) of the study

	Phase II Implementation		Phase III Expansion
	IG-1	CG-A	IG-2
Satisfaction	M (SD)	M (SD)	M (SD)
Academic tutors	80.11 (14.19)	-	79.03 (13.50)
Students	87.60 (0.27)	88.40 (0.28)	83.60 (0.35)
	IG-1 vs. CG-A		IG-2 vs. CG-A
Mean difference	-0.8		-4.8
P value	0.601		**0.018**

Percentage of students in each group who responded to the satisfaction survey: IG-1, 29.23%; IG-2, 28.6%; CG-A, 35.06%. Number of academic tutors per group was: IG-1, $n = 22$; IG-2, $n = 31$. All academic tutors (100%) completed the satisfaction survey. Significance of mean differences was calculated with independent *t*-tests as the variable is normally distributed. **In bold**: $p < .05$

significantly higher than that in either control group, with differences ranging between 5% and 7% (IG-1 vs. CG-A: +7.5%, $p = .000$; IG-1 vs. CG-B: +5.31%, $p = .003$). An improvement was similarly observed on three of the four dimensions of leadership, with students in IG-1 scoring between 3% and 9% higher than controls at T3 (Strategic Thinking: IG-1 vs. CG-A, + 8.26%, $p = .000$; IG-1 vs. CG-B: +3.86%, $p = .050$; Impact and Influence: IG-1 vs. CG-A: +7.40%, $p = .013$; IG-1 vs. CG-B: 6.51%, $p = .014$; Teamwork Skills: IG-1 vs. CG-A: +8.98 $p = .000$; IG-1 vs. CG-B: + 6.82% $p = .001$). It should be noted here that these significant differences were not observed when assessing students at the end of year 2 (T2) (see Supplementary Material 3).

The pattern of results was slightly different for the emotional intelligence dimension of self-perceived leadership. Whereas students in IG-1 had improved significantly at T3 with respect to their peers in CG-A (IG-1 vs. CG-A: +4.32%, $p = .011$), this was not the case for the comparison with CG-B. It should be noted here that students in IG-1 already scored significantly higher on self-perceived emotional intelligence at baseline (IG-1 vs. CG-B at T0: +10.81%, $p = .000$), and while this superiority was maintained at T3, the difference between the two groups was now smaller (IG-1 vs. CG-B at T3: +4.13%, $p = .010$). Thus, while both groups improved, the relative improvement was greater among students in CG-B.

Results from the intragroup comparisons show that while all three groups showed an improvement in overall self-perceived leadership skills (total Es-SALI score) between the two time points, the percentage change was significantly greater among students who received the intervention (Change at T3 vs. T0 in IG-1 vs. CG-A: +11.53%, $p = .000$; Change at T3 vs. T0 in IG-1 vs.

Table 3 Student ratings of self-perceived leadership and its dimensions in phase II (Implementation) of the feasibility study. Data correspond to ratings at the start of the degree programme (T0) and at the end of year 3 (T3). The table is split into two blocks: the upper block shows data for the comparison between the intervention group (IG-1) and controls from within the same university (CG-A); the lower block shows data for the comparison between the intervention group (IG-1) and controls from a different university (CG-B)

Leadership and its dimensions	Phase II: Implementation – Comparison with controls from the same university													
	Student scores on the SALI				Intergroup Comparison				Paired Intragroup Comparison					
	IG-1		CG-A		Diff. at same time point IG-1 vs. CG-A		Diff. IG-1 vs. CG-A at T3 minus Diff. IG-1 vs. CG-A at T0		Change at T3 vs. T0 IG-1		CG-A		Change at T3 vs. T0 in IG-1 minus Change at T3 vs. T0 in CG-A	
	Mean	SD	Mean	SD	%	p value	%	p value	%	p value	%	p value	%	p value
Leadership T0	118.55	13.83	122.23	17.79	-3.10	.176[b]								
							10.60	.438[a]	17.85	**0.000[b]**	6.32	**0.002[b]**	11.53	**0.000[a]**
Leadership T3	139.71	12.07	129.96	16.04	7.50	**0.000[b]**								
Strategic Thinking T0	31.36	4.60	32.06	5.74	-2.23	.442[b]								
							10.49	.561[a]	19.13	**0.000[b]**	7.64	**0.004[b]**	11.49	**0.000[a]**
Strategic Thinking T3	37.36[α]	3.83	34.51	4.58	8.26	**0.000[b]**								
Emotional Intel. T0	26.65	3.17	27.69[α]	2.84	-3.90	**0.047[b]**								
							8.22	.767[a]	10.58	**0.000[b]**	2.02	1.000[b]	8.56	.084[a]
Emotional Intel. T3	29.47[α]	2.19	28.25[α]	3.15	4.32	**0.011[b]**								
Impact/Influence T0	19.55	3.28	19.97	4.18	-2.15	.515[b]								
							9.55	.441[a]	18.82	**0.000[b]**	8.31	**0.010[b]**	10.51	**0.001[a]**
Impact/Influence T3	23.23[α]	3.18	21.63[α]	4.08	7.40	**0.013[b]**								
Teamwork Skills T0	40.94	6.29	42.53	8.01	-3.88	.205[b]								
							12.86	.573[a]	21.28	**0.000[b]**	7.12	**0.004[b]**	14.16	**0.000[a]**
Teamwork Skills T3	49.65[α]	4.59	45.56	6.71	8.98	**0.000[b]**								
Leadership T0	118.55	13.83	119.56[α]	17.12	-0.85	.697[b]								
							6.16	.669[a]	17.85	**0.000[b]**	10.97	**0.000[b]**	6.88	**0.033[a]**
Leadership T3	139.71	12.07	132.67[α]	14.36	5.31	**0.003[b]**								
Strategic Thinking T0	31.36	4.60	33.19[α]	4.86	-5.84	**0.030[b]**								
							9.70	.328[a]	19.13	**0.000[b]**	8.38	**0.001[b]**	10.75	**0.001[a]**
Strategic Thinking T3	37.36[α]	3.83	35.97	4.21	3.86	**0.050[b]**								
Emotional Intel. T0	26.65	3.17	24.05	3.71	10.81	**0.000[b]**								
							-6.68	**0.000[a]**	10.58	**0.000[b]**	17.67	**0.000[b]**	-7.09	**0.003[a]**
Emotional Intel. T3	29.47[α]	2.19	28.30[α]	2.86	4.13	**0.010[b]**								
Impact/Influence T0	19.55	3.28	21.34	3.22	-9.16	**0.002[b]**								
							15.67	.872[a]	18.82	**0.000[b]**	2.20	1.000[b]	16.62	**0.000[a]**
Impact/Influence T3	23.23[α]	3.18	21.81[α]	3.29	6.51	**0.014[b]**								
Teamwork Skills T0	40.94	6.29	40.98[α]	6.86	-0.10	.969[b]								
							6.92	.306[a]	21.28	**0.000[b]**	13.42	**0.000[b]**	7.86	.058[a]
Teamwork Skills T3	49.65[α]	4.59	46.48[α]	6.27	6.82	**0.001[b]**								

The number of participants in each group was: IG-1, $n=66$; CG-A, $n=68$; CG-B, $n=64$. SALI: Self-Assessment Leadership Instrument, on which the total score ranges from 0 to 160. Dimensions of the SALI: Strategic Thinking, score 0–44; Emotional Intelligence, score 0–32; Impact and Influence, score 0–28; Teamwork Skills, score 0–56. Higher scores indicate a higher level of each dimension of leadership. T0: baseline assessment at start of 4-year nursing degree programme. T3: assessment at end of year 3. α = non-parametric. Median (IQR) values for SALI dimensions in IG-1: Strategic Thinking at T3: 38 (5); Emotional Intelligence at T3: 30 (3); Impact and Influence at T3: 24 (4); Teamwork Skills at T3: 50 (7). Median (IQR) values for SALI dimensions in CG-A: Emotional Intelligence at T0: 28 (4); Emotional Intelligence at T3: 29 (5); Impact and Influence at T3: 22 (8). Median (IQR) values for SALI dimensions in CG-B: Leadership at T0: 120 (19); Leadership at T3: 132.5 (125); Strategic Thinking at T0: 33.5 (5); Emotional Intelligence at T3: 28 (5); Impact and Influence at T3: 22 (4); Teamwork Skills at T0: 42 (5); Teamwork Skills at T3: 45 (10). Difference between groups at the same time point for non-parametric variables was calculated using the following equation: Value of variable A – Value of variable B) / Value of variable A * 100. The percentage change for paired comparisons of the same variable was calculated using the following equation: Value of variable A at end time point – Value of variable A at baseline) / Value of variable A at end time point * 100 (Pope, P. How to calculate percentage change. Quick Tip Ser. Ext. Fac. Conduct. Eval. 2008.) Superscripts indicate: [a] generalized linear model (GLM); [b] Bonferroni adjustment for GLM. **In bold**: $p < .05$

CG-B: +6.88%, $p = .033$). The same pattern of results was observed on most of the leadership dimensions, with students in IG-1 improving by between 10% and 16% more than their peers in either control group (Strategic Thinking: IG-1 vs. CG-A, +11.49%, $p = .000$; IG-1 vs. CG-B, +10.75%, $p = .001$; Impact and Influence: IG-1 vs. CG-A, +10.51%, $p = .001$; IG-1 vs. CG-B, +16.62%, $p = .000$; Teamwork Skills: IG-1 vs. CG-A, +14.16%, $p = .000$; IG-1 vs. CG-B, +7.86, $p = .058$). Logically, given what we describe above for the intergroup comparisons, the results differed somewhat for the emotional intelligence dimension of self-perceived leadership. In this case, the percentage improvement in IG-1 was not significantly greater than that observed in CG-A, and it was significantly lower than the percentage improvement in CG-B (Change at T3 vs. T0 in IG-1 vs. CG-A: +8.56%, $p = .084$; Change at T3 vs. T0 in IG-1 vs. CG-B: -7.09%, $p = .003$).

Results from phase III: expansion

The intervention group for this phase (IG-2) had a similar profile to IG-1 (Table 1), with a total of 70 students providing data across all assessment points (see Supplementary Material 2). Regarding acceptability of the leadership intervention, it can be seen in Table 2 that students' satisfaction ratings (on a scale of 0–100) were high, although lower than among controls (IG-2: 83.6 (0.35) vs. CG-A: 88.4 (0.28); mean difference: -4.8, $p = .018$). Satisfaction was also high among academic tutors who delivered the participatory learning activities on leadership to students in IG-2 [79.03 (13.50)].

It is important to bear in mind when considering the results obtained in the expansion phase that students in IG-2 corresponded to the 2019-20 cohort, and hence data were only gathered up until the end of year 2 of their degree programme (for the present study, data collection ceased in July 2021). It is interesting to observe, therefore, that at this point in their training the intervention did not generally appear to have brought about a significant improvement in self-perceived leadership competence, in comparison with controls (Table 4). As already noted, this was also the case for students in the other intervention group (IG-1; see Supplementary Material 3), among whom significant positive differences with respect to controls only emerged after three years of training (Table 3). As in the Implementation phase of the study (phase II), the results for the emotional intelligence dimension of self-perceived leadership competence differed from those obtained for the other dimensions. This was most notable when comparing the intervention group (IG-2) with control group B, with the latter showing a much greater improvement over the study period, albeit without surpassing the level achieved in the intervention group.

Interestingly, however, results from the intragroup comparisons show that although the percentage improvement in overall self-perceived leadership skills at T2 in the intervention group (IG-2) was only slightly greater than that observed among controls, the difference was nevertheless significant (Change at T2 vs. T0 in IG-2 vs. CG-A: +2.29%, $p = .024$; Change at T2 vs. T0 in IG-2 vs. CG-B: +0.18%, $p = .026$). Although a similar pattern of results was obtained for the other leadership dimensions in the comparison with control group A, there were two exceptions with respect to control group B, which showed a greater improvement in self-perceived emotional intelligence and teamwork skills, in comparison with the intervention group (emotional intelligence IG-2 vs. CG-B: -12.04%, $p = .000$; teamwork skills, IG-2 vs. CG-B: -3.49%, $p = .043$).

Discussion

The importance of ensuring that nurses have opportunities to develop the skills of clinical leadership has been recognized not only by official bodies such as the American Association of Colleges of Nursing [21] or the Australian College of Nursing [22], but also by nursing students themselves [23]. With this in mind, the aim of the present study was to assess the feasibility of enhancing the self-perceived leadership competence of nursing students by incorporating formal training on this aspect into our established nurse training programme. In general, the results suggest that the participatory learning activities we designed to meet this objective were not only well-received by both students and academic tutors, but also, and importantly, they increased the self-perceived leadership skills of these future nurse professionals. However, as the study was conducted at a single institution, the feasibility of implementing similar projects may vary across different educational or cultural settings. Therefore, the project may need to be adapted to the specific characteristics of each implementation context.

The acceptability of the leadership intervention is supported by the high satisfaction ratings of the students involved, suggesting that they recognized the value of specific training in this respect. Importantly, satisfaction was also high among the academic tutors who were responsible for implementing the new participatory learning activities. In our view, a key factor here was that they had all been involved from the outset in designing the activities, as well as in decisions about how outcomes would be evaluated, and consequently they felt ownership of the process [24, 25].

A variety of approaches and activities aimed at developing the leadership skills of nursing students have been described in the literature. These include the use of student-led conferences [26], dedicated education units [27], peer mentoring [28] and the flipped classroom approach [29]. To our knowledge, the present report is the first to describe the incorporation into the nursing degree

Table 4 Student ratings of self-perceived leadership and its dimensions in phase III (Expansion) of the feasibility study. The table is split into two blocks: the upper block shows data for the comparison between the intervention group (IG-2) and controls from within the same university (CG-A); the lower block shows data for the comparison between the intervention group (IG-2) and controls from a different university (CG-B)

	Phase III: Expansion – Comparison with controls from the same university													
	Student scores on the SALI				**Intergroup Comparison**				**Paired Intragroup Comparison**					
	IG-2		**CG-A**		**Diff. at same time point IG-2 vs. CG-A**		**Diff. IG-2 vs. CG-A at T2 minus Diff. IG-2 vs. CG-A at T0**		**Change at T2 vs. T0 IG-2**		**CG-A**		**Change at T2 vs. T0 in IG-2 minus Change at T2 vs. T0 in CG-A**	
	Mean	**SD**	**Mean**	**SD**	**%**	**P value**	**%**	**p value**	**%**	**P value**	**%**	**p value**	**%**	**p value**
Leadership T0	121.13	14.60	122.25	17.79	-0.92	.697[b]								
							2.12	0.811 [a]	9.24	**0.000[b]**	6.95	**0.000[b]**	2.29	**0.024[a]**
Leadership T2	132.32[a]	15.40	130.75	15.26	1.20	0.560 [b]								
Strategic Thinking T0	31.92	4.41	32.06	5.74	-0.44	0.878 [b]								
							4.98	0.129 [a]	14.00	**0.000[b]**	8.58	**0.001[b]**	5.42	**0.006[a]**
Strategic Thinking T2	36.39[a]	4.39	34.81[a]	5.38	4.54	0.071 [b]								
Emotional Intel. T0	27.40[a]	2.47	27.69[a]	2.84	-1.05	0.540 [b]								
							0.13	0.886 [a]	3.43	1.000[b]	3.29	.978[b]	0.14	.883[a]
Emotional Intel. T2	28.34[a]	2.85	28.60[a]	4.67	-0.92	0.701 [b]								
Impact/Influence T0	19.48[a]	3.62	19.97	4.18	-2.52	0.482 [b]								
							3.12	0.209 [a]	11.96	**0.000[b]**	8.56	**0.007[b]**	3.40	**0.032[a]**
Impact/Influence T2	21.81	4.10	21.68	3.99	0.60	0.855 [b]								
Teamwork Skills T0	42.32	7.11	42.53	8.01	-0.50	0.877 [b]								
							0.78	0.746 [a]	8.20	**0.007[b]**	7.36	**0.013[b]**	0.84	**0.003[a]**
Teamwork Skills T2	45.79[a]	6.66	45.66[a]	6.54	0.28	0.912 [b]								
Leadership T0	121.13	14.60	119.56[a]	17.12	1.31	.582[b]								
							0.17	**0.023[a]**	9.24	**0.000[b]**	9.06	**0.000[b]**	0.18	**0.026[a]**
Leadership T2	132.32[a]	15.40	130.39	15.56	1.48	.485[b]								
Strategic Thinking T0	31.92	4.41	33.19[a]	4.86	-3.98	.128[b]								
							6.54	.062[a]	14.00	**0.000[b]**	6.90	**0.007[b]**	7.10	**0.003[a]**
Strategic Thinking T2	36.39[a]	4.39	35.486.	4.53	2.56	.259[b]								
Emotional Intel. T0	27.40[a]	2.47	24.05	3.71	13.93	**0.000[b]**								
							-11.88	**0.000[a]**	3.43	.386[b]	15.47	**0.000[b]**	-12.04	**0.000[a]**
Emotional Intel. T2	28.34[a]	2.85	27.77[a]	3.23	2.05	.295[b]								
Impact/Influence T0	19.48[a]	3.62	21.34[a]	3.22	-9.55	**0.003[b]**								
							11.56	.073[a]	11.96	**0.000[b]**	0.19	1.000[b]	11.77	**0.000[a]**
Impact/Influence T2	21.81	4.10	21.38	3.82	2.01	.543[b]								
Teamwork Skills T0	42.32	7.11	40.98[a]	6.86	3.27	.285[b]								

Table 4 (continued)

	Phase III: Expansion – Comparison with controls from the same university													
	Student scores on the SALI				Intergroup Comparison				Paired Intragroup Comparison					
	IG-2		CG-A		Diff. at same time point IG-2 vs. CG-A		Diff. IG-2 vs. CG-A at T2 minus Diff. IG-2 vs. CG-A at T0		Change at T2 vs. T0				Change at T2 vs. T0 in IG-2 minus Change at T2 vs. T0 in CG-A	
									IG-2		CG-A			
	Mean	SD	Mean	SD	%	P value	%	p value	%	P value	%	p value	%	p value
							-3.23	**0.019**[a]	8.20	**0.010**[b]	11.69	**0.000**[b]	-3.49	**0.043**[a]
Teamwork Skills T2	45.79[α]	6.66	45.77[α]	6.47	0.04	.983[b]								

The number of participants in each group was: IG-2, $n=70$; CG-A, $n=68$; CG-B, $n=64$. SALI: Self-Assessment Leadership Instrument, on which the total score ranges from 0 to 160. Dimensions of the SALI: Strategic Thinking, score 0–44; Emotional Intelligence, score 0–32; Impact and Influence, score 0–28; Teamwork Skills, score 0–56. Higher scores indicate a higher level of each dimension of leadership. T0: baseline assessment at start of 4-year nursing degree programme. T2: assessment at end of year 2. α = non-parametric. Median (IQR) values for SALI dimensions in IG-2: Leadership at T2: 133.5 (27); Strategic Thinking at T2: 37 (7); Emotional Intelligence at T0: 28 (4); Emotional Intelligence at T2: 29 (5); Impact and Influence at T0: 20 (6); Teamwork Skills at T2: 46 (10). Median (IQR) values for SALI dimensions in CG-A: Strategic Thinking at T2: 35 (7); Emotional Intelligence at T0: 28 (4); Emotional Intelligence at T2: 28 (4); Teamwork Skills at T2: 46 (6.54). Median (IQR) values for SALI dimensions in CG-B: Leadership at T0: 120 (19); Strategic Thinking at T0: 34 (5.75); Emotional Intelligence at T2: 29 (5); Impact and Influence at T0: 22 (4); Teamwork Skills at T0: 41 (5.75); Teamwork Skills at T2: 46.5 (11.5). Difference between groups at the same time point for non-parametric variables was calculated using the following equation: Value of variable A – Value of variable B / Value of variable A * 100. The percentage change for paired comparisons of the same variable was calculated using the following equation: Value of variable A at end time point – Value of variable A at baseline) / Value of variable A at end time point * 100 (Pope, P. How to calculate percentage change. Quick Tip Ser. Ext. Fac. Conduct. Eval. 2008.) Superscripts indicate: [a] generalized linear model (GLM); [b] Bonferroni adjustment for GLM. **In bold**: $p < .05$

curriculum of participatory learning activities aimed at enhancing nursing students' self-perceived capability in relation to four key dimensions of leadership, namely strategic thinking, emotional intelligence, impact and influence (communication), and teamwork skills (see Supplementary Material 1 for a summary of the activities used).

The results obtained following implementation of our intervention suggest that it fostered a notable increase in self-perceived leadership competence among students. Total scores on the Es-SALI, as a measure of overall self-perceived leadership skills, increased by 17.85% in the intervention group over the study period, compared with 11.53% and 6.88% in control groups A and B, respectively. This increase also compares favourably with that reported in other studies that have likewise used the SALI to assess improvement in self-perceived leadership competence among nursing students: 4.72% between years three and four of a nursing baccalaureate programme [30], and 9.72% among final-year nursing students following participation in a student-led conference [26]. In a study involving students enrolled in nursing and physical therapy programmes, Larin et al. [31] reported an increase in SALI total scores of less than 2% following their first clinical placement.

Regarding the different dimensions of leadership that we evaluated, Es-SALI scores increased over the study period by around 20%, with the exception of emotional intelligence, where the increase was just 10%. This figure of 20% compares favourably with the increases of around 9% reported by De Juan Pardo et al. [26] in their study examining the impact of participation in a student-led conference, and also, in general, with the results obtained in our two control groups. Percentage increases in Es-SALI dimension scores were all below 9% in control group A, and ranged between 2% and close to 18% in control group B, the upper value here corresponding to the emotional intelligence dimension. As for why the pattern of results for self-perceived emotional intelligence differed in comparison with the results for the other three leadership dimensions, it should be noted that the baseline score on self-perceived emotional intelligence was significantly higher in both intervention groups compared with control group B, and hence the latter group had more scope for improvement. A possible reason for this initial difference is that the percentage of students who, prior to embarking on their degree studies, had received emotional intelligence skills training was significantly higher in both intervention groups compared with control group B. Accordingly, the relatively greater improvement observed among control students may simply reflect a "catch-up" effect, and if so, this would suggest that the first three years of the standard nursing degree curriculum (as followed by control group B) is in itself sufficient to enhance self-perceived emotional intelligence among students who have not previously received training in this respect, although not to the extent that they outperform students in our intervention group. It is worth noting here that the increase in emotional intelligence scores among students in control group A was just 2%, well below the figure obtained in the intervention group.

Finally, and with respect to the expansion phase of our study, the results obtained in the intervention cohort (IG-2) at T2 (the final data collection point for this cohort) were similar to those obtained at the end of year 2 in the implementation phase. It is likely, therefore, that as occurred with students in IG-1, a significant improvement in self-perceived leadership competence would begin to emerge in the expansion cohort (IG-2) by the end of year 3. Several contextual factors might account for the absence of significant differences at T2 stage. On the one hand, the instructors in IG-2 may have introduced variability in its intensity and consistency, a phenomenon commonly observed in real-world educational settings [32]. On the other hand, the natural maturation of students over time, including increased exposure to clinical practice, could contribute to perceived competence gains independently of the intervention [33]. Obviously, this would need to be confirmed through analysis of the corresponding data, a task in which we are currently engaged as a complement to the present study.

In summary, the results obtained suggest that the participatory learning activities we introduced into our nursing degree curriculum led to a significant improvement in the self-perceived leadership competence of students, thereby supporting the effectiveness of the methods employed. The feasibility of enhancing self-perceived leadership skills through interventions of this kind will be further corroborated if positive results are obtained when analysing data for the implementation cohort (IG-1) at the end of their degree studies (year 4) and for the expansion cohort (IG-2) at the end of years 3 and 4.

Limitations

This study has a number of limitations that need to be acknowledged. One concerns the fact that the academic tutors responsible for implementing the intervention in our university also provided teaching to the control cohort of students from the same institution (control group A). To address this limitation, the number of academic faculty meetings held per academic year within the GCA programme was increased from one to three. During the first meeting, each instructor presented the methodologies they intended to implement, and it was confirmed that no strategies had been planned specifically to foster leadership development. Although during the second and third trimester, the tutors involved, affirmed that no changes were made to their standard teaching (neither in terms of content nor approach) when giving classes to control students, they may have unwittingly introduced some elements related to the leadership intervention, a limitation that was given particular consideration. In an attempt to address this possible source of bias, we recruited a second control cohort of nursing students from another university. The content and structure of the degree programme followed by these students reflected national standards for nurse training in Spain, and in this respect it was comparable to our own programme prior to the introduction of the participatory learning activities on leadership. While the use of a second control group goes some way to addressing the aforementioned possibility of bias, we could not control for individual differences in the approach used by academic tutors in this other university.

Furthermore, the fact that IG-1 and CG-A belong to different academic cohorts may have introduced contextual differences that could not be accounted for.

A further aspect that could not be controlled for concerns the possible influence of students' clinical placement experiences on their self-perceived leadership skills. In our view, however, this is unlikely to have been a major confounding factor, insofar as over the first 2–3 years of their training, students will not be expected to engage in clinical decision making, and any appreciation of leadership skills will come purely from observation of their supervisor and other senior colleagues. On a related issue, we are aware that the proportion of students who, alongside their studies, were working in the health sector was significantly higher in both intervention groups compared with control group B. We are unaware of any studies that have examined the relationship between nursing students' work experience and level of self-perceived leadership competence, and hence this is another aspect that should be explored in future research.

Finally, it should also be noted that the results are based on self-reports and reflect students' perceptions of their own leadership skills, which may involve a social desirability bias. To mitigate this risk, anonymity was ensured and students were informed that their responses would not affect their academic evaluation. Nevertheless, this limitation should be acknowledged, and future research should complement self-reports with more objective measures, such as observations in real or simulated clinical settings.

Implications for research and practice

In order to corroborate the impact of the leadership intervention we are currently in the process of analysing an additional data set so as to confirm that the tendency towards improvement in self-perceived leadership competence we observed at the end of year 3 is further consolidated by the end of the degree programme (year 4, in both intervention cohorts). In the meantime, we encourage other authors to implement and examine the impact of learning initiatives such as the one described here, not least as this would enable the comparison of results across different student cohorts and settings. Leadership training is essential for nursing students to develop the confidence and abilities needed to excel in professional practice.

Conclusion

Preliminary results suggest that the participatory learning activities we introduced into our nurse training programme led to a significant improvement in the self-perceived leadership competence of nursing students. Although the findings are promising and demonstrate the feasibility of the study, being a feasibility study, we cannot establish the effectiveness of the intervention, highlighting the need for more robust studies to confirm the effectiveness of the intervention. Furthermore, satisfaction was high among both students and the academic tutors who were responsible for implementing the new participatory learning activities. Integrating leadership skills into the nursing curriculum is seen as a suitable time for students to develop these abilities. Additional research, including in other educational and cultural settings, is required to confirm both our results and the overall feasibility of the project.

Abbreviations

Es-SALI	Spanish Self-Assessment Leadership Instrument
SALI	Self-Assessment Leadership Instrument

Supplementary Information

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Supplementary Material 1

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Author contributions

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Data availability

Data available on request from the authors - The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of the Universitat Internacional de Catalunya, reference INF-2017-03. Approval date: 19-12-2017, in accordance with the Declaration of Helsinki 2024. All participants were given a dossier containing information about the nature and objectives of the research, along with an informed consent form which they had to sign. It was made clear that all data would remain anonymous and confidential and be used solely for research purposes. Students could, at any point, withdraw consent for their data to be processed as part of the research.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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