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Development of a Clinical Teaching Unit in Internal Medicine to Promote Interprofessional and Multidisciplinary Learning: A Practical Intervention

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ABSTRACT

Problem: Effective clinical workplace learning depends on interprofessional and multidisciplinary learning. However, traditional patient wards are centered around patient care and not so much around education. Other barriers such as time constraints also contribute to suboptimal interprofessional and multidisciplinary learning. *Intervention:* Six formal and informal learning activities that aimed at stimulation of interprofessional and multidisciplinary learning were designed and introduced in our patient ward to enable optimal integration of clinical practice and learning. *Context:* The study took place in an internal medicine inpatient ward where daily patient care is performed by specialized teams consisting of different healthcare professionals from the departments of Endocrinology, Nephrology, and Infectious Diseases. In the traditional ward setting, interprofessional and multidisciplinary learning mostly takes place during shared clinical activities. In this article, we describe the development and implementation of a Clinical Teaching Unit to support learning between different healthcare professionals. *Impact:* The intervention was evaluated with an online questionnaire among 108 nurses, student nurses, clerks, residents, supervising clinicians, and managers. Open-ended questions (response rate 65%) were used to determine the changes in the workplace experienced by the participants since the introduction of the Clinical Teaching Unit and what influenced their learning process and motivation to learn. Closed questions (response rate 46%) aimed to measure the effect of our intervention on collaboration, learning, and the quality of care and education. The results of the open-ended questions showed that participants experienced more interprofessional collaboration and learning. This took place in a less hierarchical, safer work climate which also resulted in perceptions of a better quality of patient care and education. The closed-ended questions showed that the intervention resulted in perceptions of improved collaboration, work culture, quality of care, education, and learning conditions. *Lessons Learned:* The findings imply that implementation of a Clinical Teaching Unit not only facilitates the integration of patient care and education but also the integration of different professions working together. From the intervention, we also learned that a successful Clinical Teaching Unit requires investment of time and staff, clear communication between healthcare professionals, and dedication of teachers within all professions.

KEYWORDS
clinical teaching; multidisciplinary learning; interprofessional learning; workplace learning

Introduction

Workplace learning (WPL) in a dynamic clinical environment, being defined as learning taking place at work, through work, and for work, is a challenging and complex process that takes place through participation in actual patient care, and requires engagement with many healthcare professionals at different levels of experience.[1–3] Effective clinical WPL depends heavily on interprofessional and multidisciplinary learning (MDL).[4–6] Interprofessional learning (IPL) in the clinical environment can be described as a setting in which two or more healthcare professions learn with, from, and about each other to improve collaboration and the quality of care.[7] MDL in healthcare can be described as a process in which learners from health-related occupations with different subspecialties team up to collaborate in promoting healthcare.[8]

Learning activities in the clinical environment can be distinguished in formal and informal learning

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activities.[9] Formal learning occurs within an organized and structured context, is designed as learning, and is intentional.[10] It is known to be the most effective when it is relevant and well-timed.[9] Informal learning takes place during normal daily collaboration and patient care activities and is not always recognized by the learner.[4,11] Informal learning increases relatedness between different healthcare professionals, although frequently there is insufficient communication between them and disagreement about the plan of care.[12,13] Informal learning in the workplace may be improved by a feeling of shared responsibility between professionals as it triggers professionals to share their knowledge with others.[14] Therefore, establishing formal and informal team sessions may promote learning experiences.

Overall, ideal clinical WPL should be approached as a team effort with multidisciplinary as well as interprofessional elements.[4–6,9,15,16] However, as clinical WPL takes place through participation in patient care and is dependent on professional collaboration,[2,4–6,9] a bottleneck arises. Firstly, the primary aim of a traditional patient ward is to deliver patient care and not education. This makes learning vulnerable to the dynamics of this environment, time constraints, faculty shortage, financial restrictions, and high expectations of clinical productivity, among others.[17–19] Secondly, collaboration on the ward is subject to barriers such as problems scheduling educational activities, lack of clinical sites, and social hierarchy, which negatively affect IPL and MDL.[20]

One of the ways to organize clinical WPL based on the principles of IPL and MDL is through a Clinical Teaching Unit (CTU). The concept of a CTU was first defined in Canada in 1962.[21] A CTU is a designated area (e.g., patient ward) with a dedicated teaching staff and a team approach to care that also serves as a template for clinical education and research.[21] It provides undergraduate and graduate medical education while patient care is provided by a team consisting of a student nurse, a nurse, a clerk, a resident, and a supervising physician. Learners of different professional levels have graded responsibility in line with their level of training. The team works under supervision of the attending medical staff. The presence of a clinical teacher is one of the main features of the CTU. Dedicated clinical teachers, with good teaching skills to enhance teaching effectiveness, facilitate learning by using their knowledge and clinical reasoning skills to teach others and involve them in their own clinical reasoning process.[22] They are role models who expose novice learners to clinical practice and provide regular clinical supervision which is beneficial for learning.[23]

In January 2017, we started the transformation of our traditional internal medicine inpatient ward into a CTU as a designated site for patient care as well as clinical WPL for student nurses, nurses, clerks, residents, and medical staff. In this case study, we describe the development of our CTU, which focuses on promoting MDL and IPL in accordance with the educational vision and strategy of our university medical center, by introducing formal and informal learning activities with the ultimate goal of improving clinical WPL. The perceptions of this intervention were evaluated by means of a questionnaire that was sent to the healthcare professionals who were working daily on the CTU.

Context

The internal medicine ward at Leiden University Medical Center (LUMC) has 26 inpatient beds. Depending on their clinical presentation, patients are cared for by three teams from the departments of Endocrinology, Nephrology, and Infectious Diseases. Patients with clinical scenario's not specific to these disciplines, such as pulmonary, gastrointestinal, and rheumatological pathology, are equally divided between the aforementioned teams. This allows exposure of learners to a broader palette of general internal medicine cases. The complexity of the patient cases in our university hospital requires the involvement of highly specialized teams and thus multiple supervisors. On the ward, seven nurses and five student nurses work on a normal dayshift and they cooperate with three residents, three clerkship medical students (i.e., in Year 5 of a six-year undergraduate medical program), three supervising clinicians, and several consulting physicians. The daily management team consists of the nurses' team leaders, a nursing manager, and a medical manager.

In the traditional ward, shared clinical activities include daily ward rounds in the morning. In the afternoon, most time is spent on patient admissions and communication with patients' relatives. Rounds and admissions are basically performed by the residents or by the clerks under supervision. The supervisor attends the ward several times a day for consultation or patient visits when needed. When the supervisors are not present on the ward, they work on the outpatient department or perform other management, research, or undergraduate education tasks. In the traditional ward setup – as in most, if not all,

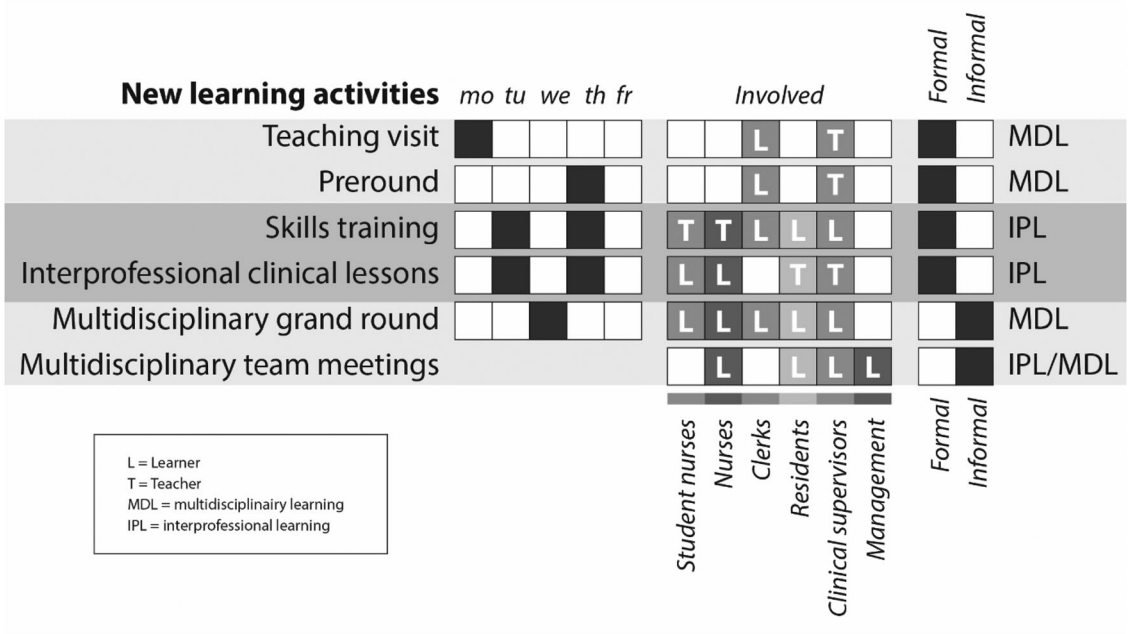

Figure 1. Learning activities in the CTU. This figure shows the learning activities that were introduced in the CTU to promote IPL and MDL. It also depicts the weekly planning of these activities, the actors involved (divided in "Teacher" and "Learner") and whether the activity comprises formal or informal learning.

wards in our country – learning mostly is informal, monodisciplinary, and patient case-based. Learning takes place during daily patient rounds, monodisciplinary grand rounds, and informal day-to-day interaction with medical and paramedical colleagues.

In January 2017, we started to transform this ward into a CTU. For this purpose, three clinical teachers were appointed, two of them being on a tenure track in Education and Patient Care. They were supervising clinicians who received teacher training and qualification, and they delivered a great part of the formal learning activities in the CTU. Informed by Evans,[24] we established a research program to reinforce the scientific framework of our educational program; clinical teachers could spend as much as 50% of their time to education or educational research. Clinical teachers and team leaders had multiple meetings to define adaptations to learning conditions as needed to integrate education into clinical training and professionalize the teaching program. From these meetings, it was concluded that, besides the introduction of learning activities, we needed to allocate staff, time, and place for teaching. Consequently, a teaching location was allocated, and we started the planning of structured teaching time into the work schedules.

Intervention

After creating the right conditions for the CTU, we introduced six formal and informal learning activities which were all scheduled sessions. Formal learning activities mainly had an educational purpose, while informal learning sessions were primarily aimed at patient care. These learning activities aimed to provide training for young professionals working in the CTU and to increase the number of opportunities for IPL and MDL. As clerks and residents obtain more differentiated training through their own discipline, active attempts were made to focus on more common patient scenarios or subjects and not to focus on overly specialized care. IPL happens when nurses and student nurses share a formal or informal learning activity with clerks, residents, or clinical supervisors. Learning is defined as MDL when it takes place between the different disciplines on the ward. Because the learning activities were provided by physicians (clinical teachers, residents) as well as nurses, bidirectional learning was promoted. The six learning activities were the following (see also Figure 1):

1. Teaching visit
   Teaching visits were 1-hour training sessions involving four to six clerks, a patient that was selected by one of the clerks, and a clinical teacher. During the session, one of the clerks performed the history taking and physical examination with an unfamiliar patient, which increased exposure to new patients. Clerks participated in this activity with a teacher and clerks from other disciplines, enriching the learning environment.

While the patients' history was taken, the clinical teacher guided the clerks through the differential diagnostic process. The visits trained the clerks to ask the right questions, helped them to argue the final diagnosis, and also focused on non-medical competencies such as organization, communication, and professional behavior. Each visit was concluded with a peer feedback session. This learning activity aimed at preparing clerks for their future tasks and enhancing their clinical reasoning skills.

2. Preround
   Prerounds were 30-minute training sessions that took place before the regular daily patient visits. Each session was attended by three clerks from the three different disciplines and a clinical teacher. During a preround, the clerks performed a visit with a patient of their choice. Each clerk reported the patient case to his fellow clerks, then they jointly visited the patient, and the clerk demonstrated a short patient interview and a portion of the physical exam. Each clerk formulated further treatment plans or diagnostic tests and made his own patient file. This activity was presumed to enhance active learning and feelings of responsibility. During the session, the clinical teacher observed and assessed the clerks.
3. Skills training
   Skills training was on-time bedside training provided by nurses to clerks and residents. Normally most skills – such as insertion of intravenous catheters, urinary catheters, or feeding tubes – were performed by nurses. On two designated weekdays however, all skills were to be performed by clerks and residents and supported or supervised by a nurse. This aimed not only at improving competence of clerks and residents but also to improve the feeling of being a team.
4. Interprofessional clinical lessons
   A clinical lesson was provided to nurses and student nurses by a clinical teacher and some residents twice a week and was planned structurally at the end of the daytime shift. The content could be chosen by the nurses or the teacher and was mostly patient case-based. It was an interactive presentation on the theoretical background and the clinical presentation of a patient case or clinical topic (e.g., electrolytes, interpretation of laboratory results). The nurses that were currently or previously involved in the care for the selected patient actively shared their experiences, and the session was concluded with summarizing the lessons learned from the case. The lessons aimed at improving knowledge, clinical reasoning skills, and understanding mutual goals in patient care.
5. Multidisciplinary Grand Round
   The primary aim of the Multidisciplinary Grand Round was to promote multidisciplinary collaboration in direct patient care. A secondary aim was to enhance broad clinical internal medicine knowledge. During this session, teams of different disciplines got together to discuss one or two patient cases each. It was a 1-hour weekly session attended by clerks, residents, supervising clinicians, and residency program directors of each discipline. The cases either represented a complex patient case requiring the input of different specialists or an interesting patient case just for educational purposes. Nurses were informed about the patients to be discussed so they could join the sessions when applicable. Patient cases were presented by residents or clerks, and a summary of the case was projected onto a screen.
6. Multidisciplinary team meetings
   Monthly multidisciplinary team meetings were attended by team supervisors, nurses' team leaders, and medical management. The cornerstone of this meeting was optimizing the quality of patient care and education. Team leaders and management reported indicators and bottlenecks for clinical quality, and participants gave their input and suggestions for improvement. The participants were also invited to discuss barriers or difficulties they faced in their daily work that, among others, could be related to direct patient care, collaboration, or organization. For example, inefficiencies during the daily patient visits could be addressed or difficulties encountered in collaboration with a specific resident due to inadequate communication or attitude. The session was concluded by setting mutual goals and an action plan for the upcoming month.

Impact

The impact of our intervention and the perceptions of healthcare professionals regarding the CTU were evaluated with a Dutch-language questionnaire (see Appendix I for the English version) in June and July 2018. The questions were based on previous research into IPL and MDL and on the potential effects that we expected from our intervention.[4] Aiming at including a variety of opinions, all healthcare professionals working on the CTU were asked to fill out the

Table 1. Response rates for all subgroups.

	Student nurse	Nurse	Clerk	Resident	Clinical supervisor	Management	All professionals *N* (response rate*)
1. What is your job title?	8	32	8	10	6	6	70 (65%)
2. How long have you been working at the patient ward or how long have you worked there?	8	32	8	10	6	6	70 (65%)
3. Have you previously worked in another patient ward or are you currently working somewhere else? (Y/N)	8	32	8	10	6	6	70 (65%)
4. If "yes," what differences do you see between this patient ward and the patient wards where you worked?	1	17	4	6	3	6	37 (97%)**
5. What motivates you most to learn at the Clinical Teaching Unit?	7	24	7	7	4	5	54 (50%)
6. What contributes most to your learning process at the Clinical Teaching Unit?	7	24	7	7	4	5	54 (50%)
7. Do you see any changes since the introduction of the Clinical Teaching Unit? (Y/N) If "yes," what changes?	2	21	3	3	4	5	38 (98%)***
8. How do you experience the following aspects since the introduction of the Clinical Teaching Unit? (closed-ended questions)	6	24	5	6	4	5	50 (46%)
9. What changes are you most and least satisfied with?	4	24	5	5	4	5	47 (44%)
10. Do you have any other comments, suggestions, etc.?	5	23	5	5	4	5	47 (44%)
Overall	8 (38%)	32 (80%)	8 (89%)	10 (42%)	6 (86%)	6 (86%)	70 (65%)

*Based on $N = 108$ invited to complete the questionnaire.
**Based on the participants that answered "yes" to question #3.
***Based on the participants that answered "yes" to this question.

questionnaire on a daily basis. Based on this criterion, consulting physicians, dieticians, and physical therapists were not included. All participants provided written informed consent. This study was approved by the LUMC Educational Research Review Board (file OEC/ERRB/20180710/1).

The questionnaire was administered in a web-based format using a hyperlink delivered via email. The questionnaire contained open-ended questions followed by closed questions, deliberately presented in this order to prevent responses to the open-ended questions from being influenced by the closed questions.

The open-ended questions were used to determine the changes experienced by the participants in the workplace since the establishment of the CTU and the differences they noticed compared to other departments they had worked in. The open-ended questions did not refer to interprofessional and multidisciplinary learning on purpose because we aimed at capturing respondents' own, free answers. Also, open-ended questions were presented before the closed-ended questions so that that respondents' answers on the closed-ended questions could not influence their responses on the open-ended questions. Participants were asked if they had previously worked in other patient wards or were currently working somewhere else. If they answered "yes" to this question, they were asked with an open question to explain which differences they perceived between this patient ward and other patient wards where they worked. The other open-ended questions asked what factors influenced their learning process, what enhanced their motivation for learning in the workplace, which changes they perceived since the introduction of the CTU, and which changes they were the most and least satisfied with.

The closed questions were formulated to measure the effect of our intervention on collaboration, learning, and the quality of care and education. The questions addressed perceived changes in collaboration, knowledge development of the team, individual knowledge development, communication, patient care, collegial atmosphere, and quality of care and education. For each item, the participants were asked to indicate whether they thought the condition worsened, was unchanged, or improved. Participants were granted three weeks to fill out the questionnaire and reminders were sent after three weeks. Questionnaires were anonymous and were collected and coded by a data manager. The researchers had no access to the source data.

The answers to the open questions were coded independently by the first (EH) and second (FvB) authors by using descriptive and in vivo coding labels for each comment in the open questions.[25] Subsequently, the investigators discussed their coding results until consensus was reached. Then, they independently clustered the codes into higher-order

themes and again discussed their results until they reached consensus on the overarching themes. Answers to open questions may not be rich enough and therefore not provide rigorous evidence.[26] Still, we decided to code the qualitative data for three reasons. Firstly, some respondents provided elaborate answers that contained multiple codable explanations. Secondly, there was a lot of overlap in respondents' answers to the questions so aggregating and coding the data seemed a better choice than presenting the data per question. Third, we wanted to analyze the data from different perspectives. The first author (EH) works on the CTU as clinical supervisor and teacher. Therefore, she could give the correct meaning to the data, but there was also a risk that she could be biased. The second author (FvB) is an educational researcher and not directly involved in the CTU. Therefore, he could analyze the data more neutrally and unprejudiced but he was also unfamiliar with some of the context-specific terms in the data. Therefore, the two coders complemented each other to code the data in a neutral, yet correct way. The systematic approach of open, *in vivo* coding followed by thematic coding seemed appropriate to reach this goal.

One hundred and eight healthcare professionals were invited to fill out the questionnaire. Eighty-three of them initiated the questionnaire, of whom 70 provided useful responses. Consequently, 70 participants were included in the study although response rates differed per question (see Table 1 for the sample breakdown); the response rate was 65% ($N = 70$) for the open questions and 46% ($N = 50$) for the closed questions, respectively. The following subgroups were identified: student nurse ($N = 8$), nurse ($N = 32$), clerk ($N = 8$), resident ($N = 10$), clinical supervisor ($N = 6$), and management ($N = 6$). Forty percent of the participants worked on the ward for less than 1 year, 37% between 1 and 5 years, and 19% for more than 5 years. Fifty-three percent of the participants had worked on other inpatient wards. Table 1 provides an overview of the response rates per question and displays the number of respondents for each subgroup.

Results

Open-ended questions

Five main themes emerged from the qualitative analysis: *work culture, collaboration, quality improvement, learning activities* (including subthemes "knowledge" for the nurses and student nurses, "skills" for the clerks, and "autonomy" for clerks and nurses), and *learning conditions*. Following Lingard,[27] we illustrate these themes below with quotes that represent patterns in the qualitative data and come from a variety of participants. Contextual information is added between brackets where this was deemed necessary. Compared to the old situation on the ward or other workplaces, a different *work culture* was perceived in the CTU that was typified by more commitment and enthusiasm of healthcare professionals, more communication between different disciplines and professions, more *collaboration* on shared goals, and a feeling of being one team. For instance, Participant #36 (a nurse) indicated that:

> The communication is improved; instead of working on separate islands [endocrinology, nephrology and infectious diseases] we are more like one team.

Moreover, Participant #40 (a resident) specified the interprofessional nature of the collaboration and the positive impact of the CTU on healthcare. Another participant (#82, a nurse) stated that people were also more willing to put more efforts in quality improvement. Participant #58 (a resident) indicated that the improved team spirit not only affected the quality of healthcare, but also of IPL:

Participant #40: "Good collaboration between nurses, residents and team managers. An effort is being made to improve healthcare on the ward."

Participant #82: "During my training, I worked in several departments. A prominent feature of the CTU is that a lot of effort is put in quality improvement and that each and every nurse cooperates with this."

Participant #58: "The last period, there is more team spirit on the ward. There is more interprofessional learning between clerks, doctors and nurses, and more emphasis on education. There is less of a sense of hierarchy."

Thus, an *improved quality* was perceived to be caused by increased interprofessional collaboration and learning. The quote from Participant #58 above implies that the CTU fostered a less hierarchical climate. This was supported for instance by Participant #60 (management):

> The CTU has a more open climate, which facilitates asking questions and therefore learning.

In sum, collaboration and learning took place in an open and safe environment with less hierarchy and in which people were not afraid to ask questions.

Changes in work culture and collaboration also were noted in the *learning activities*, both formal and informal. With regard to the latter, several managers, residents, clinical supervisors, and nurses mentioned teamwork, approachable contacts with colleagues, or

the open, safe working climate as motivating and conducive for learning:

Participant #2 (management): "Collaboration between nurses and doctors and learning together and form each other [motivates me to learn in the CTU]."

Participant #58 (resident): "In the last period, there is more team spirit in the ward. There is more interprofessional learning of clerks, doctors and nurses."

Participant #54 (clinical supervisor): "The positive atmosphere in which learning together (doctors and nurses) and delivering optimal patient care predominate [contributes to learning]."

Participant #70 (nurse): "The threshold between residents, clerks and nurses is a lot lower. Everyone thinks along and is appreciated. Nurses and clerks dare to ask questions and bring things into light. In other wards where I worked, there is more of a culture that these are stupid questions."

With regard to formal learning activities, it was mentioned that clinical teachers' enthusiasm contributed to the more open work culture. However, incorporating the learning activities in the work schedules was still difficult due to time pressure in daily patient care. The high level of *autonomy* in the formal learning activities was appreciated by a nurse and a clerk. Participant #52 (management) described how one of the formal learning activities (i.e., skills training) changed the work culture and interaction between nurses and physicians:

> Teaching skills to physicians makes nurses more confident, and this interaction improves the desired, open, approachable culture.

The clerks' answers to the open-ended questions signified that they valued the high frequency of contact with patients in the formal learning activities. They mentioned that this enabled them to practice their skills. They explicitly mentioned the teaching visits, pre-rounds, and Grand Rounds as motivating and conducive for learning. Several clerks considered clinical supervision and feedback as the important aspects of learning. Not only clerks evaluated their learning activities; Participant #70 (a nurse) explained that clerks received a high degree of autonomy in the CTU which enabled them to learn more:

> On the ward where I currently work, there is no CTU for clerks. Usually the clerks just follow the resident, and if they are lucky they are asked questions or are allowed to investigate something. In the CTU, the clerks do their own prerounds, are able to learn themselves which questions to ask the patient and which physical examination to do. In my opinion, this teaches them a lot more […]. Clerks are enthusiastic, a bit tense, but for a few minutes, they were doctors themselves.

Whereas the clerks valued practicing their skills, the nurses and student nurses emphasized that acquiring new knowledge and clinical reasoning was important for their learning. They valued the clinical lessons that the clinical supervisors gave them and the possibility to ask questions to the doctors during these lessons. The clinical lessons gave them a better understanding of how patient care was organized and why it was organized that way. The open, safe working climate seemed to play a role here, as one nurse (Participant #18) wrote:

> Due to the open climate, you can ask a lot more questions, through which you can learn a lot.

Finally, the participants perceived improved learning conditions in the CTU in terms of more time, staff, and facilities for teaching. For instance, an increase in teaching and learning moments (Participant #60, management), and in specific teaching facilities like the teaching room (Participant #70, nurse) were mentioned. Educational activities, for instance the daily rounds, were also better organized, as Participant #71 (a clerk) responded:

> Working (the daily work routine) is very structured in the CTU and I think that especially the patient visit with nurses runs smoothly.

Closed-ended questions

Figure 2 shows an overview of the results of the closed-ended questions. The majority of the participants perceived better collaboration (63%), more knowledge development in the team (72%), more individual knowledge development (70%), improved communication (55%), an improved collegial atmosphere (57%), and quality improvement in patient care and education on the ward (71%). Interestingly, 59% even perceived better patient care since the introduction of the CTU. The option "worse" was endorsed by none of the participants on any of the items.

Lessons learned

In this educational case study, we describe the development and implementation of a CTU in an internal medicine inpatient ward. The key elements were the introduction of learning activities to stimulate IPL and MDL. The questionnaire results indicate that the responding healthcare professionals experienced a less hierarchical, safer work climate since the introduction of the CTU with more focus on teaching and learning, more interprofessional collaboration, a better quality

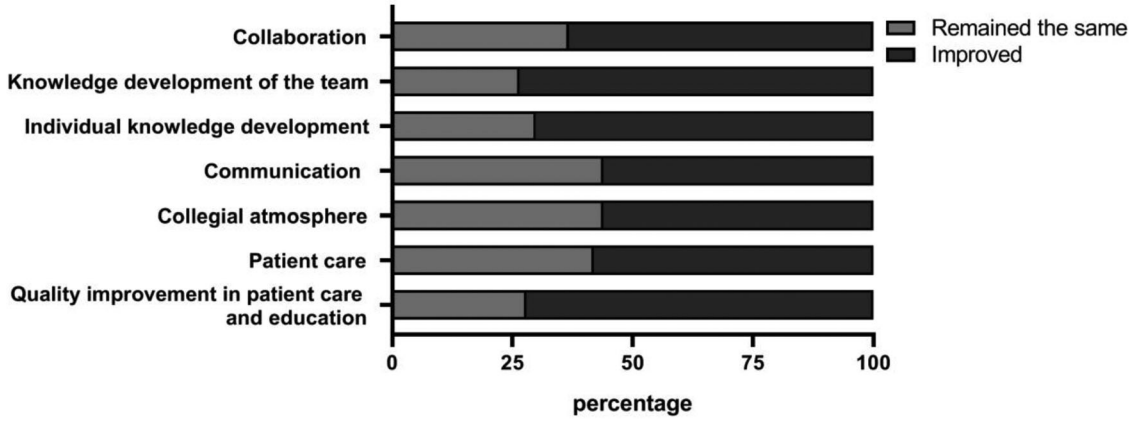

Figure 2. Results of the closed-ended questions. The questions asked for perceived changes in the items on the left. The bars illustrate the percentages of chosen answer options. Participants were asked to rate for each item if it had worsened, remained the same or improved. None of the participants chose the option "worsened" on any of the items.

of patient care and education, and more team spirit. The CTU thus not only seemed to facilitate the integration of patient care and education, but also the integration of different professions working together.

From our intervention, we learned that the key elements to a successful CTU are investment, communication, and dedication. Concerning investment, in our situation, the support from the Board of Directors was conditional for obtaining the resources required to set up a CTU. Such an intervention, in the end, requires funding, staff, and time. In addition, open communication is essential. When we initiated our wards' transformation into the CTU, the nurses' team leaders, clinical teachers, and other clinical supervisors had several meetings to discuss the CTU's goals and create a mutual understanding of the changes that were required. Thereafter, the plans for the wards' transformation were shared with the rest of the team in a transparent way. Professionals should recognize that clinical WPL is a team effort that includes residents, clerks, other physicians, and nurses.[5,16]

Lastly, dedication was one of the most important factors attributing to the success of our CTU. We argue that teaching is more effective when done by enthusiastic and dedicated teachers.[28] The fact that our clinical teachers spend quite some time teaching on the ward makes them more visible and approachable for others working on the ward. We feel that "knowing each other" improved the team spirit and relatedness of our team and that relatedness improved intrinsic motivation for learning which was reflected in the motivation of our team to invest time in education.[29] For example, we felt that the healthcare professionals that work on the ward put more effort in attending the learning activities and nurses voluntarily invested their own time in teaching clerks and residents. The latter may also have contributed to the hierarchical shift that was reported by the participants. In our opinion, the main lesson that we have learned is that communication and dedication have been cornerstones of the team members' motivation to learn from each other and the hierarchical and cultural changes that we found. In the end, creating a safe learning environment was fundamental to the learning process.[15]

Some limitations of our study should be addressed. Firstly, the qualitative data were probably not as rich as data that would have been obtained through interviews. On a more positive note, using a questionnaire did allow us to collect qualitative data from a larger sample of different healthcare professionals than we probably could have collected through interviews. Secondly, there was a decreasing response rate on the subsequent questions in the questionnaire. Although this was not entirely within our control, we do believe that more active measures should be taken in future research to maintain a high response rate.

The results of our study are in line with previous research on IPL in clinical WPL. O'Leary[13] found that interdisciplinary rounds improved collaboration between nurses and resident physicians and resulted in a higher rate of experienced teamwork climate. Bunniss and Kelly[14] describe how relational processes contribute to collaborative learning; How well people know and understand each other is important for learning together, which is also the case in collaboration between supervisors and students.[30] From that perspective, our CTU has several aspects that promote collaboration and learning.

Our findings are supported by a recent literature review by Mertens et al.[4] on healthcare professional collaborative and primary care WPL. Those authors describe the major contexts and mechanisms (the

"who, how, and when") of learning and how organizational and social factors can contribute to learning in clinical practice. Their review shows that WPL takes place through collaboration during formal and informal learning and that allocated time, resources, and strong relationships are required for optimal impact. They conclude that patient care is a crucial motivator for learning. Quality improvement in itself can also be motivating.[4,31] The organizational and social factors were also described by Irby[32] together with personal, physical, and virtual components such as online resources. Personal (e.g., increasing autonomy), social (e.g., clinical teachers, multidisciplinary meetings), curricular (e.g., teaching time, formal learning sessions), and physical spaces (e.g., allocation of teaching room) have indeed positively contributed to the development and maturation of our CTU.

Our findings also are in line with research to Dedicated Education Units (DEUs), in which nurses provide clinical instruction with faculty support, instead of a more traditional model in which faculty are the primary clinical instructors for students.[33] In DEUs, nurses perceived a better atmosphere that was beneficial for students and their learning. Teaching commitment and the quality of relationships between supervisors and students improved. The clinical nurse teachers valued observing students' growth and reflecting on their own practice by teaching others. However, they also perceived that the quality of patient care was unchanged.[33] This contrasts with our findings and findings of other studies that advocate that improved WPL can improve patient care.[17,34,35] This is an interesting and important finding since optimal patient care, in the end, is the primary aim of a patient ward.

Future directions

Professionals are often unaware of learning that takes place during informal learning sessions. Therefore, raising awareness of the effectiveness of unplanned learning activities might be needed to further optimize clinical WPL. Another dimension to be further developed is valuing the expertise of others, for instance by further incorporating nurses in training programs. Because our study was an initial, evaluative study, further research is needed to explore which mechanisms are involved in clinical WPL on a CTU, how active learning can be further optimized, and how blended learning and other innovative forms of education can be integrated in the workplace.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix I. Questionnaire

What is your job title?

◯ Supervisor ◯ Nurse
◯ Resident ◯ Management
◯ Clerk ◯ Student nurse

How long have you been working at the patient ward or how long have you worked there?

◯ Less than 1 year ◯ 4 years
◯ 1 year ◯ 5 years
◯ 2 years ◯ over 5 years
◯ 3 years

Have you previously worked in another patient ward or are you currently working somewhere else?

◯ Yes *◯ No

*In this case, what differences do you see between this patient ward and the patient wards where you worked?

What motivates you most to learn at the Clinical Teaching Unit?

What contributes most to your learning process at the Clinical Teaching Unit?

Do you see any changes since the introduction of the Clinical Teaching Unit?

How do you experience the following aspects since the introduction of the Clinical Teaching Unit?

What changes are you most and least satisfied with?

Of all the changes at the Clinical Teaching Unit, I'm most satisfied with … :

	Worsened	Remained the same	Improved
Collaboration	◯	◯	◯
Knowledge development of the team	◯	◯	◯
Individual knowledge development	◯	◯	◯
Communication	◯	◯	◯
Collegial atmosphere	◯	◯	◯
Patient care	◯	◯	◯
Quality improvement in patient care and education	◯	◯	◯

Of all the changes at the Clinical Teaching Unit, I'm least satisfied with … :

Do you have any other comments, suggestions, etc.?