


RESEARCH ARTICLE

# Impact of an interprofessional course on pharmaconomists and other health professions students: A qualitative approach

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## Keywords

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## Abstract

**Background:** Interprofessional education of healthcare professionals has been proposed as a strategy to enhance collaborative practice. This study is the first to explore interprofessional education involving pharmaconomist (PH) students. It aimed to identify the impact of an interprofessional course on PH and other health professions (KP) students. **Methods:** During the course, KP students cooperated in groups to solve a challenge from practice, where they practiced bringing their professional competencies into play. PH students participated by listening to their preliminary ideas and giving them feedback. All students were invited to answer electronic questionnaires, and at a workshop, teachers from both colleges shared their reflections on the results. The workshop was recorded and transcribed verbatim. All data was analysed in Excel and NVivo R1. **Results:** Five KP students (38%) and 27 PH students (63%) responded. Nine themes were derived, e.g., PH students' professional confidence was boosted; KP students have underrated the competencies of PH students; it is important to know each other's strengths and competencies. **Conclusion:** PH and KP students learned more about their competencies, those of other professions, and how they can complement each other in patient care.

## Introduction

### *The increasing complexity in primary healthcare requires interprofessional collaboration*

Managing patients in the primary healthcare system is becoming more complex (Graham *et al.*, 2021). The demography of patients is rapidly changing, with an increasing number of patients who have chronic and multiple chronic diseases, which is associated with decreased quality of life, functional decline, and increased healthcare utilisation, including emergency admissions, particularly with higher numbers of coexisting conditions (Stokes *et al.*, 2021).

Managing patients who use medicine to treat multiple conditions is also often complex, resulting in polypharmacy with associated risks (Davies *et al.*, 2020). A contributing factor to the complexity of managing patients with chronic and multiple chronic diseases is the high number of healthcare professionals usually involved in their care (Tsakitidis *et al.*, 2015; Baruth *et al.*, 2020).

To provide optimal patient-centred care, healthcare professionals should have expertise in their respective fields and maintain communicative and collaborative skills, enabling them to communicate and collaborate. Interprofessional collaboration in healthcare has been shown to improve patient outcomes, such as quality of care, and enhance the delivery of patient-centred and

coordinated care (Kucukarslan *et al.*, 2003; Pascucci *et al.*, 2021; Spaulding *et al.*, 2021).

A systematic literature review aiming to identify facilitators of and barriers to interprofessional collaboration in primary healthcare showed that the main challenges lay in the definition, awareness of roles, and competencies of each discipline, shared information between professions and the associated possible threats to confidentiality, primary responsibility perceptions among general practitioners, and interprofessional training (Supper *et al.*, 2015). Hence, interprofessional education of healthcare professionals has been proposed as a strategy to enhance students' and graduates' skills in collaborative practice (Green & Johnson, 2015; Spaulding *et al.*, 2021). As per the World Health Organisation, Interprofessional education involves students from multiple professions learning about, from, and with each other to foster effective collaboration and improve healthcare outcomes (WHO, 2010).

#### **The role of pharmaconomists in primary healthcare**

The complexity of managing patients in primary healthcare has augmented the role of community pharmacies in the provision of healthcare services. In Denmark, community pharmacies have been increasingly incorporated into the healthcare system over the years, as they play a crucial role in delivering professional pharmacy services by ensuring support to patients and other professionals through a wide range of counselling and pharmacy services (Hansen *et al.*, 2021). These services are provided by pharmacists and pharmaconomists on equal terms, except for a few services, such as medication reviews, which are delivered solely by pharmacists.

Pharmaconomists are the largest group of staff at Danish community pharmacies. Their roles are expansive and bear some resemblance to those of pharmacists in certain countries. As community pharmacists assume more clinical roles, pharmaconomists are increasingly involved in counselling and are "the face" of the pharmacy. They play a vital role in counselling customers on prescription medication, over-the-counter (OTC) medication and non-medical products (Danmarks Apotekerforening, 2024). A previous study showed that pharmaconomists identified drug-related problems for 15.8 % of the patients and that their counselling solved or partly solved problems for 70.4 % of patients with drug-related problems (El-Souri *et al.*, 2020). In general, pharmaconomists perform a broad array of tasks in community pharmacies in Denmark, and only a few things distinguish between pharmacists and pharmaconomists, including the legal inability of

pharmaconomists to own a pharmacy (Danmarks Apotekerforening, 2023).

Several studies have shown that community pharmacy services are unutilised and that there is a potential in collaborating with other healthcare professionals to provide patients with care and play a role in health promotion and disease detection due to the easy access to healthcare services in community pharmacies (Rossing *et al.*, 2017; Hansen *et al.*, 2021). However, there is a need to raise awareness of healthcare services and competencies in community pharmacies among health professionals and patients to fulfil their potential. Both patients and other healthcare professionals do not see community pharmacies as a part of the healthcare system (Jung *et al.*, 2020; Husted *et al.*, 2022).

#### **Interprofessional collaboration and learning in educational programmes**

Studies on interprofessional education have been carried out in various countries across different healthcare educational programmes, covering and assessing the existing types of interprofessional education programmes, their benefits for patients, and their purpose and goal fulfilment (Acquavita *et al.*, 2014; Jorm *et al.*, 2016; Dyess *et al.*, 2019; Maharajan *et al.*, 2017; Simko *et al.*, 2017; van Diggele *et al.*, 2021). There is still little experience in developing interprofessional education in the pharmacy technician and/or pharmaconomist educational programmes, and this little experience is, as far as it is known, only based on interprofessional learning programmes with pharmacy students (Mospan *et al.*, 2018).

In Denmark, other professional bachelor health educational programmes, such as nursing and physiotherapy, require elements of interprofessional education and collaboration in their curricula. Therefore, Pharmakon (PH) has been collaborating with the University College Copenhagen (KP) since 2019 on an interprofessional course for students from the following educational programmes at the KP: nursing, early childhood and social education, social work, psychomotor therapy, and physiotherapy.

The outcomes of this collaboration are not yet known. Evaluating this collaboration and its outcomes could inform further development of the interprofessional course and increase awareness of the pharmaconomist profession among graduates from different educational programmes, thereby improving interprofessional collaboration and patient outcomes.

This study aimed to identify the knowledge acquired by students from various educational programmes when

they engage in an interprofessional course to discuss and solve practice challenges.

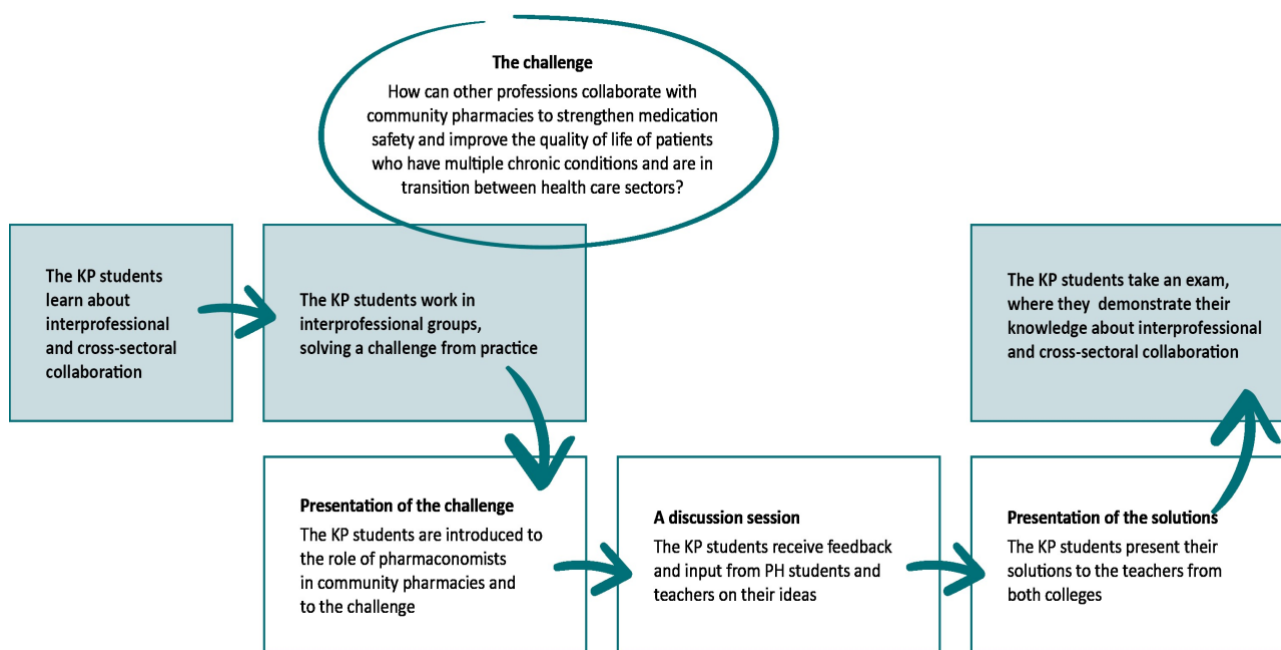
cooperate in interprofessional groups to solve a practice challenge, bringing their professional competencies into play. The course ends with an exam where students demonstrate their knowledge about interprofessional collaboration.

**Methods**

**Description of the interprofessional course**

Figure 1 illustrates the interprofessional course for KP students in 2021/2022. During this course, KP students learn about interprofessional collaboration and

This course focuses on each profession’s tasks, responsibilities, communication, and collaboration. It also addresses organisational, legal, and ethical aspects of resolving interprofessional challenges. Table I shows the learning objectives of this course.



**Figure 1. Description of the interprofessional course for KP students and the involvement of pharmaconomist (PH) students.**

**Table I: Learning objectives of the interprofessional course for KP students**

Learning objectives			
The students can understand their own and other professions’ responsibility and tasks in the different sectors of the welfare society	The students can analyse interprofessional and cross-sectoral dilemmas based on knowledge from practice and scientific research	The students can communicate with respect for their own professional competencies and those of others and encourage and facilitate the dialogue with collaborators from other professions, citizens, patients, and relatives	The students can take responsibility and derive solutions by bringing their own professional competencies and those of others into play to come up with holistic solutions for and with the citizen or the organization.

KP students who took this course were all final-year (third-year) students in their respective degrees. They all had practical experience in their field and, before this specific course, had learnt about interprofessional collaboration during their educational programmes in courses lasting between two to five weeks. Since 2019, PH has been contributing by proposing a challenge for KP students concerning medication safety for patients

at the community pharmacy. KP students were tasked with developing an idea for an interprofessional intervention to solve the challenge during the course.

The 2021/2022 challenge was as follows: How can other professions collaborate with community pharmacies to strengthen medication safety and improve the quality of life in patients who have

multiple chronic conditions and transition between healthcare sectors? (Figure 1)

In January 2022, KP students received feedback on their ideas from PH students and teachers from both colleges during an online session via Microsoft Teams. The discussion was planned to be held in person but was done online due to COVID-19. Figure 1 shows the activities KP students undertook while working with the challenge.

All PH students involved in the discussion session were final-year (third-year) students and had practical experience at a community pharmacy. They were introduced to the following concepts before the discussion session with KP students:

- The collaboration between PH and KP
- The specific challenges faced by KP students
- Interprofessional education and collaboration
- Their role in the discussion session.

Three teachers were involved in this course, two from PH and one from KP. The latter was the educator and mentor for the KP students during the course and their examiner at the end of the course. PH teachers trained PH students on interprofessional collaboration before the discussion session; they also introduced and facilitated the discussion session.

The discussion session lasted two hours, during which four interprofessional groups of 3-4 KP students each had up to 30 minutes to:

- Pitch their idea to solve the challenge.
- Get feedback on their idea from an opponent group of KP students.
- Get feedback on their idea from PH students.
- Get feedback on their idea from the teachers, if needed.

### **Data collection**

A qualitative approach was chosen to collect data on the learning acquired by the students from working with the challenge. The qualitative approach included questionnaires with primarily open-ended questions sent to all students involved and a workshop, where teachers from both colleges listened to the results of the questionnaires and gave their input and reflections. The researchers who collected and analysed the data were not involved in the planning, teaching, or facilitating of the interprofessional course.

The research was presented to teachers from both colleges before conducting the study, and it was presented to the students by their teachers and in the introduction section of the questionnaires.

Two questionnaires were developed for KP students and PH students, respectively. The questions were derived from the interprofessional course learning

goals for KP students (Table 1). The questionnaires were then validated by two researchers with experience in qualitative and quantitative methods and were adjusted according to their feedback. Two teachers from the PH and the KP, respectively, were also involved in the validation process to ensure that the questionnaires were correlated with the learning goals for the course at a meeting between the teachers and one of the researchers.

The questionnaires were created on Microsoft Forms and were anonymous. The first question asked whether the students agreed to use their answers for research anonymously. The second question was: "How much did working with the challenge contribute to your learning about interprofessional collaboration?" Students were required to rate it on a scale from 0-10, where 10 is the most challenging. After this question, students could write their reflections on the question and elaborate further on their answers. The rest of the questions were open-ended and were about learning about other professions, learning from working with the challenge, how to use the acquired knowledge in practice, what worked well and what did not work in the process, suggestions to optimise the process, the effort students put into their work with the challenge, and other reflections on the process.

The questionnaires were pilot-tested by a researcher and modified according to her suggested amendments, which included making the introduction section more thorough so that students knew how to fill out the questionnaire and making some of the questions more related to the learning objectives in their wording. The teachers then emailed the questionnaires to all KP (n=13) and PH (n=43) students who participated in the discussion session. Students were given one month to answer in February and March 2022 at the end of the interprofessional course. They were reminded to complete the questionnaires by email twice and in person in the classroom once.

The replies to the two questionnaires were transferred to Excel and NVivo R1 and analysed quantitatively (one scalar question) in Excel and qualitatively in NVivo R1. The qualitative data were analysed using a thematic analysis (Braun *et al.*, 2019).

The researchers presented the results of the questionnaire during a workshop for teachers from PH and KP. The findings were organised by themes derived from the questionnaire data analysis. Following each theme presentation, the teachers were asked the following questions:

- Do you recognise the theme?
- Can you elaborate on the theme?
- Do you have some examples that clarify your input?

After presenting and discussing the themes, the researchers invited the teachers to share any additional thoughts regarding student learning from working with the challenge.

The teachers' input and reflections were recorded, transcribed, and analysed thematically (Braun *et al.*, 2019) using NVivo R1.

The results from the questionnaires and the workshop were combined and are presented in this article.

### Data analysis

Data from the questionnaires and the workshop were analysed using a 6-phase analysis, according to Braun and colleagues (2019). The data were read and re-read to get familiar with the content (phase 1: familiarisation with the data). The first author then inductively coded the data (phase 2: inductive coding). The coding was then discussed with another author to qualify the developed themes. Relationships between codes were clarified and helped develop subthemes and themes (phase 3: development of themes). Transcripts and original data from the questionnaires were revisited to ensure that the developed themes corresponded with the data and make sure that the themes were thoroughly described (phase 4: reviewing themes). Each theme was named according to the essence of its content, and representative quotes were identified by revisiting the data and then used in the written analysis (phase 5: defining themes). Quotes were selected to ensure a balanced representation of the students and teachers from both colleges. Description of themes and quotes were discussed and presented to all authors, and a narrative of the themes was written using quotes identified as illustrative evidence (phase 6: reporting).

The credibility of the study was ensured by inviting all the students and teachers involved in the course, describing the analysis process thoroughly, and combining two different sources (students and teachers). The credibility of the analysis was ensured by researcher triangulation throughout the analysis, with the authors having experience with qualitative research, teaching competencies, and delivering educational programmes for students from both colleges. The coder and the author involved in phase 3 are both researchers with experience in qualitative research and a master's degree in pharmacy.

Dependability was determined through a discussion between two researchers on the developed themes and the relationships between codes until a consensus was reached.

Confirmability was ensured by describing the analysis process and the roles of the researchers in the different stages of the process.

Transferability was ensured by thoroughly describing the context of the course, the students' professional background and how and when the research was presented to the teachers and the students. It was also stated that the researchers were not involved in the course planning, teaching, or facilitation.

### Ethics

Danish law does not require ethical approval when conducting anonymous qualitative studies (Datatilsynet, n.d.; Ministry of Justice, 2012). Ethical considerations were met and performed in accordance with the recommendations of the Helsinki Declaration (World Medical Association, 2022). The questionnaire introduction section provided a written statement that data would be treated confidentially and anonymously as per the European General Data Protection Regulation ACT (GDPR). The participants could decide whether to allow their responses to be used in research or not. The teachers were also presented with this information at the beginning of the workshop.

Written informed consent was obtained from the students to publish this paper.

## Results

### Quantitative results

Twenty-eight PH students and five KP students responded to the questionnaires. One PH student opted not to include their response in the study; thus, it was excluded from the analysis. KP students whose responses were included in the study were from the following KP educational programmes: nursing (n=2), early childhood and social education (n=1), psychomotor therapy (n=1), and physiotherapy (n=1).

The question: "How much did working with the challenge contribute to your learning about interprofessional collaboration?" received scores of 5.4 and 6.0 from PH students and KP students, respectively (Table II).

**Table II: Results on the question "How much did working with the challenge contribute to your learning about interprofessional collaboration?"**

	Average score (SD)	Response rate
PH students	5.4 (1.9)	63% (n=27)
KP students	6.0 (2.0)	38% (n=5)

### Qualitative results

This section presents the results from the thematic analysis of the questionnaires and the workshop with teachers. The thematic analysis revealed nine themes

on the learning acquired by all students. All the themes are illustrated in Figure 2 and described further in the following sections.

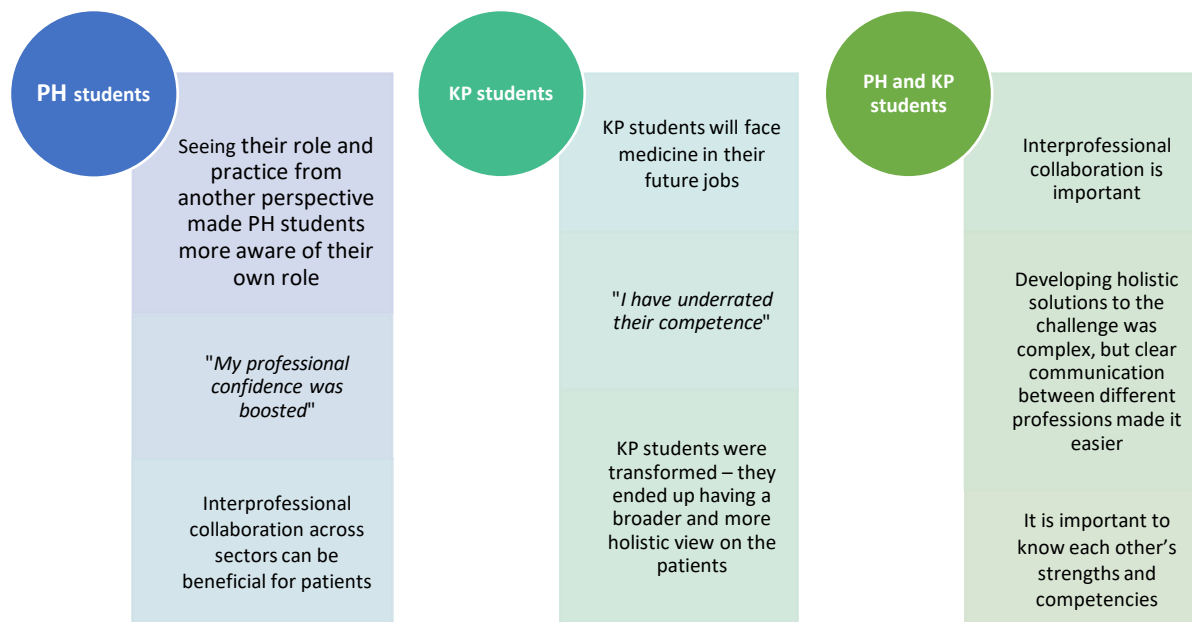


Figure 2. Themes derived from the questionnaires and the workshop with teachers

#### *The learning acquired by pharmaconomist students from working with the challenge*

The results described in this section are from the analysis of data derived from the questionnaire answered by PH students and from the workshop with teachers.

- Seeing their role and practice from another perspective made pharmaconomist students more aware of their role:

PH students enjoyed talking about their profession and community pharmacy practice and listening to the reactions of KP students.

*"It was exciting to hear what they think about the pharmacy and our profession."* (PH student)

Some PH students had the impression that KP students did not know much about community pharmacies in general, more specifically about the organisation of community pharmacies in Denmark, ownership of community pharmacies, the economic system, and how they are regulated. KP students' lack of knowledge of community pharmacies became clear to PH students through the preliminary ideas they suggested to solve the challenge. Some of the ideas were unrealistic and

could not be implemented in community pharmacy practice.

*"The other professions' knowledge of what we do as pharmaconomists at the pharmacy is limited."* (PH student)

PH students stressed the importance of being aware of others' lack of knowledge about community pharmacies when collaborating with other professions.

The interaction with KP students gave PH students insights into their roles and how they can collaborate in patient care. PH students are now aware of potential interprofessional collaborators, such as professionals at nursing homes and home care and that this form of collaboration could increase the quality of patient care.

PH students now recognise their role in supporting different professionals after graduation with their knowledge of medicine. They are also prepared to listen to other professionals to find out how they would like to be assisted with medication-related tasks.

*"My professional confidence was boosted"*

PH students' professional confidence has been boosted through their contribution to the discussion session with students from other professions.

*“It was nice to contribute with suggestions to the KP students’ ideas and to help them get a better understanding of the pharmaconomist profession. This boosted my professional confidence.” (PH student)*

The teachers were satisfied to hear that PH students had gained insight into the challenges other professions face in handling medicines and their role in helping other professionals in this task.

After the discussion session, teachers observed that PH students expressed that they had learned more about how they could contribute with their specific skills and knowledge when they graduate.

*“In that way, working with the challenge has probably helped the students shape their professional identity and justified their role because they possess special knowledge and skills.” (PH teacher)*

- Interprofessional collaboration across sectors can be beneficial for patients:

PH students learned that patients might have several touchpoints in the healthcare system, and they were confident that better interprofessional collaboration could solve the challenges that may occur. They could use this knowledge when counselling the patients in community pharmacies.

*“I am beginning to look at our pharmacy customers from several different perspectives and becoming aware that they might have been in touch with several healthcare professionals – and that can influence the individual counselling they get at the community pharmacy.” (PH student)*

PH students believed that better interprofessional collaboration would lead to better patient experiences of contact with the healthcare system. If healthcare professionals are aware of each other’s strengths and competencies, they could give patients the best possible journey through the healthcare system by leveraging and referring to each other’s expertise.

The teachers were satisfied that PH students gained insight into potential problems when patients interact with different health professionals. As a result, PH students gained a broader perspective and a deeper understanding of patients and their conditions, enhancing their ability to provide more relevant counselling to patients in community pharmacies.

*The learning acquired by University College Copenhagen students from working with the challenge*

The results described in this section are from the analysis of data derived from the questionnaire

answered by KP students and the workshop with teachers.

- University College Copenhagen students will face medicine in their work in the future jobs:

Teachers reported that after a new authorisation law was adopted by which physiotherapists became authorised health professionals with specific duties and responsibilities, a learning objective has been added to the curriculum to help physiotherapy students meet the required skills in medicine and pharmacology. They also felt that this addition was not highly prioritised by physiotherapy students as it represented only a small part of their educational programme. However, the teachers stressed its importance, especially when asking patients about their medications, whether pain-relieving medicines or others. Some physiotherapy students did not realise the relevance of the topic at first.

According to the teachers, physiotherapy students, like their KP peers, realised when working on the challenge that there is a demand for collaboration with other professionals in medicine-related tasks. For example, early childhood and social work students became aware that they would face medicine-related issues in their future work. Thus, KP students have gained insight into the types of situations requiring collaboration with pharmaconomists. An example mentioned by one of the teachers is:

*“If one pill was dropped in the sink from a package with five pills, what should you do?” (KP teacher)*

- “I have underrated their competence:”

The teachers believed that other professions lack knowledge of what pharmaconomists could offer. They also think that there is a demand for engaging in a collaboration with them.

Some KP students had already met pharmaconomists at hospitals before the course, where they were an integrated part of their workday. These KP students were aware of the competencies of PH students in handling medicine. For them, it was natural to engage in collaboration with pharmaconomists in other areas of the healthcare system.

The teachers reported that early childhood and social work students were unaware of the pharmaconomist profession and its capabilities. However, they gained this knowledge during the course, as evidenced by KP students’ solutions at the end of the course. The teachers also observed that students were unaware of pharmaconomists’ extensive knowledge about medicine and their ability to offer teaching for the staff in residential facilities for the disabled, for example, as seen in posts on some community pharmacy webpages.



These early childhood and social work students believed there should be more recognition of pharmaconomists' knowledge and competencies.

*"They [the PH students] know more about medicine than I thought. Clearly, I have underrated their competence and the role they can play in medication adherence and in general interprofessional collaboration."* (KP student)

The teachers reported that it would also make sense for KP students if PH students followed them more in solving the challenge because KP students have to acquaint themselves with medicine-related knowledge and knowledge about community pharmacies.

*"That they [PH students] have such a deep and broad professionalism took me by surprise, especially their knowledge about medicine."* (KP student)

The teachers also reported that a group of KP students came up with the following while working on a solution to the challenge: KP students should collaborate with PH students during their education so they get acquainted with PH students' competencies before graduation. This approach would lead to a collaboration with the pharmaconomists after completing their education. For example, they would call the community pharmacy after graduation to buy a teaching programme for staff at residential facilities for the disabled. In their solution, they also suggest that the residential facility contacts the community pharmacy directly and not through the municipality, as they imagine it would be at present. Thus, the teachers believed that KP students obtained essential knowledge of what the community pharmacy and pharmaconomists could offer.

- University College Copenhagen students were transformed and ended up having a broader and more holistic view of patients:

The teachers believed that, at the beginning, KP students did not see how they could use the course in their education and practice. This fact applies, in particular, to physiotherapy students who were more focused on their profession.

However, during the course and working on the challenge, students became aware of the possibilities associated with interprofessional collaboration. The teachers reported that at the beginning, some physiotherapy students did not see the reason for collaborating with community pharmacies on medication safety because they did not consider themselves involved with patient medicines in any way. Some might even consider themselves an alternative to medical treatment.

Thus, according to the teachers, there may be differences between the different groups of KP students as to whether they see the point in collaborating with the community pharmacy and pharmaconomists at the beginning of the course. However, during the course, everyone realised the importance of this collaboration, as evidenced by KP students' presentations of their solutions/products.

*"It is almost as if the students were transformed, and they now have a broader and more holistic view on the patients."* (KP teacher)

The teachers reflected on whether they could do something to enlighten students who could not see the point in interprofessional collaboration at the beginning of the course. They concluded that understanding the value of collaboration is a gradual process. While acknowledging their role in planting the seed, the teachers emphasised that students must recognise independently the necessity for collaboration with other professions, including pharmaconomists, while working on the challenge.

*"It was nice, and it really made sense to see their [the PH students'] point of view, because the challenge was from their practice."* (KP student)

*The learning acquired by pharmaconomist and University College Copenhagen students from working with the challenge*

The results described in this section are from the analysis of data derived from the questionnaire answered by PH and KP students and from the workshop with teachers.

- Interprofessional collaboration is important

The questionnaire results and post-discussion dialogues between teachers and PH students indicate that the PH students have developed a respect for the represented professions. They now view their peers as future collaborators. PH students gained insight into the challenges faced by other students and recognised how their professional background allows them to contribute to solving some of these challenges.

*"It is an interesting project and I find it important that we learn to collaborate during education. It is important to know about each other's professions and competencies to see how we can contribute and how they can contribute to deliver good patient care."* (PH student)

The teachers reported that PH students understand that the community pharmacy cannot stand alone but must collaborate with other professions to help patients. The teachers were satisfied that PH students expressed that working with the challenge enabled



them to see patients from the perspective of other professions, for example, from the teacher's standpoint. They would not have acquired this learning elsewhere.

After the course, teachers also noted that KP students showed interest in other professions, gained knowledge of other professions, and recognised the importance of interprofessional collaboration. The teachers were satisfied that KP students grasped that the most essential outcome was not merely finding the right solution to the challenge. More importantly, it was the gain from collaborating in groups and discussing with PH students.

Some KP students (nurses) also found it essential to collaborate with physicians in finding solutions to the challenge of medication safety, as they imagined that they would collaborate more with physicians than with pharmaconomists after graduation.

*"Interprofessional collaboration with other occupational groups, e.g., physicians, because that is the occupational group that nurses are mostly in touch with." (KP student)*

Some PH students found the interaction with other professions so stimulating that they expressed interest in being the contact person in a community pharmacy, ensuring collaboration between the community pharmacy and other potential collaborators on medication safety for patients.

PH students found interprofessional collaboration interesting because, through discussion sessions, they experienced various healthcare professions grasping patient-related problems differently and from different perspectives. They reported that interprofessional collaboration makes sense and leads to improved patient safety.

*"The idea of collaboration across occupational groups is, in my opinion, always good, because it gives a greater understanding and hopefully enhanced patient safety." (PH student)*

- Developing holistic solutions to the challenge was complex, but clear communication between different professions made it easier

KP students grasped that developing a holistic solution and identifying a suitable solution to the challenge is complex and requires extensive knowledge. They found it hard to identify solutions, but they gained understanding of developing a good process, including interprofessional communication, a well-defined plan and purpose, respect in collaboration, and knowledge of others' competencies.

*"It is complex and requires more knowledge than what we had in our group and more than we were*

*able to obtain to come up with a real and qualified idea. I am humble regarding the complexity of the task." (KP student)*

Teachers reported that students learned a valuable lesson about how challenging it can be to communicate correctly with other professionals because they do not necessarily use the same terminology. Therefore, they must remain curious and ask questions when discussing with other professionals.

All students learned that communication is essential in interprofessional collaboration and that they must be open, curious, and understanding when communicating with other professionals who may also have different perspectives and grasp of a problem. These factors highlight the importance of clear communication. So, students should make sure that they understand other professionals correctly and that they need to ask questions and request other professionals to elaborate further if they are uncertain.

*"We are different, but everyone can contribute with something from their own education, and it is important to have good communication skills so that everyone understands each other." (KP student)*

Some KP students did not remember what they learned from the discussion session, but they realised that they learned from the whole process of working on the challenge and that all the feedback they received during the process contributed to their solution to the challenge.

- It is important to know each other's strengths and competencies

PH students felt that KP students realised which competencies pharmaconomists possess, and they assumed that KP students gained a good impression of the roles of pharmaconomists and community pharmacies in general.

Interacting with KP students and learning about their competencies and practice was also insightful because it gave PH students an understanding of how each profession can contribute to better healthcare for patients.

*"I learned that it is possible to collaborate on many subjects. You just need to know each other's strengths." (PH student)*

KP students stated that they gained knowledge about PH students' medicine-related and practice-related competencies. Many KP students were surprised by the extensive knowledge of medicines PH students had. Some declared that PH students may have more knowledge and be more updated than physicians and

nurses because the core of PH students' education is medication. Some KP students also noted that pharmaconomists may have more in common with other healthcare professionals than expected and that they can play a role in various settings, such as nursing homes and hospitals. Some KP students revealed that they had previously played the pharmaconomists' role in identifying and solving adherence problems and their overall role in interprofessional collaboration.

*"They [pharmaconomists] have more in common with other health care professionals than I thought, they could easily work at a nursing home or at hospitals." (KP student)*

Some PH students considered that interprofessional collaboration would be difficult to achieve if professionals did not have enough knowledge of each other's strengths and competencies. One of the PH students believed it was complex to describe a collaboration model with other professions but had several ideas about interprofessional collaboration during the discussion session. Another PH student reported always having thought that interprofessional collaboration made sense and that it was great to see KP students equally interested in interprofessional collaboration.

Some PH students believed they could accomplish more when working collaboratively but acknowledged the difficulty of collaboration when practices are different between professionals. Efficient collaboration requires some knowledge about each other's strengths and competencies. Sometimes professionals' scope of practice only partly overlaps with pharmaconomists' practice. But even if different professions can contribute similar elements to patient care, collaboration is recommended.

In general, the interaction with students from different educational programmes made it clear to PH students that the healthcare system in Denmark incorporates a wide range of competencies, so they can learn with and from each other. Each educational programme forms the background for student focus when faced with patient-related challenges and the solutions they come up with. PH students reported that they now have a broader view of patient care.

Some PH students considered that when students know about each other's strengths and competencies at an early stage, they become more prepared for interprofessional collaboration upon graduation. PH students believed that, with this knowledge, they could complement each other and refer the patients to each other when needed. This collaborative approach could build trust between health professionals.

## Discussion

### Quantitative results

The response rate was higher among PH students than among KP students. The difference could be because PH students were reminded in person to respond to the questionnaire during the test period. It was hard to reach out to the KP students and remind them to respond to the questionnaire, as they were not at school during the test period; therefore, they did not check their emails very often. The results show that KP students scored slightly higher on the question: "How much did working with the challenge contribute to your learning about interprofessional collaboration?" KP students worked on the challenge in groups and had to find solutions, adjust them, and present them to the teachers. The process they went through was more comprehensive than that followed by PH students, which might explain the slightly higher results they reported. However, the low number of responses makes it difficult to conclude on this matter.

### Qualitative results

In this study, PH students examined their roles and practices from a different perspective and became more aware of their role. Their professional confidence was boosted by contributing to solving the challenge. They now realise that interprofessional collaboration across sectors could benefit the patients. The findings also show that KP students realised that they would face medicine-related issues throughout their careers and that they underrated PH students' competencies. KP students experienced transformation because they ended up having a broader view of the patients.

Students from both colleges acknowledged the importance of interprofessional collaboration and clear communication between different professions. They recognised the value of knowing each other's strengths and competencies to collaborate efficiently.

These findings illustrate the learning that students acquired from working on the challenge. The learning outcomes documented in this study correspond to the predefined learning objectives of the interprofessional course. Interestingly, PH students gained professional confidence in the process. Another study highlighted the difficulty in documenting changes in self-efficacy among pharmacy students when participating in interprofessional programmes due to the general attitude of healthcare professionals, reflecting that the community pharmacy workforce is not a part of the healthcare system (Jung *et al.*, 2020). The same attitude towards community pharmacies in Denmark can also be found in patients with diabetes (Husted *et al.*, 2022). This fact is further illustrated in this study by how KP

students underrated the competencies of the pharmaconomist profession at the beginning. This study showed that it was possible to improve the professional confidence of PH students and raise their awareness of the pharmaconomist's competencies.

Studies that evaluate interprofessional education programmes often use validated quantitative approaches and explore one or more of the following domains: learner satisfaction, modification of attitudes/perceptions (i.e., changes in the perceived needs for interprofessional collaboration), acquisition of knowledge/skills (i.e., the ability to communicate with each other), behavioural changes (i.e., transfer of interprofessional learning into practice), changes in organisational practice, and the benefits for patients (Spaulding *et al.*, 2021). This study adopted a qualitative approach to examine and identify the kind of learning acquired by the students in this programme, inform the evaluators, and guide potential adjustments to the programme. Although the evaluation was open-ended, the students addressed some of the main domains mentioned. The findings of this study revealed that students changed their perception of the need for interprofessional collaboration and became aware of the importance of good communication skills. They also demonstrated that they were able to translate their knowledge into practice by finding an interprofessional solution to the challenge. However, the study's scope does not evaluate whether interprofessional education will lead to organisational changes or changes in patient outcomes.

### **Strengths and limitations**

As far as it is known, this study is the first to explore interprofessional education in the pharmaconomists' curriculum. Its findings provide several themes regarding the benefit of the educational course for the involved students, e.g., their knowledge about their own and other professions and their strengths and competencies. Therefore, these findings may be of interest to educators with ambitions to introduce interprofessional education into the pharmaconomist curriculum.

The discussion session was planned to be held in person but was conducted online due to COVID-19. The virtual platform provided the students with the comfort of their homes and reduced the risk of disease transmission. On the other hand, the online platform and the students' surrounding environment might not have encouraged the students to interact with each other and share their perspectives on the same level as if the discussion session was held in a classroom.

Although all the students were reminded to answer the questionnaires, the response rate was low.

Nevertheless, the received responses represent students from various educational programmes with different experiences and attitudes towards the interprofessional course. Only social work students were not represented. It is also acknowledged that more responses may have produced other findings.

Some KP students could not determine whether the learning they gained during the course was due to their interaction with PH students or their work in interprofessional groups.

The questionnaires were sent three weeks after the discussion session, which was not optimal, and some students wrote in their answers that they could not answer some of the questions thoroughly.

It would be interesting to have students participate in the workshop so they could elaborate on their answers to the questionnaires and reflect from their standpoint. But again, it may be difficult for them to recall the specific course in detail, as mentioned above.

### **Conclusion**

PH and KP students learned more about their own competencies, those of other professions, and how they can complement each other in patient care. They recognised that interprofessional collaboration benefits patients and that meeting students from different educational programmes during their learning journey could strengthen interprofessional collaboration after graduation.

It would be interesting to assess the impact of an interprofessional course where PH students are a part of interprofessional groups and work across professions with KP students to solve a practice challenge. It would also be interesting to examine the long-term impact of interprofessional education, objectively assessing the change in collaborative behaviour in graduates who had interprofessional experience during their education, especially on the collaboration with pharmaconomists as providers of medicine-related knowledge.

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## Conflict of interest

The authors declare no conflict of interest with respect to the authorship and/or publication of this paper.

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