

PROGRAMME DESCRIPTION

Pharmacy Stories: Creating a digital learning platform on pharmacy history

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Abstract

Background: Norwegian pharmacy students seem to be taught less pharmacy history than other European students. Historical insight is essential for understanding our current professional challenges. However, there is a lack of appropriate educational tools to give students vital insights into pharmacists' experiences of their professional role and function in society over time. The aim of this study is to establish a digital learning platform on pharmacy history accessible to all pharmacy departments in Norway. **Methods:** Video- and audio recordings and images from interviews with 33 elderly pharmacists were analysed. The emerging themes were categorised and further developed into learning modules on a digital learning platform (Canvas), accompanied by suitable video/audio clippings from the interviews. Additional learning resources and assignments were incorporated. **Results:** Six learning modules with associated subthemes were developed. The modules were: 1) Pharmacy and the pharmacist, 2) Medicines and medicine use, 3) The medication user, 4) Legislation, 5) Global health and emergency preparedness, and 6) Pharmaceutical research. The subthemes include, e.g. Drug shortage, Ethics in pharmacy, Pharmaceutical information and Pharmacy legislations. **Conclusion:** A digital learning platform which accommodates the dissemination of real-world stories from pharmacists to today's pharmacy students and academic staff is established. This work is done in collaboration between five Departments of pharmacy in Norway.

Introduction

Pharmaceutical education in Norway has more than 350 years of history, from the inception of pharmaceutical education in the Denmark-Norway union. The first School of Pharmacy was established by the University of Oslo in 1932 (Johannessen, 1995; Kruse, 2007). Historically, pharmacy education included natural sciences and internships in community pharmacies focusing on medicine dispensing and production (Sverre, 1952). Over time, the pharmacists' role has evolved, culminating in the official recognition of pharmacists as healthcare personnel in 1999 (Norwegian Ministry of Health and Care Services, 2005-

2006). A change in legislation in 2001 allowed non-pharmacists to become pharmacy owners, and pharmacy design shifted towards self-service of over-the-counter medicines. Pharmacists assumed a more prominent role and acquired soft skills to communicate orally with customers to ensure patient safety and medicine adherence (Hopstock *et al.*, 1981; Lange & Granås, 2003; Hamran, 2010; Sæter, 2024). Today, pharmacists are accessible and trusted healthcare professionals (Norwegian Pharmacy Association, 2024).

To meet the demand for more pharmacists, six universities now offer pharmacy education, the last one established in 2014. A joint curriculum for all pharmacy

students was implemented in 2019 (Norwegian Ministry of Education and Research, 2019; Norwegian Ministry of Education and Research, 2020), and the learning objectives are aligned with the European regulation. These emphasise, among other requirements, the importance of pharmacy students having knowledge of the history of pharmacy (European Parliament and the Council of EU, 2005).

To further address current professional challenges and determine the future role of pharmacists, it is important to understand historical developments. A survey by the Norwegian Society for the History of Pharmacy in 2017 found that Norwegian pharmacy students were taught less pharmacy history than other European students (Norwegian Pharmaceutical History Society, 2017). Although several books describe the development of community pharmacy (The Norwegian Pharmacy Association, 2011), hospital pharmacy (The Norwegian Hospital Pharmacies, 2006), pharmaceutical industry (Amdam, 1994), and legislation (Austdal, 2021), they have little to no descriptions of the pharmacists' professional identities and societal roles. Learning about their profession and its history helps students understand today's challenges, which have historical roots (Tekiner, 2018), and hopefully provides a better understanding of future pharmacy challenges.

Today's students expect flexible, accessible and digitally supported learning environments, and perceive e-learning to be a highly acceptable instructional approach in pharmacy education (Salter *et al.*, 2014). Thus, there is a need to change the way the history of pharmacy has been taught from textbooks and old objects towards modern digital solutions. In this way, students can adapt to an interactive approach to learn about history.

A survey from 2017 on consistent teaching across institutions reveals a gap: the absence of a shared, digital learning resource that presents pharmacy history and pharmacy practice as professionally relevant and pedagogically engaging (Norwegian Pharmaceutical History Society, 2017). Using interviews with senior pharmacists as a base for newer history in pharmacy and developing a digital platform focusing on themes from these interviews, will address this gap and may strengthen development of students' professional identity, at the same time as it gives a deeper understanding of current challenges in pharmacy practice (Salter *et al.*, 2014).

The aim of this manuscript is to establish a national digital learning platform on pharmacy history, informed by interviews with senior pharmacists.

Description of innovation

The learning platform was developed in accordance with national (Norwegian Ministry of Education and Research, 2019; Norwegian Ministry of Education and Research, 2020) and EU regulations (European Parliament and the Council of EU, 2005) for pharmacy education and will support the attainment of the required skills and knowledge in pharmacy history and professional role development.

The interviews

Around 40 candidates with a long career in the pharmacy profession were invited to share important stories and events from their professional lives. Of these, 13 men and 20 women agreed to be interviewed. The candidates in Oslo were recruited with assistance from the Norwegian Pharmaceutical History Society, and those in Bergen and Tromsø were recruited with assistance from the local academics LH and MW, respectively, with assistance from the project leader AGG. Pharmacists from all major sectors were sought, such as community and hospital pharmacy, public and private sectors, and academia. The sample consisted largely of elderly pharmacists with long careers, introducing an obvious selection perspective.

Prior to the interviews, participants were encouraged to reflect on what they considered important for students to understand regarding the historical development of the profession and its evolving role in society. Based upon their submitted reflections, a tailor-made interview guide was developed for each informant. Three standard questions were included in all interviews: 1) Tell us about yourself; 2) What advice would you give to future pharmacy students; and 3) Is there a person who has made a particular impression on you during your career? Pre-interview correspondence was conducted via e-mail and phone calls.

The interviews took place in three cities. In Oslo, the interviews took place in the Pharmacy Museum, and in Bergen and Tromsø at the University Media Department's professional recording studios. A photographer used three cameras and two microphones to record the interviews. Three pharmacists (AGG, MW, LH) conducted the interviews. LK was the head of management.

Thematic module development and learning design

Following the 33 interviews, a group of academics within social pharmacy from five departments of pharmacy in Norway was formed, and a shared Microsoft Teams platform was established for collaboration. In total, the recordings are in sum 22

hours, equivalent to 170,000 transcribed words. AGG listened to all interviews and selected thematic videoclips and asked all co-authors to listen to 3-4 interviews to agree on which theme and videoclips were to be extracted. In total, 36 themes emerged from analysis, and these were categorised under six modules. These were further developed on the learning platform Canvas, accompanied by suitable video/audio clippings from the interviews. Additional learning resources and assignments were incorporated into each module.

Monthly meetings were held to discuss the platform's content and design

Two pharmacy students listened to all interviews, reviewed the content in the learning platform, and took part in discussions with the authors. Their feedback

informs the structure, content, and visual design of the learning platform. The authors ensured that the academic content remained accurate and aligned with the themes.

Platform layout

Six learning modules were developed: 1) Pharmacy and pharmacist, 2) Medicines and medicine use, 3) The medication user, 4) Legislation, 5) Global health and emergency preparedness, and 6) Pharmaceutical research. They were aligned with the main modules in the textbook in Social Pharmacy (Granås and Bakken, 2018), see Figure 1. The sub-themes go beyond social pharmacy, such as pharmaceuticals and pharmaceutical production. The development of modules based on themes identified in the recordings is shown in Figure 1.

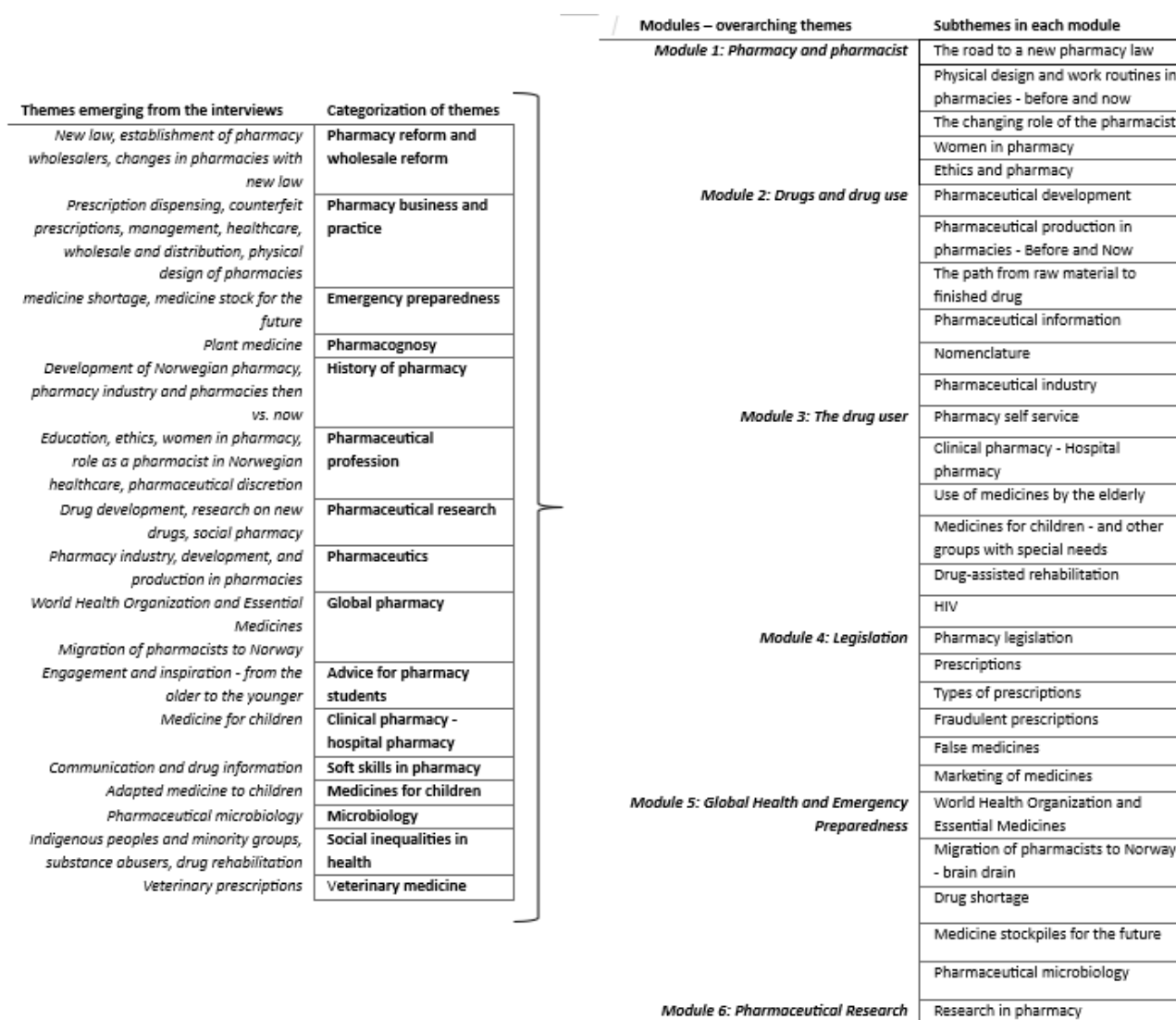


Figure 1: An overview of all themes extracted from the interviews, the categorisation of the themes and sub-themes

The learning platform was first developed and then shared on Canvas Commons. Lecturers can then import modules, or parts of modules, from Canvas into their own courses. This represents a new way to integrate

pharmacy history into their own teaching material. A screenshot of the Canvas Commons homepage shows the six modules (Figure 2).



In Norway, there are numerous collections and museums that have preserved the physical history of pharmacy, including objects, interiors, written documents, and equipment used in drug production. However, the cultural and historical development of the pharmacists' role is not as well documented—for example, the consequences of major changes in the pharmacy sector, hospital pharmacies, the pharmaceutical industry, administration, preparedness, and so on. Much of the more recent history exists only as anecdotes held by individual pharmacists. Very little has been documented as audio recordings or video.

This resource has been created with this in mind. You can either listen to the full audio recordings of the 32 individuals who were interviewed, or explore numerous audio clips that are thematically integrated into the six main modules of this educational resource.



Click on the images of the different modules to learn more.

Pharmacy & Pharmacists	Drugs & Drug Use	The Drug User	Legislation	Global health & Emergency Preparedness	Pharmaceutical Research

*Some of the images in the platform were AI-generated with assistance from Freepik. This content has been translated from Norwegian to English with assistance from ChatGPT.

Figure 2: Illustration from the learning platform's homepage, which navigates to the 6 different modules

The modules introduce the topic by providing relevant background information, including related legislation, guidelines, industry standards, and typical practices for the profession. Furthermore, short videos and/or audio clips, assignments, questions for reflection, cases, and relevant literature provide a basis for in-depth study.

The assignments typically include elements such as reflective prompts, self-assessment activities, or case-based tasks incorporating audio or video excerpts from the interviewees. Figures 3 and 4 illustrate examples of these assignments.

Use of artificial intelligence and machine translation tools

Some images in the platform (as seen in Figure 2) were AI-generated with assistance from Freepik. The images are used only for pedagogical visualisation. All textual content is written by the authors.

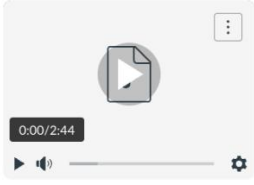
Due to the learning platform being designed in Norwegian, the illustrations (Figures 3 and 4) in this manuscript have been translated into English with assistance from ChatGPT. The translated material was reviewed and validated by the authors.

Pharmaceutical judgement

The ability to make decisions is an important part of professional competence. Pharmacists must make many complex decisions based on, among other things, knowledge and experience. It is not possible to create written procedures that cover every conceivable situation that may arise in a pharmacy. Here, you can listen to experienced pharmacists talk about having the confidence to use professional judgment:

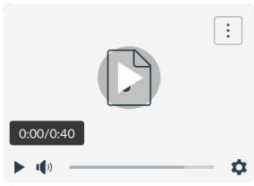
 Listen to pharmacist Atle Naterstad





 Listen to pharmacist Eli Bjørke







 Listen to pharmacist Erling Bruun







 Watch:

This video introduces what it means to act professionally and what is meant by the concept of pharmaceutical judgment.



  Se på YouTube

 Test yourself:

- Which law/regulation addresses emergency dispensing of medicines?
- What does this law/regulation say about emergency dispensing?
- Which other laws are relevant in this situation?

 For reflection:

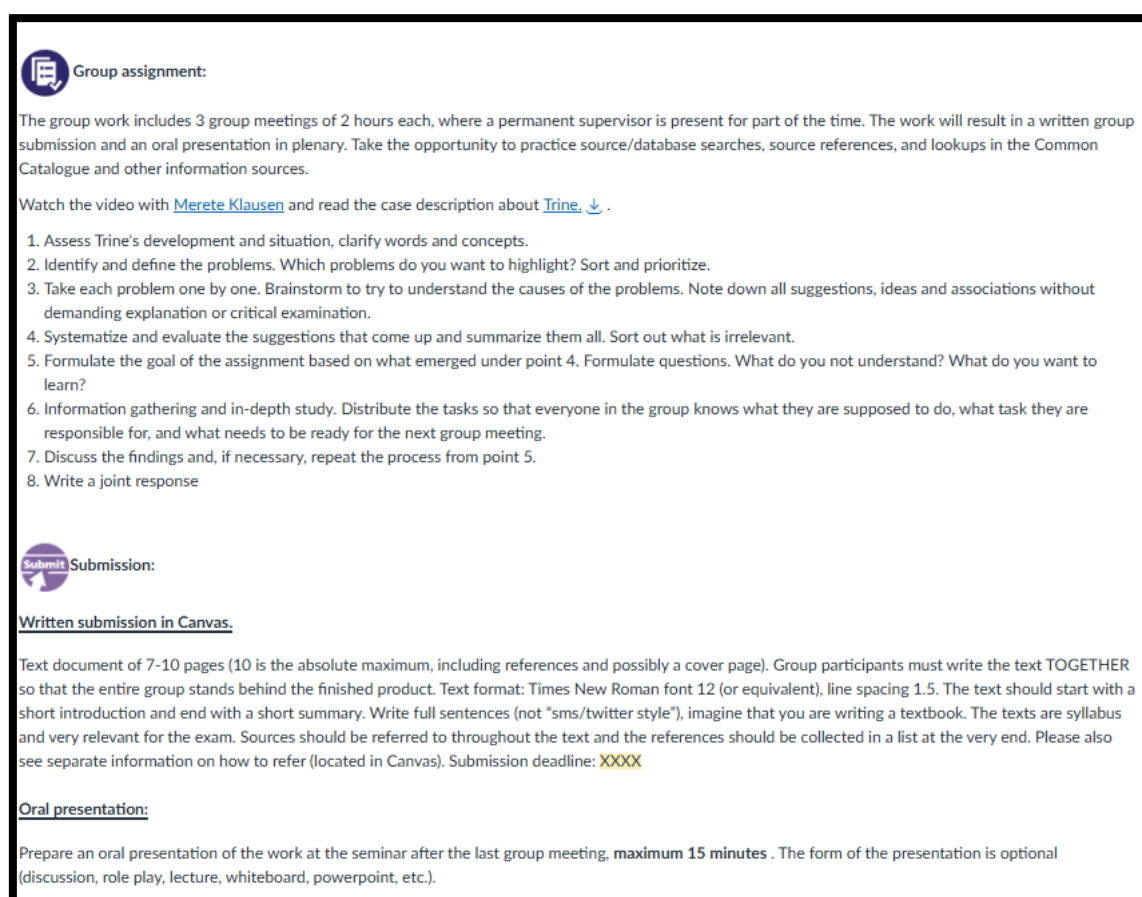
- Which ethical guidelines would you apply in this situation?
- Would you dispense insulin or methadone to individuals who do not have a valid prescription? Justify your answer.
- Erling Bruun explains that they developed standards for the use of pharmaceutical judgment so that staff would handle customer interactions more consistently. Argue for and against the (paradoxical) attempt to standardize the use of professional judgment.

 Further readings:

<https://www.apotek.no/aktuelt/nyhetsarkiv/%C3%A5-si-jeg-kan-ikke-hjelpe-deg-strider-imot-v%C3%A5r-natur>

This content has been translated from Norwegian to English with assistance from ChatGPT.

Figure 3: Under the module Pharmacy & Pharmacists is the subtopic Pharmaceutical judgement



Group assignment:

The group work includes 3 group meetings of 2 hours each, where a permanent supervisor is present for part of the time. The work will result in a written group submission and an oral presentation in plenary. Take the opportunity to practice source/database searches, source references, and lookups in the Common Catalogue and other information sources.

Watch the video with [Merete Klausen](#) and read the case description about [Trine](#). [↓](#)

1. Assess Trine's development and situation, clarify words and concepts.
2. Identify and define the problems. Which problems do you want to highlight? Sort and prioritize.
3. Take each problem one by one. Brainstorm to try to understand the causes of the problems. Note down all suggestions, ideas and associations without demanding explanation or critical examination.
4. Systematize and evaluate the suggestions that come up and summarize them all. Sort out what is irrelevant.
5. Formulate the goal of the assignment based on what emerged under point 4. Formulate questions. What do you not understand? What do you want to learn?
6. Information gathering and in-depth study. Distribute the tasks so that everyone in the group knows what they are supposed to do, what task they are responsible for, and what needs to be ready for the next group meeting.
7. Discuss the findings and, if necessary, repeat the process from point 5.
8. Write a joint response

Submission:

Written submission in Canvas.

Text document of 7-10 pages (10 is the absolute maximum, including references and possibly a cover page). Group participants must write the text TOGETHER so that the entire group stands behind the finished product. Text format: Times New Roman font 12 (or equivalent), line spacing 1.5. The text should start with a short introduction and end with a short summary. Write full sentences (not "sms/twitter style"), imagine that you are writing a textbook. The texts are syllabus and very relevant for the exam. Sources should be referred to throughout the text and the references should be collected in a list at the very end. Please also see separate information on how to refer (located in Canvas). Submission deadline: XXXX

Oral presentation:

Prepare an oral presentation of the work at the seminar after the last group meeting, maximum 15 minutes. The form of the presentation is optional (discussion, role play, lecture, whiteboard, powerpoint, etc.).

This content was translated from Norwegian to English with assistance from ChatGPT.

Figure 4: Example of a group assignment in module 3 – The drug user. Here, the student learns about the historical development in Norwegian drug-assisted rehabilitation programme and is given the opportunity to reflect. Additionally, the students learn about source criticism and develop their skills in both written and oral communication.

Ethics approval and consent

All participants who agreed to be interviewed provided written consent to the use of the recordings for educational purposes and public dissemination. At the time of data capture, this type of project did not require ethical approval, however informed and archived written consent from participants was a requirement. Participants, or their relatives postmortem, may withdraw their consent at any time, in which case the audio and/or video recordings will be deleted.

At the time of data collection, ethics approval from the Regional committees for medical and health research (REK) was required for medical and health research intended to generate new knowledge about health and disease, including research involving humans, human biological material, or health information. As this project involved interviews with pharmacists about professional history for the development of an

educational resource, it did not fall within REK's remit and ethical approval from REK was not required.

The project leader, the media adviser, and the journalist at the University of Oslo reviewed all initial recordings and transcribed them digitally. Any sections considered to be of a private or sensitive nature were removed, for example, where participants shared personal information.

The recordings/transcripts are kept and securely archived at the Museum of University History, University of Oslo, Norway, and will be retained unless withdrawal of consent is requested in accordance with the consent procedure.

Evaluation

The platform was launched for the Norwegian pharmacy teaching community in late January and made publicly available in May 2026. At the end of the

year, an evaluation of how it is used, including evaluating student learning, engagement, usability, acceptability, implementation, and teaching outcomes, will be performed.

Discussion

This online learning platform was developed in collaboration between five departments of pharmacy in Norway, and the platform is a new way of teaching the history of pharmacy. The audio/video clips of old pharmacists bring life to historic developments and pharmacy practice from the 1940s until today. The platform will be a valuable source for lecturers and pharmacy students, assisting them in better understanding their professional role. It also supports a more unified approach to teaching pharmacy history across different pharmacy departments in Norway. Pharmacy students can learn from the experiences of senior pharmacists and apply this when similar situations arise in their work-life (Cornett *et al.*, 2023). At the same time, being able to see how other pharmacists have worked in previous decades will add to the discussions for what constitutes a pharmacist's role, now and in the future (Burns, 2014; Zakaria & Awaisu, 2011).

The digital learning platform increases accessibility and flexibility for students and teachers. Video and audio clips engage students in active learning (Brame & Perez, 2016), which motivates students and builds character and attitudes as professional pharmacists (Owens *et al.*, 2020). It may also have an overall impact on motivation, which moderates key learning characteristics such as attention and memory consolidation (Cavanagh *et al.*, 2016). A digital platform also poses some drawbacks, such as lower motivation and engagement from the students to seek information in textbooks and other sources (Salem & Anahí, 2024). Although the platform at large was developed by academics in social pharmacy, it covers all fields within pharmacy practice as it reflects the informants' collective life experience in the pharmacy profession. However, it remains to be seen whether it will be used by academics in other areas, such as microbiology, pharmacology, or pharmaceuticals.

Strengths and Limitations

The project is based on interviews with 33 older pharmacists. While their extensive experience and involvement in professional changes constitute a strength, modules were developed from the most frequently cited topics in the interviews. A strength is that the complete audio recording and transcriptions of

the interviews are freely available online (www.farmasihistorier.no). A key strength of this project is the collaborative development of the learning platform, which involved lecturers from five pharmacy departments, ensuring a broad range of expertise and pedagogical perspectives. Additionally, a systematic alignment with established pharmacy curricula and the inclusion of pharmacy students in the content development process helped to align the platform with students' needs, hence improving relevance and engagement.

A clear selection bias in the choice of interviewees is that pharmacists who have been active over many years in professional debates, held leadership positions, or played central roles in shaping professional policy were selected. This raises an evident dilemma, such as following particular professionals that have been successful, viewpoints driven by personal engagement, and interpretations of the history that rely primarily on retrospective reflections.

To mitigate this bias, interviewees representing opposing positions on the most controversial reform in Norwegian pharmacy were invited. These reforms include the change in community pharmacy ownership in 2001, representatives from all three major pharmacy chains, and representatives from the competing pharmacy education programmes at the Universities in Oslo, Bergen, and Tromsø.

Conclusion

In conclusion, this paper demonstrates the development of a digital learning platform, grounded in insights gained from interviews with senior pharmacists. Student focused evaluation and further optimisation are currently pending.

Conflict of interest

The authors declare no conflict of interest.

Source of funding

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