



## Collaborative Discussion as a Strategy Encouraging Active Learning in Pharmacy Education

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### Abstract

*The changing character of pharmacy practice necessitates the expansion of today's role of pharmacists. Today's pharmacists are expected to be more health professionals and patient counsellors, and less merely drug sellers. The delivery of the expanded pharmaceutical care, with patient-centered focus, requires a relevant set of social skills and poses new requirements for pharmacy education [1]. This paper presents work related to the project Staying Connected Through Connecting: Peer Learning and Peer Assessment in Pharmacy Education, being realized in the Bachelor of Pharmacy study program, Nord University, Norway. The project received three-year funding from The Norwegian Directorate for Higher Education and Skills and its goals are oriented towards strengthening students learning outcomes through active and collaborative methods of learning. This paper's main objective is to document and disseminate the results of one of the first stages of project realization. Within the course Pharmaceutical Analysis, a teaching activity was developed and tested using collaborative discussion - 'Think-Pair-Share' as a learning method. The teaching activity was implemented in two phases starting with discussing viable solutions to a real-world problem. Perceptual data collected from students show positive response to the use of 'Think-Pair-Share' as a learning technique for enhancing engagement with the learning material. Both quantitative and qualitative feedback was prevalently favorable and affirmative. These results encourage further experimentation with collaborative discussions and expanding their implementation to didactic work aiming at structured approach to training generic skills such as critical thinking and critical reflection. These skills are of critical importance for 'reflective practitioners' and working on their development is one of the three main goals of the project.*

**Keywords:** Active Learning, Collaborative Learning, Think-Pair-Share, Pharmacy Education

### 1. Introduction

In the last decades, the roles of pharmacists have changed from mainly being responsible for producing and dispensing medicines, to taking active roles in caring for patients in both community pharmacy and hospital settings. The new requirements for pharmacists' competence emphasize the importance of skills in pharmacotherapy, clinical pharmacy, and pharmaceutical care as well as skills in communication and cooperation with both patients and other health care professionals.

Since 2021, the pharmacy education in Norway has been following a new governance system for health and welfare education. A National Regulation with 12 common learning outcomes were to be adapted to all health and welfare educations [2], including the pharmacy educations. In addition, a national curriculum for the study program was developed [3]. New pharmacy curricula have been developed at all institutions, and the focus on generic skills such as communication, cooperation and reflection have been strengthened to meet both regulations and demands in practical work life.

The increasing demand for developing social skills along with professional knowledge, prompts the need for implementing teaching methods that would engage students in the forms of learning that involve social interaction and collaborative work and hence raise the degree of active participation in the learning process.

This paper explores students' perceptions of a cooperative learning strategy 'Think-Pair-Share' implemented in the course *pharmaceutical analysis* to aid the understanding of the connection between advanced chemical knowledge and its practical application. The choice of 'Think-Pair-Share' was motivated by the assumption that increased level of social participation required by this activity will enhance students' engagement in the learning process and consequently benefit achieving the learning goal in the subject. Meanwhile students may realize the value and role of individual contributions in constructive collaboration.



## 2. Background

### 2.1 Active Learning as an Overarching Approach

The study presented in this paper is a part of the work on the project aiming at developing a model for a three-year undergraduate study program in pharmacy. The novelty and didactic value of the model is to be based on incorporation of peer learning and peer assessment, i.e., forms of learning with a high degree of social component. Since the project proposal was developed in response to the call of proposal within an active learning program, involving students in active learning is an overarching pedagogical approach and the goal of our work. Collaborative forms of learning are specific actions undertaken to achieve this goal.

Active learning engages students in learning process on a deeper level which results in better understanding and retention of the learning material. The premise of active learning is that students must be involved in *doing things and thinking about what they are doing*. Furthermore, while doing things students must engage in higher-order thinking activities such as analysis, synthesis, and assessment [4]. *Across healthcare education, there has been a greater emphasis in recent years on the use of active learning in the classroom to better prepare students for the ever-changing healthcare needs of their future patients* [5]. *In the view of changing role of pharmacists, active learning methods can be particularly useful in providing pharmacy students with the necessary skills to deliver pharmaceutical services*. A scoping review of world-wide literature shows that *case-studies and various cases of simulation are particularly popular among active learning methods at pharmacy faculties* [6]. To ensure high degree of students' social presence we opted for collaborative discussion and specifically Think-Pair-Share activity as a method of engaging students in active learning.

Think-Pair-Share is defined as *a cooperative learning strategy in which the teacher poses a topic, question or problem; students have time for individual reflection; students then pair off and discuss their ideas; then they have an opportunity to share their thoughts with the whole class* [7].

### 2.3 Practical Realization of Think-Pair-Share Technique in the course Pharmaceutical Analysis

The presented study discusses students' perceptions of a Think-Pair-Share activity realized in two phases in the course Pharmaceutical Analysis. In the first phase students were presented with a real-world pharmaceutical problem concerning caffeine consumption in energy drinks during pregnancy. The assignment in this phase required that students thought of possible advice in such cases and reflected on what information they needed to make the advice evidence based. Each participant had to write down three ideas (*think stage*) and then discuss them with one co-student (*pair stage*). The outcome of the discussions in pairs was in turn to be shared with the entire class (*share stage*).

The aim of the second phase of the activity was to illustrate the significance of applying knowledge and skills from pharmaceutical analysis to pharmaceutical problems. After having been presented with data-driven information about the problem discussed in the first phase, i.e., publication from the Norwegian Institute for Public Health, students were asked to incorporate this new information into the ideas developed during the first stage of Think-Pair-Share and, if necessary, revise these ideas following the same steps as in the first stage, i.e., *think-stage, pair-stage and share-stage*. In the second phase students were provided with access to literature about a quantification method of caffeine in human plasma, and a method for determination of caffeine contents in various food items.

## 3. Data Collection and Analysis

Fifteen undergraduate students in their second year of the bachelor study program in Pharmacy participated in the Think-Pair-Share activity. Perception data from students were gathered through a questionnaire containing five close-ended Likert scale questions with seven-point semantic differential scales and four open-ended questions that required respondents to elaborate on their opinions in their own words. Distribution of responses to close-ended questions uncovered degrees of opinions on the level of collaborative activity usefulness and respondents' engagement in the activity. Open ended questions allowed to obtain respondents feedback in more detail and provided qualitative element in the survey focusing on students' affective reaction to the collaborative learning experience and suggestions for possible improvements. Textual analysis applied to the written responses was approached both quantitatively, where the features of text were measured numerically, and



qualitatively, where the content analysis aimed at identifying recurrent opinions. The investigation undertaken has an exploratory character and aims at forming the basis of more conclusive research.

## 4. Results

### 4.1 Quantitative part of the survey

The opening Likert scale question asked about students' opinions on the usefulness of clarifying by the teacher the goal of the class and the action plan to achieve the goal. One student was neutral on the subject. All the other students chose an answer option above the midpoint. The following question asked students about their opinion on usefulness of collaborative activities. Likert scale report shows the distribution of most frequent responses above the neutral point and the prevailing scores in the upper range of the scale. The level of neutrality on the subject was very low. The questions about the degree of students' engagement in the collaborative activities received comparable profile of responses: majority of students (87%) chose response options above the midpoint. One student was neutral on the subject and one student chose response option below the midpoint. Students' responses to close-ended questions are shown in Fig. 1 and Fig.2.

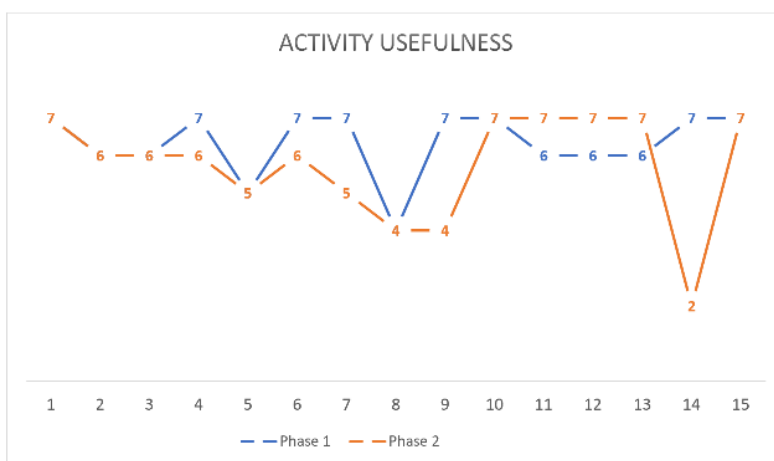


Fig. 1. Students' perceptions of Think-Pair-Share (TPS) usefulness. The horizontal number line represents participating students. The chart line shows values on a seven-point Likert scale.

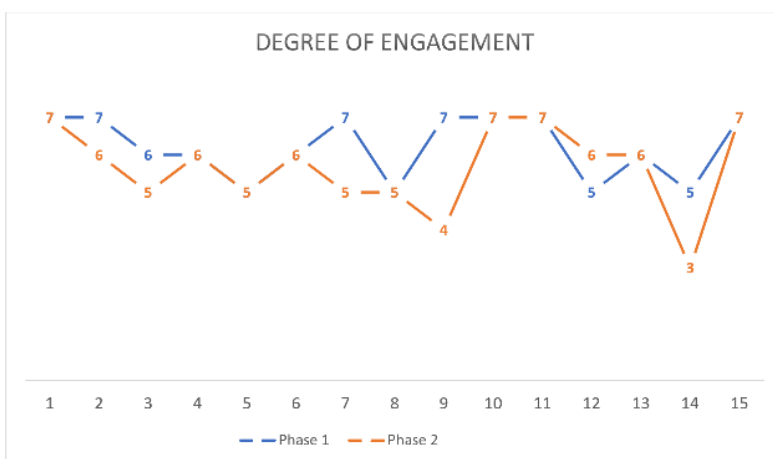


Fig. 2. The degree of students' perceived engagement in TPS activity. The horizontal number line represents participating students. The chart line shows values on a seven-point Likert scale.

### 4.1 Qualitative part of the survey

In total, students used 324 words in their answers to the question "What did you like about collaborative activities" and 99 words in total in their answers to the question "What did you not like about collaborative activities". The recurrent opinion in favor of collaborative discussion emphasized the advantage of hearing what and how others were thinking about the problem. Out of 99 words used



by students to express negative opinions, 74 words were used to state that it was difficult to come up with any negative opinions. The only two comments that were indeed the answers to the question “What did you not like about the collaborative activity” pointed to “perhaps” not enough differentiation in students’ opinions on the discussion subjects and “perhaps” too much time allocated to the discussion. The adverb “perhaps” is a direct quotation from students’ comments and connotes uncertainty about the expressed opinion.

The answers to the question “What would you do to improve the collaborative activities?” were expressed in 86 words in total, where 35 of those words were used to point to the lack of ideas about what could be done better. Comments with the suggestions for improvements contained remarks that there could be more discussions in groups, more cases to discuss, students could speak louder so it was easier to hear everyone. The answers to the question about further comments did not contribute further information.

## 5. Discussion and conclusion

Both numerically based results and the outcome of textual data analysis indicate positive perceptions of collaborative discussion as learning activity. The only two remarks with reference to what was disliked about the activity (25 words in total) did not concern the didactic idea of collaborative discussion as such and both were tentative. Suggestions for possible improvements advocated using more collaborative discussions.

Numerous studies have proved collaborative methods to be beneficial for students. Their benefits extend beyond the academic outcomes and include also social and psychological dimensions [8]. The significance and impact of our study lies in its contribution to further design of project activities. Affirmative attitude to the Think-Pair-Share activity encourages its incorporation to problem solving assignments in theoretical subjects, where understanding of the connection between theory and practice is instrumental for developing professional competence. The method is relatively simple and can be suitable for working on a solution to a range of problems that require interdisciplinary approaches. However, formulating good problems that combine approaches from various pharmaceutical knowledge areas can pose a challenge. The unquestionable advantage of the investigated method is the prerequisite of social presence and goal-oriented interpersonal engagement. These qualities are prior conditions for developing generic skills such as communication and collaboration, development of which is targeted by one of the main project’s goals. The limitation of the study is a small sample size which may not reflect the population concerned. The design of the survey could have also included feedback on perceived learning outcomes. These constraints will be addressed in further research.

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