

Work in Progress

'Students reflection to "review articles" and their presentations as a teaching tool'

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Scientific Review Papers (SRPs) provide an integrated, synthesized overview of the current knowledge that evaluates existing methodological approaches, identifies inconsistency in prior results and potential explanations, and describes research insights, existing gaps, and future research direction. Review papers can serve as an educational tool to increase the students' horizons on each taught subject.

We use SRPs as a supplementary educational tool to enrich the students' perception of concepts they learn in a pharmacology course. Our target group is Master-students in the biomedical sciences program who participated in the Foundation of Clinical Pharmacology Course. A pilot study targeted students who participated in the course during Fall semester 2020 (n=30). Students were divided into groups of four and assigned various review (literature review, systematic review, meta-analysis) papers related to the course topics. The groups were asked to read the articles, discuss them in their groups and present them, emphasizing the connection to the material & topics discussed in lectures. The presentations were through WebEx, and each group had the opportunity to have one or multiple presenters. The other groups reflected through evaluation forms. The group presentations were graded and counted as 30% of their final grade. Peer evaluations of students accounted for 50% of their project grades. They included a quantitative scale for different aspects of the presentation accompanied by an explanation of two strong and two weak points. We evaluated the students' opinions through anonymous questionnaires. The final goals of this educational activity have been itemized as two general goals (1 and 2) and two specific goals (3 and 4) as follow:

1. To familiarize students with different types of review papers
2. To improve scientific presentation skills
3. To increase understanding of the topics discussed in lectures
4. To introduce students with commonly used medications in each discussed field

We have used the first three Kirkpatrick pyramid levels for program evaluation, i.e., satisfaction, learning, and impact. Questionnaires and instructor judgment were used as the evaluation tool. As the initial step, we focused on general goals. At the beginning of the semester, students received education about the characteristics of review articles versus systematic review articles. At each group meeting, different SRPs were assigned to various groups. Students practiced applying their learned knowledge by identifying the type of the paper through specific characteristics that they learned. By the end of the semester, students' ability to identify the style of the articles increased by 70%. Peer and instructor evaluation forms were completed after each presentation to help students improve their presentation skills. Our analysis showed that 72% of students' evaluations aligned with the instructor's. However, student reviewers were less restrained or forgiving than the instructor and mainly focused on their peers' presentation skills. Students were encouraged to use the evaluation

forms as a critique to improve their presentation skills. Students' confidence and presentation skills in all groups were enhanced, reflected in their grades for the group assignments. Each group had in total four presentations, and the presentation skills improved slightly after each presentation. The improvement in the last two presentations was more significant than the first one ($P < 0.0001$). The efficacy of the program for specific goals targeted the satisfaction of the students. The goal Students satisfaction and suggestions for designing a more efficient activity. A questionnaire was designed to evaluate the students' satisfaction regarding the training and provided materials. 83% of students were in favor of the method. Although most students stated that the activity helped them better understand the subject, they believed that the effect was not significant. The majority of the class agreed that making all students accountable for reading all the papers and doing an activity regarding the paper's content will improve their concentration and deep learning during the peer presentation and help them have a more constructive discussion. It seems that the cognitive load was a burden for students. While the presenting group gained some knowledge about the commonly used medications discussed in the paper, the audience gained minimal knowledge.

Based on students' assessment, we will revise both the content and the method to make all students accountable for the same material and incorporate before and after assessment to evaluate students' improvement more accurately.