



Research design group activity to enhance learning

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Article Info: Received 14 November 2018; Accepted 10 December. 2018

Cite this article as: Anwar, S. (2018). RESEARCH DESIGN GROUP ACTIVITY TO ENHANCE LEARNING. *International Journal of Medical and Biomedical Studies*, 2(6).

DOI: <https://doi.org/10.32553/ijmbs.v2i6.65>

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Conflict of interest: No conflict of interest.

ABSTRACT:

BACKGROUND: Study designs in research are a difficult topic to understand for undergraduates in MD program unless it is accompanied by some hands on activity with real journal articles published in renowned journals. The objective of the study was to make the understanding of the concepts of study designs better and to boost the learning through group activity.

METHODS: A formative activity was conducted in the class after taking the course lectures series on research study designs for the students. A questionnaire was given by the course director to the students after the conduct of a formative activity in the class. The questionnaire was semi structured with mostly close ended questions and few open ended questions. Percentage responses were noted for each category of response and median score was calculated for all responses.

RESULTS: Almost all students (94.8%) were highly satisfied with the activity. 69.8% felt that it was also easy to identify the participants and the study setting in the given article. 65.5% agreed that it was easy for them to identify the prospective or retrospective nature of the study design. Most of the students (81%) felt that group members help in understanding the concepts. After doing the activity, 68.1% students were confident that they could read any journal article.

CONCLUSION: Group activity helped the students to understand and compare the concepts of different study designs in a better way. It made them more confident at the end of the activity with the aid of real journal articles.

KEY WORDS: Research design, group activity, undergraduate students, questionnaire

INTRODUCTION:

BACKGROUND:

Research study designs is a difficult topic to understand for undergraduates in MD program unless it is accompanied by some hands on activity with real journal articles published in renowned journals. The differences between

prospective cohort, retrospective cohort, case control and cross sectional studies are difficult to absorb at undergraduate level. Once the students see the real published studies, it is easy for them to understand the differences in study setting, cases, control groups, prospective or retrospective nature of studies, measures of frequency or association involved in a

comprehensive manner. The key issue in learning research designs appears to be the abstract nature of the subject matter and the disjoint between the theory and the practice.

The lecture series of study designs in a didactic lecture of 60 minutes does not achieve the objective of thorough understanding of the concepts in different study designs. Moreover students learn better in a group activity module wherein group members' cooperation helps them to understand the difficult concepts better and gives them more confidence. It also enhances the morale of the students who are unable to grasp even the minutest of the concepts. Learning is most effective when student involvement, participation and interaction are maximized [1]. In activity-based education, the student becomes more actively involved in the learning process through acts of 'doing', 'being' and 'critically reflecting' than in traditional, didactic education that is more centered around the passive act of 'knowing' [2]. It has been documented that having the instructor provide all the materials to the passive student is the old paradigm; the new paradigm is to actively engage students with the material and one another [3].

Moreover the research is considered as an uninteresting topic for students which they have to study just because it is compulsory. Not many are interested to do their own research in future. In addition, the majority of undergraduate programs do not have integrated research methods and statistics courses [4]. For those programs that do not offer full research experiences and integrated methods and statistics courses, the exercise of learning with group activity allows students to experience the whole research process. Activity based learning modules would help students to read the journal articles and critically appraise them in future which are considered as a Herculean task by most of them. It will also help them to design their own research. Thus an activity was done with the students post lecture to give them practical hands on in understanding the concepts

of various research designs with real journal articles taken from renowned journals of epidemiology and public health. The aim was to boost the learning and make the understanding the concepts of study designs better.

MATERIALS AND METHODS:

A formative activity was conducted in the class after taking the course lectures series on research study designs for the students undertaking the undergraduate course of Epidemiology & Public Health in MD program of Oman Medical College. The activity included giving journal articles to the students in groups of 5 each. Two articles were given to each group which belonged to different study designs like prospective cohort, retrospective cohort, case control, cross sectional, experimental and case studies. These articles were chosen by the course director from different online journals on epidemiology and public health. A worksheet with questions related to the study design used in the given article was also given to the group. It had questions on understanding of students of study setting, participants, prospective or retrospective nature of study, measures of frequency or association used in the study. Each group had to discuss the first article for one hour followed by documenting their responses on the worksheet collectively. They worked collaboratively to discuss the answers. In the second hour, another article with different study design than the first article was given to the groups. They also had to write a short summary of the journal articles. After the activity, each student had to individually fill a survey questionnaire related to this activity after taking informed consent from them with anonymity and confidentiality of data. They were made aware that the responses will help the course director to improvise such activities in the future for better learning of the students. The survey was approved by the institutional research and ethical committee.

A questionnaire was given by the course director to the students after the conduct of a formative

activity in the class. The questionnaire was semi structured with mostly close ended questions and few open ended questions. Close ended questions mostly were based on a Likert rating scale of 1 to 5; 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree responses or yes/ no responses. In addition some of the open ended questions were designed to obtain feedback from the students about the activity per se. Data was entered and analyzed in SPSS. Percentage responses were noted for each category of response and median score of responses were calculated. Reliability of the scale was checked by Cronbach alpha. Mann Whitney U test was used to compare median across the groups. A p value less than 0.05 was considered statistically significant. Answers to open ended questions were broadly themed based on similarities of responses.

RESULTS:

Total students in the year 5 batch taking the course of Epidemiology & Public Health was 128. Out of them 116 students participated in the survey, thus the response rate was 90.6%. Gender wise 109 students were females (94%) and only 7 were males (6%). Two articles were given to the students to review. Cohort study was reported to be the first article by 44% of the class followed by cross sectional study article (26.7%), experimental study (15.5%) and case control study (13.8%). The second article was commonly cross sectional (31.9%) followed by case control (29.3%), cohort (20.7%) and experimental study design (18.1%). After doing the activity, 56% of them felt that only one article was enough for the activity while 37.9% felt that the two articles given as a task to them was appropriate.

They were questioned if they had participated in research before doing this activity; most of them (72.4%) had not done any research activity in the past. This assignment related to research was first of its kind for them. However, most of them (81%) had read some journal article in the past. Only 18.1% agreed that it was a difficult activity

to start with; most of them (43.1%) felt that it would be an easy task after taking the lectures on research design in the class prior to the activity. A few (31%) agreed that they were nervous to write details and comments in the activity form. While after doing the activity, 76.7% found it to be an easy task.

Between 63% and 95% of students answered positively to a range of questions concerning activity objectives. In relation to specific survey questions:

- 62.9% agreed that data collection tool was easy to identify in the article.
- 69.8% felt that it was also easy to identify the participants and the study setting in the given article.
- 65.5% agreed that it was easy for them to identify the prospective or retrospective nature of the study design.
- 52.6% agreed that they were able to decipher the frequency measures or the measures of association in the study.
- After doing the activity, 68.1% students were confident that they could read any journal article now and will be able to understand and comment on the study design used.

The satisfaction rate with the activity was very high, 110 students (94.8%) were highly satisfied significantly that the activity could meet its objective of understanding the different study designs used commonly in research worldwide ($p < 0.05$). Most of the students (81%) felt that group members help in understanding the concepts they did not know was immense and they were able to do the activity with better understanding it being a group exercise. However, a very small percentage (7.8%) felt that if it were an individual exercise, they would have done the activity in a better way and more confidently; most of them disagreed (75%) to this statement. In tune with this opinion poll, 87.9% were of the opinion that in future also such activities should be group work; only 6% felt that they would like to go for individual exercise

and another 6% felt that such activities are not needed.

The overall median score was 4 (Agree) with an interquartile range of 0.5. Likert scale with 6 items in the construct was reliable (Cronbach alpha = 0.701). Median score was higher for those who preferred group activity over individual task; Mann Whitney $U=175$, $p=0.003$. The median score of those who had read any journal article before the activity was higher than those who had no experience but the result was not statistically significant. Similarly no statistically significant difference was seen in the median score of those who had participated in any research project before the activity.

Qualitative feedback was also sought from the students. Open ended question was asked to the students as to what were the good things about the activity. Their responses were combined into three broad themes: advantages of group activity, better understanding of concepts and knowledge gain. Under the first theme of advantages of group activity, 31.9 % responses were recorded. Students felt that due to the group task, they could understand the activity and the study design well. The cooperation of the group members and team work helped them a lot. It helped them to share ideas and information. Group activity was thought as a good means of learning exercise and also it was fun and gave an enjoyable learning environment.

The activity helped them to understand the concepts of study design; there were 19.8% responses on this theme. Students felt that they could apply the concepts learnt in theory class into practice after seeing the actual examples of study designs in this activity. Now they knew different types of study designs and could compare its characteristics across different designs. They could see the process and steps involved in research. They could draw interpretations from the article given to them which was translation of theory into practice.

The third theme of responses based on knowledge gain by the activity was given by

10.3% of the students. They felt that they gained knowledge on how different study designs are used in the journal articles which are real. They knew more details of the different study designs than taught in the lecture class and came across some new terminologies. Seeing examples of different study designs actually expanded their learning. It was a new experience and they felt very confident after the exercise. Few students (37.1%) did not choose to write any comments on the benefits of this activity.

Another open ended question related to ways of improving the activity in future was also included in the survey. The responses were broadly classified into 3 themes: timing of the activity, number of group members, and number of journal articles. Around 13.8% students gave comments related to modifications in the timing of the activity. They preferred it in the morning. Few felt that it should be only for one hour and may be given to them as an assignment on computer. Around 8.6% of the students felt that only one article is sufficient for the activity. Some felt that the article may be given to them few days before the activity so that they can read enough. Few felt more discussion time should be given as 2 hours was not sufficient. Around 9.5% responses were related to modifications in the number of group members in the future activities. They felt the group should have only 2-3 members but this is logistically not possible with big batch strength of students. However 68.1% students did not give any comments related to future modifications in the conduct of activity.

DISCUSSION:

Most of the students (72.4%) had never done any research in the past. Students found the activity was difficult to start with but by the end of the activity 76.7% felt that it was an easy task. This shows the nervousness of the students before any new assignment that subsides down with good instructions, orientation to the task and support throughout the activity. The activity stimulates reflective thinking about the key

elements of various research designs. It pushes the students to answer higher-order questions that stimulate reflective thinking and deeper processing of the material [5]. It encourages them to ask questions and engage in elaboration and argumentation which are the keys to effective learning [6].

Almost all students (94.8%) were highly satisfied that the activity could meet its objective of understanding the different study designs used commonly in research worldwide. Most of the students (81%) felt that group members helped in understanding the concepts. Team work enhanced their learning. The findings of this study are in line with much of the research outlined in the literature review regarding the limitations of the lecture-based approach. The activity-based approach appears to result in students who embody the characteristics of active learners [7]. Students must do more than just listen. They must read, write, discuss, or be engaged in solving problems [8].

After doing the activity, 68.1% students were confident that they could read any journal article in the future with confidence and would be able to understand and critically appraise the study design and methodology of the research studies. Furthermore, teachers acknowledge that actually conducting research is essential to students' understanding of statistics and research methods [9]. By encountering and overcoming obstacles in the research process, students actively learn lessons, and lessons actively learned are lessons remembered [10].

CONCLUSIONS:

The group activity helped the students to understand and compare the concepts of study participants, study setting, prospective or retrospective nature of study design, measures of frequency and association with different study designs in a better way. It made them more confident and satisfied at the end of the activity giving them in-depth knowledge, translating theory into practice with the aid of real journal articles in an enjoyable learning environment. In

future it would help them to read the journal articles and critically appraise them. It would also help them to design their own research. This approach to teach research designs enhances student participation and makes learning and teaching more enjoyable and easier to understand and apply. Such activity based learning will equip students with a deeply-learned battery of research skills to take into their further academic and professional careers.

ACKNOWLEDGEMENTS:

The author would like to acknowledge the students who participated in the study.

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