Direction to AI: A Group Versus an Individually Activity Among Medical Students Focused on the Preclinical Phase of MAHSA University, Malaysia

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Abstract. In a group work setting like team-based learning (TBL), students are urged to benefit from one another's ideas, experiences, and strengths as well as weaknesses. The aim of the study is to assess whether group-based activities or individually focused activities related to artificial intelligence (AI) learning have a greater impact on medical students' knowledge acquisition, and teamwork, with their perception in the preclinical phase at MAHSA University. Medical instructors have consistently urged for implementing active learning paradigms such as TBL to encourage students to apply their problem-solving skills. Before the professional preclinical examination (PCPE), 107 students of Year 2 were participated in the revision session of respiratory module based on their Individual Readiness Assurance Test (iRAT) and Group Readiness Assurance Test (gRAT) scores by asking them Five (5) scenario-based single response questions (SRA) and one extended matching question (EMQ) in individual & group as well. At the end of the sessions, 47 students provide their feedback. On an individual level, students responded more accurately when the same questions were provided to them in groups rather than individually. SRA 2, 4, and 5 were correctly answered by all groups, while SRA 3 was successfully answered by 87.5% of the groups. Students gave the most accurate response for SRA 5, scoring 71.4%. This study demonstrates that using TBLs might improve student engagement and perceptions of learning effectiveness. TBLs can help medical students learn more effectively.

Keywords: Quizizz, IRAT, GRAT, Artificial Intelligence learning, TBL

1. Introduction

1.1 Background

In the current trend of medical education, artificial intelligence (AI) is a helpful tool for instructors in the digital age[1]. Implementing AI in education improves students' meta-skills, enabling them to adapt and respond to technological advances in education[2]. AI based team-based learning (TBL) approach aimed at improving students' understanding of basic concepts and skills. TBL is a collaborative learningenvironment where students are encouraged to learn from each other's ideas, experiences, strengths, and weaknesses. It

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is thought that this approach provides opportunities for students to learn from one another by sharing their knowledge and challenging each other's opinions. With increased access to internet-based educational resources, classrooms may no longer be where students first encounter innovative content. Medical educators have been continually advocating for active-learning paradigmsthat motivate the application of problem-solving skills and collaborative learning by students[3]. TBL is a structured form of small group learning that emphasizes student preparation out of class and application of knowledge in class. TBL could engage students in learning, help them gain a deeper comprehension of subjects, foster a sense of responsibility for their teammates, and improve course achievement[4-5]. Students are motivated to come to class well prepared because they detect a feeling of competition among teams[4]. The flipped classroom seeks to motivate students by encouraging them to learn critical thinking, application, and evaluation of concepts before class using knowledge gained outside of or during lectures[5]. Student performance & attitude are often diverse[6-7]. The team-based learning approach (TBL) is a highly structured collaborative model that was developed to encourage students' active learning and problem-solving skills and self-improvement through feedback from others[8-9]. TBL's cardinal principlesare: 1). forming and managing learning groups; 2). holding students responsible for their individual and group task performance; 3). Frequent and timely feedback; 4). Provide assignments that help students both master content and 5). Build teamwork skills[10]. The TBL strategy improvesthe depth of students' understanding, fosters a sense of responsibility toward their teammates, and helps them do better in class[2]. TBL shifts the focus of teaching from the instructor to the students. The MAHSA University Faculty of Medicine, Bioscience and Nursing (FoMBN) offers a graduate medical program that takes five years to complete. During the first and second years, students learn from integrated pre and paraclinical curriculum consisting of both didactic lectures and PBL. To explore the individual and group activities in TBL, we evaluated how these experiences affected students' performance and perceptions.

2. Methodology

2.1 Participants

The study conducted at MAHSA University, FoMBN, and 107 MBBS students (year 2) participatedwho had completed the respiratory system module in MBBS Y1 by (lectures, practical, DSL)) attended an anatomy revision session before their year 2 professional examination.

2.2 Design and procedure

A cross-sectional descriptive study was conducted among undergraduate Y2 medical students. The study was approved by Masha Faculty Research Ethics committee under E3/MSC (PH). The goal was to assess the application of AI tools and software related to medical practice, such as AI for diagnostic and clinical decision support systems. In the currentstudy, the students were divided into groups according to their matric number. In total 11 groups contain 10 students, and one group contains 7 students. The study was conducted faculty of medicine at anatomy dissection hall (ADH) 1 and ADH 2 of Masha University. The Session was conducted on July 13th, 2022, from 8:30–10:30 morning. They receive their instructions through mail from a facilitator who knows the subject matter best. Before designing the session, the students were asked to prepare a pre-reading assignment which includes all anatomy topics and practical of the respiratory system. The whole sessions were 2 hours duration. The session included group pre-reading assignment, individual & group tests. The research was divided into three sections. 1) Assessing students individually using AI-generated 5 SEQs 2) Implementing AI-integrated 5 SEQs in TBL 3) Implementing AI-integrated 1 EMQ questions in groups. This included grouping students posing important questions regarding teachers' progress, monitoring, evaluating results, and assessing overall effectiveness. They were evaluated based on their iRAT and gRAT scores. Participants were asked to respond immediately to each question individually, at the end of iRAT we started gRAT and discussion of question-answer at the end of session. The students were advised to sit apart from each other by maintaining adequate distance between them during their response to answer individually. For each question, students were given five minutes to answer individually. After students answered the questions on their own, they were grouped into teams for TBL procedure according to their provided list. Same SRA and EMQ were sent to all groups' representatives (already selected one representative from each group) who had previously provided them to individual students, after team-based discussion group representative from each group sent their answer through his/her mail addresses to google platform. At

end of the sessions, the overall question and answer discussion done by expert anatomy lecturers and least the students sent their comments based on validated questionnaire of those who were attended.

2.3 Data Collection procedure

Data collected online by using Google form. The students were not required to sign in to an account toanswer the form to maintain the anonymity. The data were analyzed by using IBM SPSS version 27. Appropriate tables and graphs were used to describe the data.

3.Results

Five single response answer questions regarding gross anatomy of respiratory tract were introduced to49 students and asked them to answer on individual basis and group basis. SRA1 was a question related to the site for local anesthesia for a tension pneumothorax, SRA2 was a question related tothe site for thoracentesis, SRA3 was a question related to lymph node enlargement, SRA4 asked about bronchopulmonary segments and SRA 5 is a question related to para nasal air sinus **(Fig 1).** In addition, an extended matching question (EMQ) on respiratory tract histology was requested to be answered.

Based on Figure 1, students gave the most correct answer for SRA 5, showing 71.4% and the least correct answer for SRA 1and 3 (34.7%) on individual basis. When the same questions were introduced in group wise, students' responses were better as compared to individual responses **(Figure 2).** All the groups answered correctly for SRA 2,4 and 5 while 87.5 % answered correctly for SRA3. However, only 37.5% answered correctly for SRA1, showing approximately 2% improvement in group based as compared to individual based **(Fig 2)**

One EMQ was asked to eight groups of students and all of them gave correct answers for questionsrelated to respiratory region, vocal fold, terminal bronchioles, and alveoli. However, 62.5% of the students gave correct answers for question related to olfactory region while 37.5% gave incorrect answers.

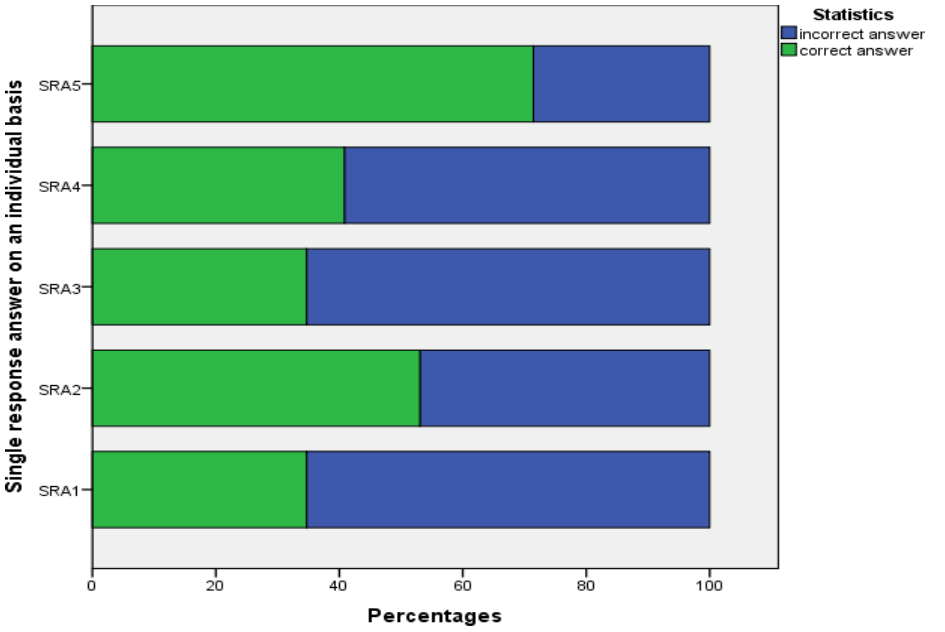

Fig. 1. AI integrated Single response answer on an individual basis

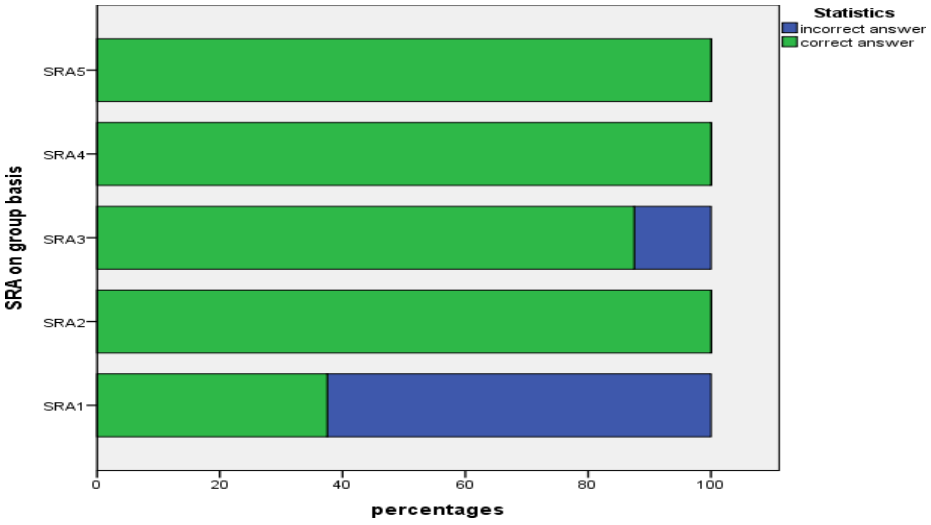

Fig. 2. AI integrated Single response answers by group

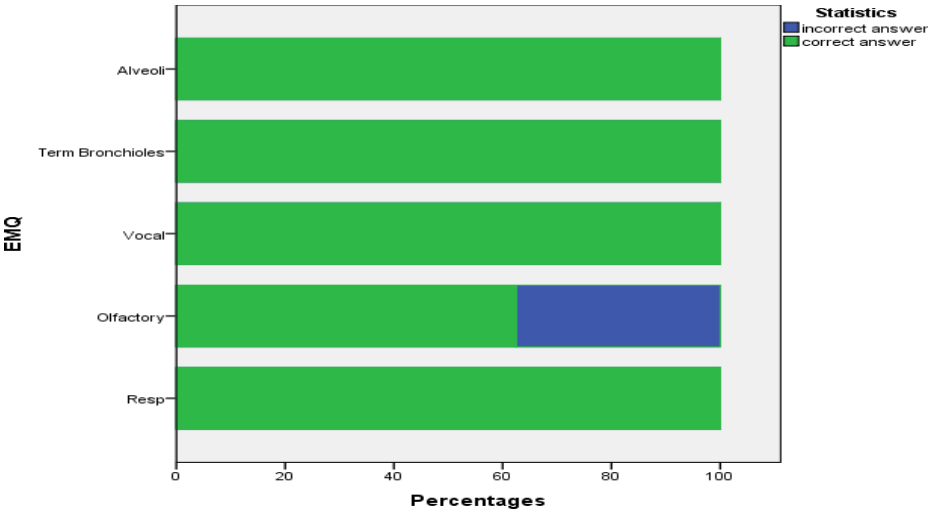

Fig. 3. AI integrated EMQ answers based on group-wise

Regarding the students' perception towards TBL, the highest percentage of agreement was noticed in the statements: it enhanced critical thinking skills (100%), it was well organized (98%), it helped to apply knowledge in different situations (98%) and it helped me in understanding concepts (98%). On the other hand, 93.9% of the students disagreed that TBL should be preceded by a lecture on the same topic, 87.8% disagreed that it does not improved problem- solving skills and 59.2% disagreed thatwas a good as an assessment tool **(Table 1).**

Table 1. Respondents' perception towards TBL

TBLs	Disagree	Agree
have helped me in understanding concepts	2.0%	98.0%
are better than lectures	4.1%	95.9%
have improved my communication with classmates	6.1%	93.9%
made me confident to share my knowledge	6.1%	93.9%
have improved my analytical skills	8.2%	91.8%
are fun way of learning	22.4%	77.6%
should be preceded by a lecture on same topic	93.9%	6.1%
are a wastage of time	6.1%	93.9%
have improved my problem-solving skills	87.8%	12.2%
leave me unsure of my achievements	22.4%	77.6%
are well organized	2.0%	98.0%
promote critical thinking skills	0.0%	100.0%
have helped me in applying my knowledge in different situations	2.0%	98.0%
are good as an assessment tool	59.2%	40.8%

4. Discussion

Students were introduced to AI technology and its use in teaching. The goal was to identify learning issues and build AI-based solutions for an autonomous curriculum. Problem-based learning involves teams (TBL) working together to solve real-world problems and create solutions. This study also examined how 47 year 2 students at MAHSA University viewed their problem-solving ability through the lens of The TBL approach with regards to their perception. SRA and EMQ questions were used to measure students' problem-solving abilities. The results showed that onlythree students scored less than 80% on this test, which indicates that many students were able to generate at least one solution for each problem presented in the SRA. Most of the students were able to come up with multiple solutions for each problem presented, as indicated by their performance on the EMQ test. The results showed that only one student scored less than 80% on this test, which indicates that most students were able to generate at least two solutions for each problem presented in the EMQ. All the students in this study agreed that TBLs improved their critical thinking skills and helped them understand concepts (98%) and apply their knowledge in different situations (98%). These findings are consistent with previous studies that found that students who used TBLs were able to improve their critical thinking skills and apply their knowledge in different situations[11]. The results also indicated that all the students in this study agreed that TBLs increased their ability to synthesize information and solve problems (98%). This finding is consistent with previous studies that found a positive relationship between using TBLs and improved problem-solving skills in mathematics[12]. When compared to traditional lecturers, most of the students (96%) in this study reported that problem-solving during PBL is a more effective way to learn[13]. However, 6.1% of students in the current study thought that TBL should be preceded by a lecture on the same topic to help them understand the concepts. While this study was unable to determine whether TBL is better than traditional lecturing at improving conceptual understanding, it did find thatstudents who use TBLs tend to have higher levels of conceptual understanding. This finding is consistent with previous research[14], but it goes against the common belief that using TBLs reduces student engagement in class[15]. The results of this study suggest that using TBLs can be an effective way to promote conceptual understanding. However, it isimportant to note that this study did not include any control conditions for comparison. Future research should also investigate whether TBLs are as effective at promoting conceptual understandingas other teaching methods that do not involve problem solving (e.g., lecturing). The study also revealed that TBLs were effective at promoting conceptual understanding even when students did not have prior knowledge in the subject area being covered by the TBLs. The findings of this study support previous research on TBLs, which has shown that they can be an effective way to promote conceptual understanding even when students do not have prior knowledge in the subject area being covered by the TBLs[16]. The study's findings suggested that students who are struggling with a concept might benefit from being given additional practice problems before continuing to more advanced material. It was proven that TBLs have been shown to develop conceptual understanding by encouraging students to engage in multiple representations and inquiry-based problem-solving strategies.

5. Conclusion

Group activities are likely to improve students' collaboration and problem-solving skills through peer contact and pooled knowledge. Individual activities can encourage autonomous thinking and deeper self-reflection on AI uses in healthcare. TBL not only helps students acquire confidence but also improves inter-personal relationships through group discussions. This study suggests that the use of TBLs may improve student engagement, as well as their perception of learning effectiveness. The use of TBLs can improve the learning process for medical students.

6. Limitation and suggestions

This study was conducted on a small sample of MBBS students from a single university. Therefore, its results cannot be generalized to populations outside this group. The study was limited by the fact that it relied on self-administered surveys. Additionally, the results do not generalize to nonmedical populations. Escalating the sample size and including students from multiple universities would enrich study's external validity and representativeness.

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