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ORIGINAL ARTICLE

Electronic posters: Future of learning.

Syeda Hanaa Fatima[1], Sajida Naseem[2], Tayyeba Ifthikhar Mirza[3], Syeda Ridaa Fatima[4], Naushaba Sadiq[5], Syeda Sanaa Fatima[6]

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ABSTRACT… Objective: To explore student's perception regarding use of E-posters as a learning strategy after its use in the learning of public health concepts in the Gastro Intestinal Tract module. **Study Design:** Interventional study. **Setting:** Shifa College of Medicine, Islamabad. **Period:** August 2019 to August 2020. **Material & Methods:** Year 3 undergraduate medical students of a private college of Pakistan were given a task to present an e-poster in the module of Gastro-Intestinal Tract, focusing on the public health aspect. Students were divided into 7 groups comprising of 13 students each. Each group was provided with one individual study theme. They were provided with a template to cover all aspects of public health. All the basic scientists involving 30 faculty members were invited to judge the e-poster through a checklist. The mean score was calculated. A certificate was awarded to the group that scored the highest. A focused group interview involving one voluntary participant from each group was carried out. Thematic analysis was done manually. **Results:** Themes generated in focus group discussion are Opportunities for Self-Directed Learning, Opportunities for Self-reflection, Good formative assessment, Peer to Peer Interaction and Collaboration, Opportunities for developing Self-Regulation, Innovative learning strategy, Working in teams and Confidence Building, Use of IT Related Skills, Need of More Facilities. **Conclusion:** Students welcomed the use of innovative learning through electronic media when carried out in a relaxed environment.

Key Words: E-poster, Public Health, GIT- Module, Medical Students.

INTRODUCTION

A poster presentation is generally considered an effective tool to share knowledge, innovative ideas and research findings on platforms involving critical thinking, particularly research conferences.[1] Recent advancements in technology, particularly the prevalence of personal computing on laptops and smartphones have made the task of poster presentations vastly inter-active and at the same time entertaining.[1] Electronic posters abbreviated as E-posters are digitally interactive posters that can be made available to a larger number of audiences throughout the conference. It may or may not need the presentation by the presenters. All the information regarding the topic or the research work is made digitally available and is complemented by 3D images, videos, hyperlinks and audio presentations-poster presentations present a unique opportunity to students of all backgrounds to participate fully in an educational arena that allows them to have an equal chance to benefit from feed-back and constructive criticism[1,2] of their senior colleagues and subject experts.[2] In today's digital era, medical students should be sensitized to the learning strategies which are student-centered, make them familiar with the topic/subject and at the same time entertain them and satisfy their thirst for being computer savvy.[3] The objective of the study was to explore student's perception about learning experience regarding preparing and presenting the electronic poster on pre-specified topics of preventive health in gastrointestinal diseases.

MATERIAL & METHODS

It was an interventional study based on qualitative methodology in which a focus group discussion was conducted to explore medical student's perceptions about learning experience from the E-poster activity. The study was conducted at

1. MBBS, MMEd Assistant Director Medical Education, Shifa International Hospital Limited, Islamabad, Pakistan.
2. MBBS, MPH, CHPE, Associate Professor Community Medicine, Shifa College of Medicine. Shifa Tameere-e-Millat University Islamabad, Pakistan.
3. MBBS, MHPE, Assistant Professor Medical Education, Foundation University Medical College Islamabad, Pakistan.
4. BDS, Post Graduate Student, M.Phill Dental Materials (In Progress), National University of Medical Sciences (NUMS), Rawalpindi, Pakistan.
5. MBBS, MCPS (Radiology), MHPE, Associate Professor Health Professions Education, National University of Medical Sciences (NUMS).
6. MBBS, ACMed, MHPE, Assistant Professor Medical Education, Pak International Medical College, Peshawar, Pakistan.

Correspondence Address:
Dr. Syeda Hanaa Fatima
Department of Medical Education
Shifa International Hospital Limited,
Islamabad, Pakistan.
drhanaa85@yahoo.com

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Shifa College of Medicine, Islamabad, from August 2019 to August 2020, and the study population comprised of third year medical students of SCM.

Ethical approval (IRB#1002-277-2018) was sought from the institutional ethical review board before the start of the project. Informed consent was taken from all third-year medical students. Permission was taken from module director of the module gastrointestinal tract (GIT), related faculty of SCM, the judges and faculty of community and family medicine.

GIT module in the third year of medicine degree program was of four weeks' duration in which students were delivered with the related content of basic health sciences of medicine with relation to the clinical contexts. Students were not exposed to any content of community and family medicine (CFM) related to these topics during the module.

For the sake of this study, the students were briefed about the project at the beginning of the module and were divided into seven small groups, 13 students in each group. In the last week of the module, each group was given a topic from the course of GIT module. The students were assigned with a task to prepare and present an electronic poster on the community and family medicine aspects of the given topic. Following topics were given to the students: Oral ulcer, Difficulty in swallowing, Epigastric pain, acute Abdomen, Jaundice, Acute & Chronic Diarrhea, Worm in stool and Altered bowel habit.

A designated one-hour slot was provided in the schedule of the GIT module to train the students on how to make an E-poster. They were given templates and guidelines for designing an E-poster. The templates and guidelines were adopted from "E-poster boards" (www.eposterboards.com/poster-templates/) and "Digital heritage International congress held in Marseille, France from 28Oct – 1stNov" (www.digitalheritage2013.org/).

Students were given major headings under which they had to put the content of CFM related to particular topics. These headings are as follows:

1. Epidemiology
2. Public health days
3. Public health message
4. Preventive measures focusing on lifestyles
5. Counseling skills assessed during the interviews

On the day of the E-posters presentation, all the faculty members of the basic health sciences were invited to judge E-posters made by different groups according to the structured checklist. Each group was given 15 minutes; they were instructed not to present the posters. Faculty members were briefed in detail about the checklists. The session occurred simultaneously at two different venues. Four e-posters were presented at one venue while three at the other. The faculty members to judge the e-posters were divided randomly in the two venues and were informed through email about the venue a day before the session. Judges attended E-posters presentations while the posters were digitally interactive. They asked questions at the end of each presentation from the group who had made a particular poster. All the judges marked each e-poster. The mean was calculated and the result was shared with the class and the faculty.

To explore the perceptions and learning experience, a focus group discussion was conducted with students from different groups who volunteered to participate in the discussion. A designated slot was scheduled and was informed to the volunteer participants for the focus group discussion. The group size for the focus group discussion was 10, and one session was conducted that lasted for 2 hours. Each student was given codes from 1-10 to ensure the confidentiality of data. Principal investigator carried out and audio recorded the discussion while another researcher transcribed the key points of the discussion. The discussion was semi-structured in nature and a focus group discussion guide was used to probe questions indirectly to the participants. The students were asked to discuss their experiences, issues raised during the activity, and suggestions to further improve learning. Every participant was given a chance to share his/her view. All the responses were noted and organized into themes.

Data Analysis

Quantitative data was analyzed through SPSS Version23. Qualitative data was analyzed through the triangulation method. The audio recording of the discussion and the transcribed key points of the discussion were given to three different colleagues. They transcribed and coded the data and the themes were generated.

RESULTS

There were six domains that were assessed with total marks of 30.

Six domains were assessed in each e-poster through a checklist

1. Epidemiology
2. Public health days
3. Public health message
4. Preventive measures focusing on lifestyles
5. Counseling skills assessed during the interview
6. Question & answers

Each domain was given five marks, so the total score was 30. The following table shows the detailed marks achieved by different groups.

Domains	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Epidemiology	3	4	4	4	3	3	4
Public Health Day	3	4	4	3	3	3	4
Public Health Message	2	2	4	2	4	4	3
Preventive Measures	4	4	2	3	4	4	2
Counseling a patient	2	4	1	3	2	4	3
Q & A	1	3	3	1	3	2	1
Overall	15	21	18	16	19	20	17

Group 2 scored highest marks among all the groups. Mean score achieved by whole of the cohort (whole class) in each domain was calculated to get an idea regarding gain of knowledge in these specific six domains.

The following table shows the mean score of whole of the class in six specified domains of CFM. The mean overall score was 18 with an SD of 2.1. The maximum mean score was in the domain of epidemiology with a score of 3.57 with an SD of 0.4. Epidemiology makes the major chunk of the curriculum of community medicine. The highest score was 21 out of 30 which was scored by group 2. Their score in each domain was 4 out of 5 except in the domain of public health and Q&A.

Domains	Means SD
Epidemiology (5)	3.57. ± 0. 4
Public Health Day (5)	3.42 ± 0.53
Public Health Message (5)	3.0 ± 0.53
Preventive Measures (5)	3.2 ± 0.95
Counseling a Patient (5)	2.7 ± 1.1
Q& A (5)	2 .0± 1.0
Overall (30)	18 ± 2.1

The themes identified from the focus group discussion are as follows:

1. Opportunities for Self-Directed Learning
2. Opportunities for Self-reflection
3. Good formative assessment
4. Peer to Peer Interaction & Collaboration
5. Opportunities for developing Self-Regulation
6. Innovative learning strategy
7. Working in teams & Confidence Building
8. Use of IT Related Skills
9. Need of More Facilities

DISCUSSION

The aim of this study was to introduce E- posters as a learning aid for the undergraduate Medical students as no such work has been done in Pakistan so far to the knowledge of the authors where electronic posters were used as a learning aid for the undergraduate Medical students. A comparative analysis with other research done in this area was limited as hardly any work has been done by other people in this field.

E posters have a number of advantages over traditional posters as E- posters can provide access to all the students for results of the research work. Results can be easily stored for

future learning and consultations. They can be easily shown to colleagues and students in the subsequent years.[4] Feedback which is an integral part of effective teaching and learning can also be made available electronically to individuals, teams or to the whole class through E-poster presentations.[4]

1. Opportunity for Self-Directed Learning

The four self-directed learning components include students' motivation towards the identification of specific learning needs, identification of resources, evaluation of resources identified and evaluation of outcome and its effects on learners' practice.[5] This activity provided the learners with the opportunity to set their own goals as they were only provided with the domains they needed to cover in E-posters. Students identified resources for gathering relevant information and also evaluated their final product before presenting. As student (5) stated "We gathered information, read about it ourselves and later we made an E-poster we were involved in every step of the process so the whole activity was useful" (verbatim)

Student (6) stated "We are usually given slots for SDL in our schedules which is actually a break for us, if someone wants to study he or she can just read books and stuff in the library the rest just enjoy their free time. So as there is no proper structure of self-directed learning, we never knew what is it in true sense and what its significance is. This activity helped us to understand the concept in its true sense, like we had our topic and then we had to study ourselves through different strategies to fulfill the objectives and stuff so we loved it. And also the content stayed with us for long like in our memories and I think its because that we did it ourselves" (verbatim).

2. Opportunity for Self-Reflection

Self-reflection and self-criticism although are new practices for the students often prove to be useful for effective learning.[4] Self-reflection forms the foundation on which learners not only demonstrate their performances but also evaluate it according to standards. Through self-reflection on self-thinking, feelings, and actions, learners are acquiring competencies to face daily life challenges. If a learner engages in self-reflection, this behavior leads to progressive change in attitudes and promotes problem-solving and professional awareness. Self-reflection is a tool for the learners to develop self-awareness in them, they would be able to develop a better understanding and to control the factors that decrease their understanding.[6,7,8] The activity of making electronic posters gave our medical students a chance to explore their knowledge and creativity. It also provided them an opportunity to reflect on their reactions and responses to the questions asked by the faculty. As student (3) stated, "I think the whole activity allowed me to reflect on so many things like it let me reflect on my own knowledge about the topic when the panel asks questions I later was able to reflect on the status of my knowledge, I could reflect on my presentation skills, I could reflect on my overall performance and I definitely thought how to improve everything in future" (verbatim).

3. Formative Assessment

According to Sadler in 1998, formative assessment refers to an assessment, the main function of which is to provide feedback to the learners and to promote learning. Learners can themselves regulate their learning with the help of formative assessment and the feedback.[9] In our study, students thought that making an E-poster regarding certain topics not only allowed them to gather information on their own and putting it into a design of an E-poster but also gave them an opportunity to assess the status of their own knowledge through the instant feedback they received from the faculty on their E-poster presentation. As Student (6) stated "It was a good way of knowing our preparation for the exam when faculty asked questions we knew where we were lacking" (verbatim). Student (5) stated "It definitely prepared us for the questions" (verbatim). Similarly, student (8) stated "We missed out an interview, something important and highlighted by the faculty it was good that our mistakes were highlighted instantly and we don't have to wait till the end of the course to get to know our mistakes" (verbatim).

1.

4. Peer to Peer Interaction

In our study, students enjoyed the interactive portion which they experienced during making of the E-poster presentation. It included discussions among the teammates while making posters and with the faculty during the question-answer session at the end of each e-poster presentation. Student (6) "We were asked to work in a group and a group leader was made we were given a week time to make the poster, I was not sure initially how would I get the group to work on it I used to text them at really odd times, I made a WhatsApp group I called the meetings ….but at the end the poster was there and I think I and everyone else in my group at least also learnt how to work with others in a good manner"(verbatim).

5. Opportunity to Develop Self- regulation

Self- regulation refers to the active monitoring of multiple learning processes which include identification and setting of learning goals, identification of strategies to achieve those goals, management and arrangement of learning resources, reactions to the feedback provided, and the final products produced.[9] Learning is now usually taken as an active process where learners construct their own knowledge and skills instead of teachers transmitting it.[10,11] Learners actively interact with the subject content, discuss among themselves to construct the understanding and the connections with already known material. The core assumption of student-centered learning is the active engagement of the learner in the whole learning process and the learning process in which the responsibility of learning is with the learner.[12]

In our study students thought that the activity of making E-posters on certain topics increased their knowledge regarding that particular topic, they thought they have benefitted more because the control of the learning was in their hands and the whole process was active and energetic. Student (5) stated, "If you ask me I would say the knowledge I gained while making posters was way better than I would spend the same time studying, the things that were on the posters stayed in my memory I think it's a good learning strategy"(verbatim). Similarly, student (3) stated "as far as knowledge is concerned, knowledge is increased when you yourself make the posters" (verbatim). The quantitative data also shows that the overall knowledge of the students increased after the activity.

6. Innovative Learning Strategy

Our students believed that the use of E- posters was overall an innovative learning strategy and should be used more frequently in the future. The student thought it was a new learning experience for them and they should get more exposure to electronic poster presentation sessions to improve their skills. Student (6) stated "I think as far as learning is concerned it helped me in putting many concepts which are wide apart into one place which really helped me in clearing many concepts which otherwise will be disconnected concepts" (verbatim).

Student (4) stated "should be done more, some things remained in mind as photogenic memory helped' (verbatim).

Student (7) said "For learning…I think it was a good in grasping concepts in an efficient way I remembered most of the things of not only my posters but also about others say it like caloric requirement of an infant which wasn't my poster, I could recall it in exam" (verbatim).

Student 7 also stated "So making a poster which is understandable to someone who is not a doctor or a layman is a great thing to do. Plus we had to make a poster that is self-explanatory; it helped us to get the skill to explain something to a layman" (verbatim).

Student (3) said "we haven't done anything like this in the last three years" (verbatim).

Student (1) commented "If you ask me I would say the knowledge I gained while making posters was way better than I would spend same time in studying, the things that were on the posters stayed in my memory I think it's a good learning strategy"(verbatim).

Student (2) commented "Routine in medical

college is generally very boring, asking us to make posters helped us in relaxing a bit, we were learning and having fun at the same time. It was definitely fun and the whole process was very energetic" (verbatim).

7. Working in Teams & Confidence Building

The capacity for encouraging team building cannot be overlooked because with the involvement of more students and ease in sharing knowledge, students can engage more actively with their curriculum compared with the passive uni-directional model of textbook-based learning.[2] Students of third year believed this is one of the best ways to collaborate with the whole class. Student (3) stated "So when I interacted with teachers and peers in the making of the posters I think the thing I learnt the most was how to do team work which is beautiful at the end" (verbatim).

Other positive aspects of E-poster presentations include increased exposure and confidence-building.[1] Our students also thought that the activity of electronic poster presentations helped them build their confidence. Student (8) commented "some people ask questions which are very uncomfortable and this activity helped me to learn how to deal with this as I reflected later on the answers and I get to know better after that" (verbatim).

Similarly Student (1) stated "so when the team came in to judge us my heart literally skipped a beat and I was scared and confused but interacting one on one with the panel which contained professors and the faculty who give us lectures was really helpful in building up of my confidence" (verbatim).

8. Use of IT related skills

One of the benefits of E- posters, as discussed by Bishop et al in 1995 is the integration of IT skills in the curriculum. For learners, E-posters are much easier to manage, students have the option of trying out new formats, content, and styles.[4,13] Our students learned the method of the layout of information for a better understanding of the audience. It improved their presentation skills. Students appreciated the opportunity of using computers and IT skills in the presentation of the topic. As student (10) stated "Gave me a chance to discover other talents, edit a video make a poster" (verbatim).

9. Need More Facilities

No doubt there are many benefits of E- posters, but planning and implementation of E-posters as a valid teaching and learning tool needs resources like high-speed internet and access to personal computational tools, like laptops and smart-phones, should be provided to students.[1] Students of undergraduate 3rd year Medical college also commented on provision of better facilities to make it an effective learning strategy as student (7) commented "I think better multimedia; better facilities should be provided in the future(verbatim)."

Disadvantages

The literature review provides some disadvantages of the E- poster presentations. One of the draw backs is the cost of the database that needs to be installed in the computers, cost of systems and screens.[14] Implementation of electronic posters as a teaching and learning strategy is a big challenge, in an under developed country like Pakistan, where the provision of electricity is a major issue and electronic gadgets are difficult to be afforded by all students.

Secondly, the impact of submitting electronic posters might be negative with regards to exposure which is vast in the case of blackboard panel exhibit as compared to electronic posters and it may discourage scientists from submitting their work. One of the fears of the scientists is if the culture of electronic posters is promoted, it might decrease the attendance of the members and researchers in the conferences and meetings as their work can be submitted electronically, they do not have to be present physically to present their work and it can be made available even after the conference. The culture of virtual discussion and virtual feedback will be increased.[13]

LIMITATIONS

The study was conducted in a single institute

that too on a single class so the results cannot be generalized. The students believed that their learning was enhanced through this learning strategy but due to time constraints we were unable to compare this learning strategy with other strategies used by students.

CONCLUSION

Including teaching and learning strategies in the curriculum of medical students that promote self-directed learning, self-reflection, working in teams and self-regulation is advisable by many educationalists and medical faculty. Electronic posters can be utilized in the future as an effective learning strategy. Students will be engaged in the process of learning, it will also help to develop said competencies in order to make them effective doctors in the future.

RECOMMENDATIONS

The implementation of electronic poster presentations within the teaching curricula of medical schools is a tool that has not yet met with wide-spread dissemination, particularly in a resource-poor country like Pakistan.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Syeda Hanaa Fatima	Conception of idea, synopsis writing, data collection, data analysis, write up, proof reading before submission.	
2	Sajida Naseem		
3	Tayyeba Ifthikhar Mirza		
4	Syeda Ridaa Fatima		
5	Naushaba Sadiq		
6	Syeda Sanaa Fatima