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Does Clinical Training in Pediatrics Improve Med III Students Approach to Children? A Cohort Study

Defining the Role of the 'Future Surgeons: Key Skills' Course in The Surgical Curriculum

Implementing Innovative Medical Education Strategy at Moi University College of Health Sciences: Are there Enough Resources?

Improving Medical Students Preparedness for Post-graduate Practice: A Supplementary Teaching Programme

A Case of Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)

Rare Cases of Pneumatosis Intestinalis and Hepatic Portal Venous Gas without Bowel Ischaemia

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Abstract

Introduction: The purpose of this study was to assess the perception and preference of the SPICES model among students at the Moi University College of Health Sciences. We can define innovative teaching and learning method or the SPICES model as a program or series of events which the teacher implements to assist the student to remain focused on what that individual is doing. Problem-based learning is considered superior to the lecture-based learning due to long-term retention of knowledge, development of generic skill and attitudes. This study looked into the students' views of problem-based learning versus lecture-based learning in Moi University College of Health Sciences.

Methods: 274 students were divided to School of Medicine, School of Public Health, School of Nursing and School of Dentistry as per their number of students in each school. Self-administered questionnaires were used in quantitative data collection while in-depth interviews quantitative were used in qualitative data collection. A reliable and valid questionnaire utilized a five-point forced Likert scale (1-Totally disagree, 2-Disagree, 3-Not Sure 4-Agree, and 5-Totally Agree). Cronbach's alpha, median and inter-quartile range (IQR) were calculated in SPSS 22. P-value less than or equal to 0.05 was taken as statistically significant. Ethical approval was obtained from the Institutional Review and Ethics Committee (IREC) of Moi University and Moi Teaching and Referral Hospital.

Results: The response rate among students was 250 (91%) out of 274 who were given questionnaires. Majority of the students 179 (72 %) preferred SPICES model compared to 71 (28 %) who preferred lecture method of learning. A chi-square test to determine the measure of association between schools and preference of Problem Based Learning and Lecture method of learning showed no statistical significance with a P-value of 0.092; at $p < 0.05$.

Conclusions: Problem based learning is fun, provides contextual learning and imparts long-term retention of knowledge through students' active participation in a small group. It also promotes generic skills and self-directed life-long learning.

Key Words

Medical School; Perception; Problem Based Learning; Students; Lecture

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Introduction: The purpose of this study was to assess the perception and preference of the SPICES model among students at the Moi University college of Health Sciences. We can define innovative teaching and learning method or the SPICES model as a program or series of events which the teacher implements to assist the student to remain focused on what that individual is doing. It stimulates the students' ability to engage in problem-solving activities that make a student an expert in his/her area of concentration. This process makes a student an active learner and the teacher a facilitator as opined¹.

Innovative approach to learning was facilitated by the growth of technology in 19th century² argues

that the introduction of instructional media in teaching facilitated various innovative opportunities. To meet the needs of innovative teaching and learning method, majority of the institutions who adopted it opted for problem-based teaching and learning method. Flavio argues that problem-based teaching and learning method is becoming increasingly popular in educational institutions because of actively being able to engage students in constructing knowledge³. Innovative method of teaching and learning adopted by medical colleges then is the problem-based learning. Koh *et al* opines that problem-based learning have been introduced to improve the quality of graduating health professionals. They argue that graduates taught using problem-based learning method are more

competent and systematic compared to the ones trained using traditional lecture method⁴.

Problem-Based Learning (PBL) is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. In addition to course content, PBL can promote the development of critical thinking skills, problem-solving abilities, and communication skills. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning⁵

Methods: This research is a descriptive cross-sectional study design which utilizes both qualitative and quantitative method of data collection. The goal of mixed methods is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both methods. Data was collected from September to December 2016. From the 1,200 student population; first year students were excluded for being new to the program. Their views might not reflect the actual scenario on the ground. This brings the target population of students to 940; distributed as follows: - School of Medicine 570 (61%), Public Health 160 (17%), Nursing 130 (14%), and Dentistry 80 (8%). All students in year two of their studies and above had equal chance to participate they were all currently using the SPICES model as a way of learning and comparing it with the lecture method which was used in high school. Probabilistic and non-probabilistic techniques were used in recruiting research participants. The sample size of 274 for students is the representative of all the four schools; to distribute the figure of 274 to four schools; stratified sampling was used. In a stratified procedure, 274 sample sizes were divided to School of Medicine, School of Public Health, School of Nursing and School of Dentistry as per their number of students in each school; resulting to 166: 47: 38: 23 respectively. Self-administered questionnaires were used in data collection; the questionnaire was designed with the intention of answering the research questions and objectives. This questionnaire utilized a five point forced Likert scale (1-Totally disagree, 2-Disagree, 3-Not Sure 4-Agree and 5-Totally Agree), test-retest and Cronbach's alpha test were used to test the validity and reliability of the questionnaire. The questionnaire also consisted of an open-ended section to comment on the PBL process contents; thematic analysis was used to analyze data collected from this section. Data entry was done in SPSS version 22. Descriptive statistics were presented using median and interquartile range. Cronbach's alpha was used to test the validity and reliability of

the questionnaire. P-value less than or equal to 0.05 was taken as statistically significant. Ethical approval was obtained from the Institutional Review and Ethics Committee (IREC) of Moi University and Moi Teaching and Referral Hospital.

Results: The response rate among students was 250 (91%) out of 274 who were given questionnaires. Student participants who returned the questionnaires were drawn from the four schools in the College of Health Sciences; the highest numbers of students were from the School of Medicine 145 (58 %) with the lowest from the School of Dentistry 21 (8 %). The tool was highly reliable with internal construct reliability more than 70% (Cronbach's alpha = 0.77). Majority of the students 179 (72 %) preferred SPICES model compared to 71 (28 %) who preferred lecture method of learning. Forty eight (68 %) who preferred lecture method of learning were from the School of Medicine, 11 (16 %) from School of Public Health, while 5 (7%) were from the School of Nursing, 7 (10 %) were from School of Dentistry. A chi square test to determine the measure of association between schools and preference of Problem Based Learning and Lecture method of learning showed no statistical significance with a P-value of 0.092; at $p < 0.05$.

Students also expressed different views during qualitative interviews on how to improve the SPICES model. One student felt that a repeat of training first year students in PBL method of teaching and learning should be done during the second term of 1st year. Students will have identified the problematic areas of this mode of teaching and learning he said:

"Orient students in PBL method of teaching and learning during first one week in second term of first year".

Other students felt like the University need to add more equipment's they said:

"Equip library, subscribe e-books and avail internet" while the other one said "Equip the library, ensure that there is wireless internet in all lecture halls and tutorial rooms".

Another approach the study found of ending this confusion is by improving lecturer student relationship. Student participant 141 stated:

"Improve student lecturer relationship." Another student participant 220 stated

"Provide mentorship for younger students to motivate them".

If there is good relationship between lecturers and students, lecturers as mentors will be able to influence the new students to know the areas they are required to concentrate in their studies hence improving the outcomes of the SPICES model.

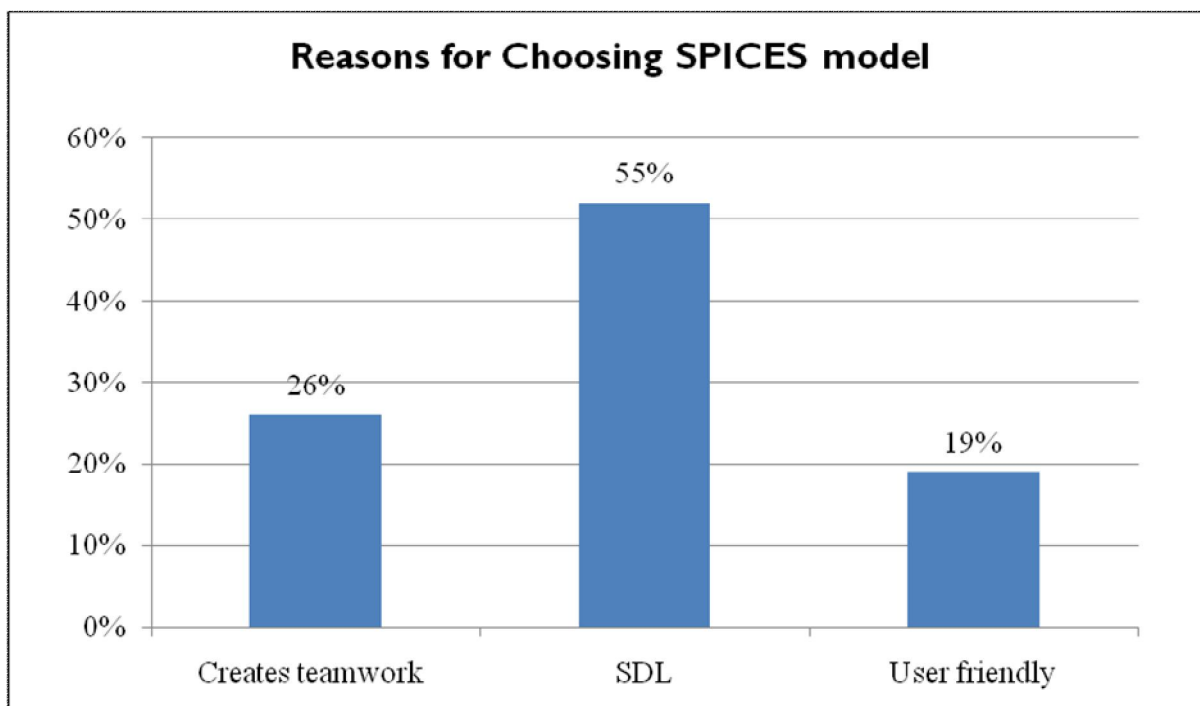


Figure 1 : Reasons for Choosing SPICES Model by Students

Perception and preference scores for SPICES model

Out of the students who preferred SPICES model; 98 (55 %) preferred this method of learning because it is self-directed which gives them adequate time to prepare and also read at their own phase. A group of 46 (26%) prefer SPICES model because it creates a spirit of teamwork, and another 34 (19%) preferred SPICES model because they find it to be flexible and user friendly as per Figure 1.

As indicated in Table 1 below students in year four of their studies, given an option to choose between

SPICES model versus lecture method of teaching and learning 53 (78 %) would choose SPICES model. The School that is having the highest percentage of students opting for SPICES model was the School of Nursing with 32 (84%). School of Dentistry has the highest percentage of students who would opt for lecture method of teaching and learning at 7 (30%); followed by School of Medicine with 48 (29%). Generally in all the four schools, more than 50% of their students would opt for SPICES model of teaching and learning, it ranges from 58% being School of Medicine to 84% being School of Nursing.

Learning Method	Year of Study					Total
	2	3	4	5	6	
High School (Lecture)	16	17	15	15	8	71
SPICES model	45	44	51	19	29	179
Total	61	61	66	34	28	250

Table 1: Comparing SPICES Model to Lecture Method of Teaching among Classes

Ser.	Responses	Percentage
	Students	
1	It is confusing rarely do we know what is expected from us	23%
2	Demands a lot from the student	29%
3	Creates excuse for lecturers absenteeism that students are doing SDL	23%
4	Overcrowded tutorial groups	25%

Table 2: Challenges of SPICES model as viewed by students

Challenges faced by students concerning SPICES model

Students were asked to name the weaknesses of SPICES model; 58 (23%) of them said that the program is confusing; rarely do we know what is expected of us. Others, 72 (29%) said it demands a lot from the student; while 58 (23%) hold the view that this system gives excuse to the lazy lecturers to avoid going to class to teach in the name of the students doing self-directed learning. Sixty two students (25%) think that tutorials are overcrowded, as per Table 2.

Discussion

None of the students in all the four Schools had gone through the SPICES model in their high school education. All of them said they first encountered SPICES model upon reporting to the College of Health Sciences. However, when asked to state the program they would opt for, given a chance to choose between Lecture method of teaching and SPICES model, majority in all the four Schools said they would prefer SPICES model. They gave three reasons for their likely choice, namely: that it is user-friendly; creates teamwork spirit among the students, and that it enables a student do his/her self-directed learning at own phase. Indeed, SPICES model is student-centered because the student is the one leading the learning session; the lecturer merely becomes a facilitator. The findings agree with the view that SPICES model is a student-centered approach¹.

A cross-tabulation of student participants and their schools was done to determine if there was any relationship between being a member of a particular school and the level of preference of SPICES model method of teaching and learning. A Chi-square test was carried out which established no statically significant association between their school and the choice of SPICES model over lecture method in the schools of SOM, SPH and SON. This meant that every student had equal chance of understanding SPICES model of teaching and learning in the College of Health Science regardless of their alma mater. This finding agrees with the views of another study done by Majumder⁶.

SPICES model of teaching and learning recognizes the principles of adult learning, which give autonomy to every student to study the way they know best. The principles of adult learning give credit to learners; which enables them to join a new program with past experience and setting priorities on what they want to know, a view supported by both^{7, 8}.

The findings on students' awareness in all the four Schools on SPICES model elicited many views. Most of them understood SPICES model as a student-centered learning process. In agreement, others simply explained SPICES model as a move-away from the lecture method in which the central person is the student. Indeed, in SPICES model, the central person is the student and the lecturer is merely a facilitator. The lecturer acts as a resource person but students are the ones seeking solutions to the set problems. SPICES model leads learners to learn by discovery. It shifts the responsibility of learning from the teacher to the learner. Students become active participants, involved as much as possible in all activities and they own the solutions they⁹.

Though students would opt for SPICES model, given to choose between SPICES model and lecture method, lecturers if given the option to choose, majority would opt for mixed method. This shows that the induction students go through during orientation has had an impact in understanding SPICES model of teaching and learning to them, but it has not caused impact to lecturers. Among the lecturers, induction and other issues; such as lack of teaching materials still hinder them from preferring SPICES model of teaching an observation that agrees with that of Hudson in a study done in 2015¹⁰.

Majority of the students in all the Schools admitted that self-directed learning motivated them in college and would benefit them after graduation. This view has been supported by¹¹. Other benefit of self-directed learning includes the fact that the amount of time students spend on a particular subject is left to them and the responsibility of retaining what they have learned for future use¹².

The study further established that teamwork among students in all the four Schools has been facilitated through electives and community-based education and service (COBES). Majority of the student participants said that COBES and electives had helped them to improve in their academic performance. They said that the COBES programs had enhanced their performance because students were integrated from four schools enabling them to learn from one another. When health professional trainees put their expertise together, they are able to tackle difficult health problems from all dimensions^{13, 14}.

The other benefit of electives and COBES is that they provide an opportunity for medical students to encounter real health problems of the community. During COBES and electives; students were challenged to provide solutions to existing community's health problems. This provided an alternative, practical and realistic approach to learning and problem-solving¹⁴.

The students were also faced with challenges in the SPICES model as some lecturers were absenting themselves from class. These lecturers absented themselves arguing that students were engaged in self-directed learning and therefore did not need the instructor. In Makerere University, for example, it was noted that some lecturers who did not understand SPICES model of teaching avoided taking part in some courses a view also observed by both^{15and16}. To overcome this problem, it was recommended that there was a need to ensure that lecturers attended classes through improved supervision of program; and workshops on SPICES model of teaching and learning. This will equip the lecturers with skills and courage to enable them attend class¹⁰.

Some students complained that they did not understand SPICES model during orientation. Some of them observed that the previous lecture method did not prepare them for change¹⁷. Some of the students said the SPICES model was confusing, especially in regard to the much that is expected of them by the instructors. Others still complained that SPICES model demanded too much from them. These findings indicate the need to repeat SPICES model training later following the one done when first years were being orientated. Students suggested that SPICES model training be repeated during second term in first year when they will have identified the challenges in it. Students must be fully prepared on how to use SPICES model to avoid confusion over what is expected of them as observed by both^{18and17}. Even though SPICES model is a student-centered approach to training, learners still need constant interaction with the lecturers. As

mentors, lecturers can help new students to identify the areas they need to pay closer attention to in their self-directed studies as agreed by¹⁶. Therefore, regular interaction between students and lecturers can reduce the problem of students finding SPICES model too overwhelming. Lecturers can help students adjust to SPICES model of teaching and learning¹⁷.

Conclusions

That majority of students led by fourth years across all schools would opt for SPICES model of teaching and learning, given the option of choosing the method of teaching and learning between SPICES model and lecture method. Students applied the principles of innovative teaching and learning in their studies. Supervision of lecturers, students and administrators should be intensified by having monthly administrative meetings to receive progress reports on the challenges of teaching and learning and hence solutions would be agreed upon.

Competing interests

The authors declare that they have no competing interests.

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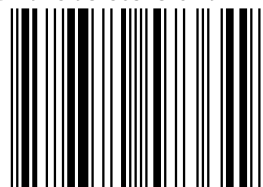


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