

Evaluating the models available for undergraduate medical education

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Introduction

Three major models of medical student teaching have developed: traditional, spiral and integrated [1].

- Traditional: complete separation of pre-clinical and clinical years, no placement during pre-clinical years. (figure 1a)
- Spiral: clinical and pre-clinical teaching coinciding in the same timetable, clinical placement directly linked to current teaching. (Figure 1b)
- Integrated: a gradual increase in clinical learning and decrease in academic learning throughout progression of medical school. (Figure 1c)

Method

Final year medical students received a pretested AMEE specific questionnaire asking them to rate teaching [2].

A 10-point ordinal scale was used to assess teaching based on three metrics, academic teaching, clinical teaching and satisfaction levels.

The questionnaire was tested internally before going into a two-phase pretesting, with phase one testing involving non-medics and phase two testing involving non-eligible medical students

Figure 1a: traditional model

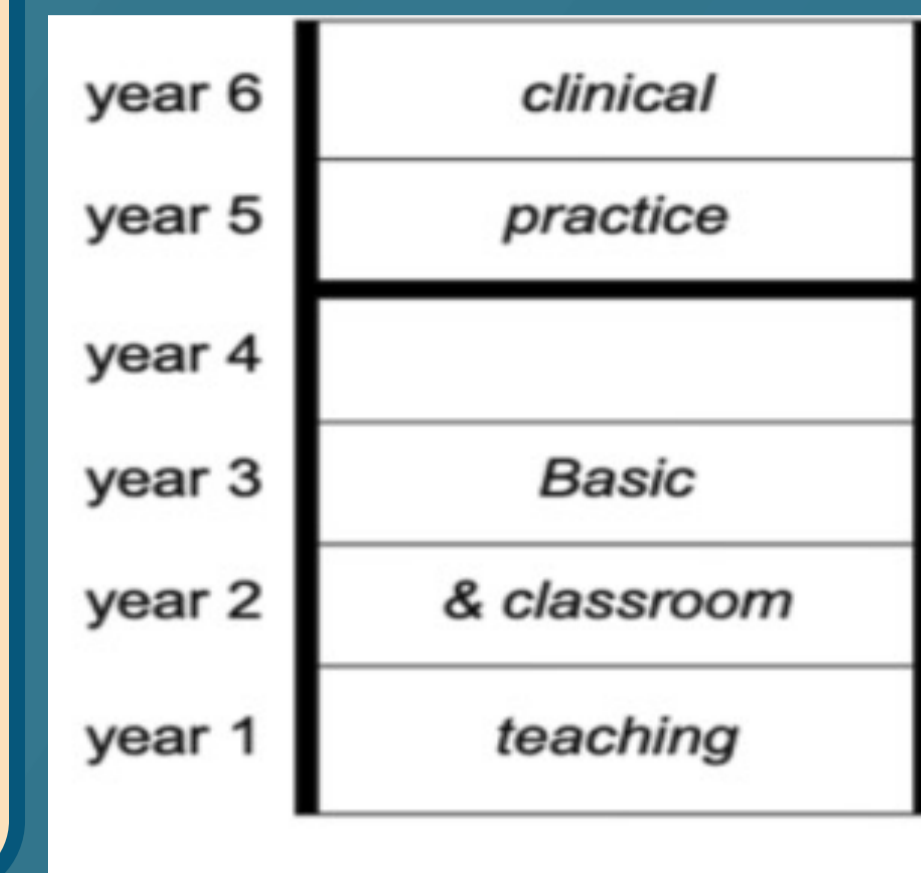


Figure 1b: spiral model

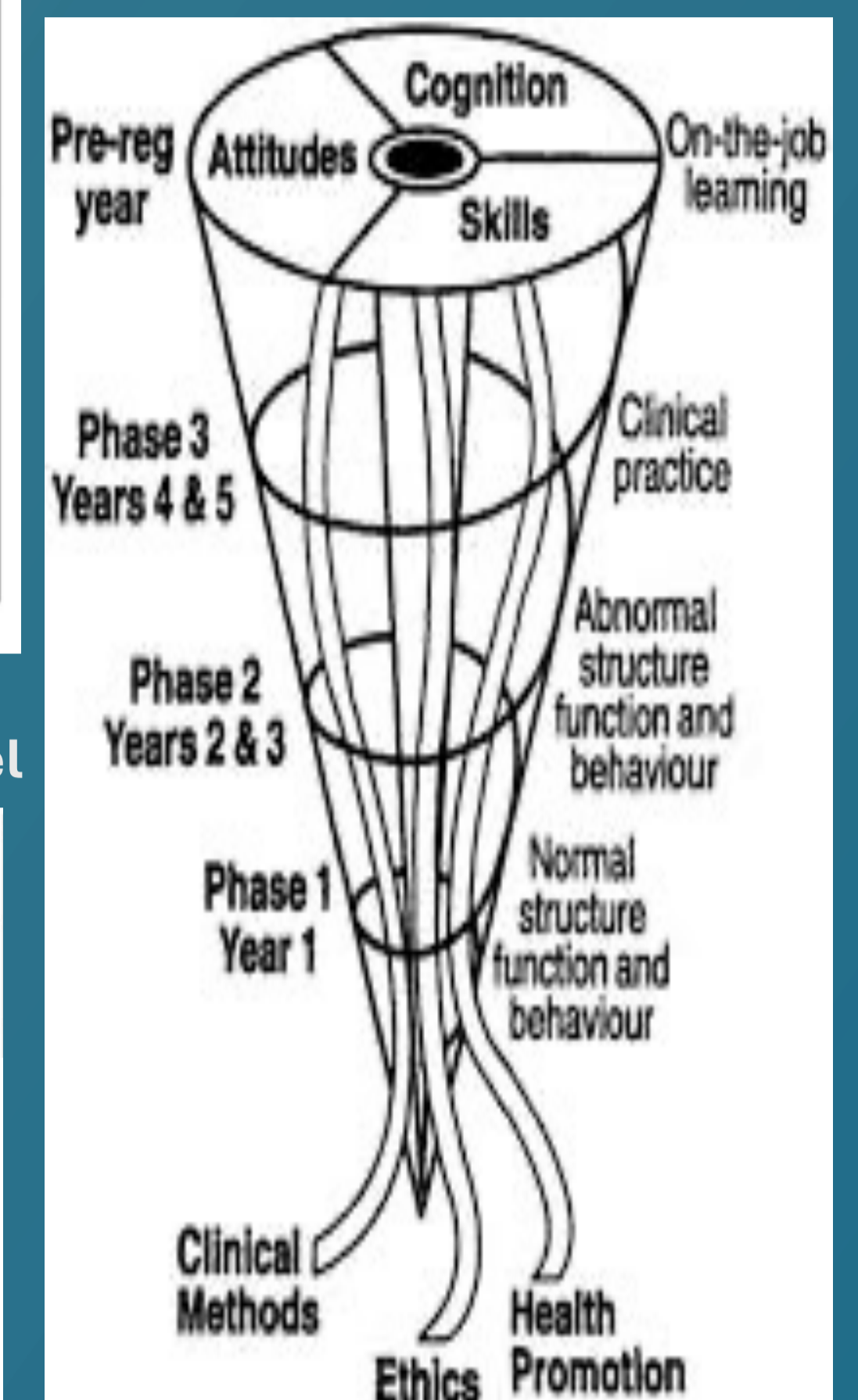
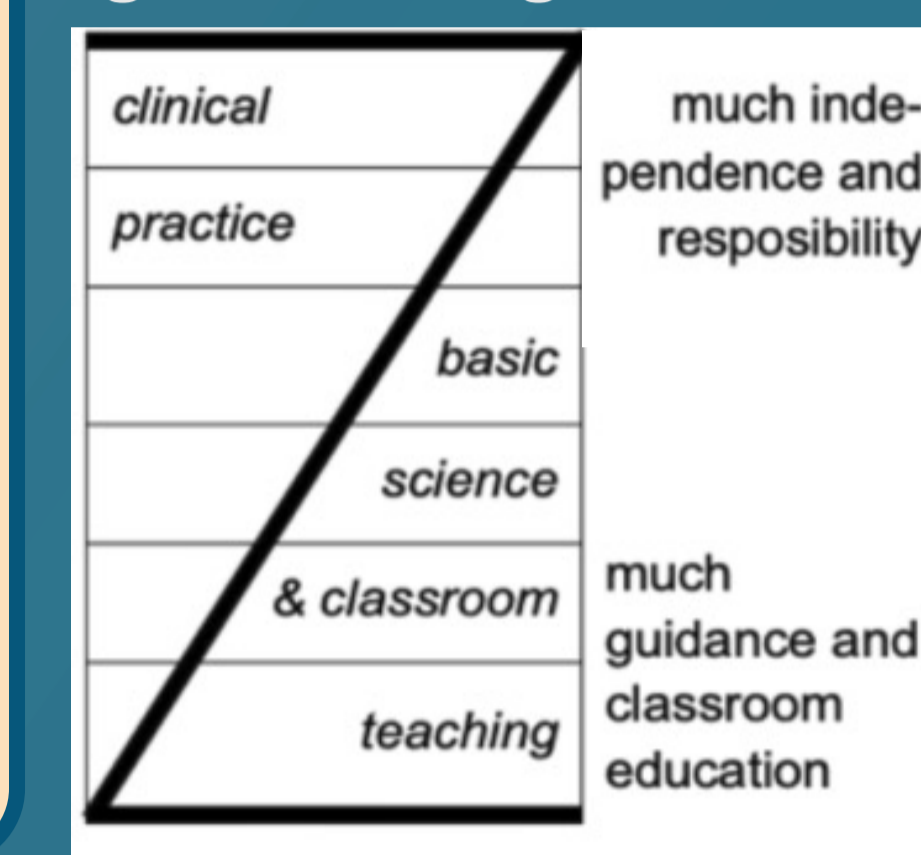


Figure 1c: integrated model

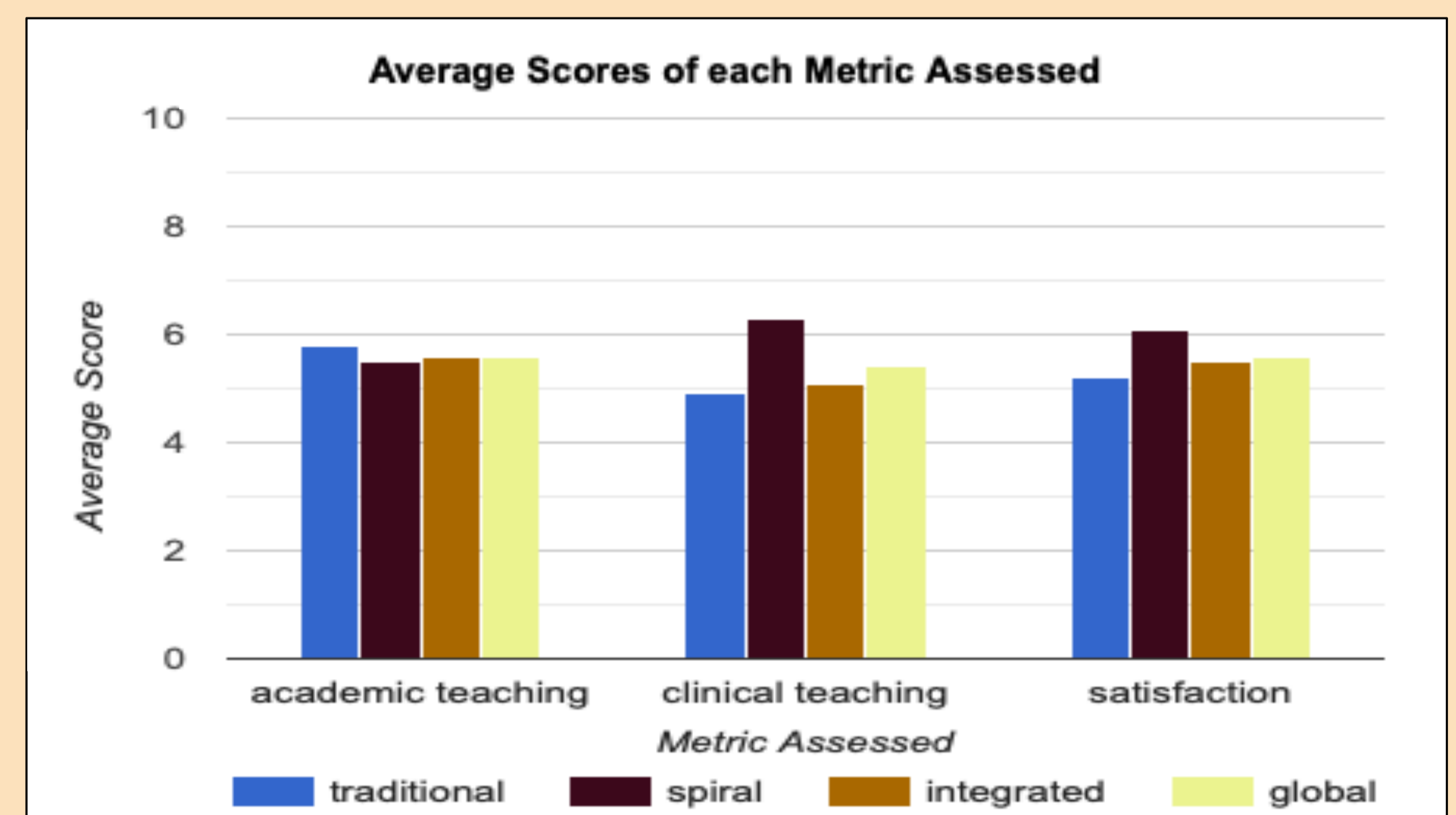


Results and Discussion

474 students responded to the questionnaire, of which 416 were eligible for inclusion; 188 traditional, 153 spiral and 75 integrated.

Table 1. Average scores of metrics assessed per teaching model. * significant at p<0.05

Type of educational model	Number of responses	Average academic teaching score	Average clinical teaching score T test	Average satisfaction score
Traditional	188	5.8 ± 1.8	4.9±2.2*	5.2±1.4*
Spiral	153	5.5±0.8	6.3±1.1*	6.1±3.3*
Integrated	75	5.6±2.0	5.1±1.9	5.5±0.6
Total	416	5.6±1.4	5.4±2.3	5.6±1.7



Against the global average, no model was significantly better or worse in academic teaching. The traditional model was significantly worse in clinical teaching and student satisfaction. The spiral model was significantly better in clinical teaching and student satisfaction. The Integrated model was non-significant in all three metrics.

Trying to identify why these findings occurred is an interesting discussion. The traditional model is the longest serving model, and it has undoubtedly produced some of the great doctors that we have today. However, as educational understanding continues to improve it is perhaps growing more apparent that medical students need to be combining academic and clinical teaching synonymously to achieve the best learning. The complete separation of pre-clinical and clinical years teaching is perhaps outdated and there should be a growing focus on shifting away from this model.

Table 2. Comparison of metrics between the models of teaching with p values

	Academic Teaching	Clinical Teaching	Satisfaction
Traditional VS Spiral	0.0566	0.0001	0.0001
Traditional VS Integrated	0.4315	0.4902	0.0747
Spiral VS Integrated	0.5913	0.0001	0.1201

When looking at how the three models compared against each other, no model was statistically better or worse at academic teaching than its competitor. The spiral model was significantly better in clinical teaching when compared to either model and was significantly better in student satisfaction than the traditional model. There was no significant difference between the integrated and traditional models.

This comparison between the models of teaching provides an interesting discussion between the necessity of clinical and non-clinical balance. Clearly the spiral model which encourages the greatest volume of clinical exposure earlier on produces the best learning outcomes. However, it is also clear that simply having clinical exposure early on does not absolutely guarantee the best learning. This blend in clinical and non-clinical teaching is the hardest part of designing effective curriculums and it is impossible to design one that every single student will be satisfied with.

Conclusion

Overall, there was no statistically significant difference in academic teaching between any of the three models. The traditional model was statistically worse in clinical teaching and satisfaction levels than the global average and the spiral model was significantly better in clinical teaching and satisfaction levels.

Future works

There will be a need to further expand on this work, potentially looking at refining the metrics tested or expanding the cohort to include all year students. There is also scope to look at different metrics or to look at how the teachers look at their relationship with students rather than looking from the student's perspectives.

References

- 1)Artino AR, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. Medical Teacher [Internet]. 2014 Mar 24;36(6):463–74. Available from: <https://www.tandfonline.com/doi/full/10.3109/0142159X.2014.889814>
- 2) sitemaster. Medical School Teaching Styles [Internet]. The Medic Portal. 2021. Available from: <https://www.themedicportal.com/application-guide/choosing-a-medical-school/teaching-styles/>
- 3) Early clinical exposure in medical education: the experience from Debre Tabor University - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/The-traditional-H-shaped-medical-curriculum-and-a-Z-shaped-curriculum-model-5_fig1_370069976
- 4) Brauer DG, Ferguson KJ. The integrated curriculum in medical education: AMEE Guide No. 96. Medical Teacher [Internet]. 2014 Oct 16;37(4):312–22. Available from: https://medicine.hofstra.edu/pdf/faculty/facdev/facdev_the%20integrated%20curriculum%20in%20medical%20education.pdf
- 5) Zhang P, Ji L, Zhou G, Yao X. A commentary on the practice of integrated medical curriculum in the interdisciplinary field of medical engineering. Annals of Medicine. 2022 Mar 11;54(1):812–9.