

INNOVATIVE IDEA

Volume 10 Issue 3 2018

DOI: 10.21315/eimj2018.10.3.6

ARTICLE INFO

Submitted: 06-08-2018

Accepted: 24-08-2018

Online: 28-09-2018

Phy-Antastic Teaching: An Innovative Landscape for Malaysian Anatomical Education

Boon Seng Yeoh¹, Siti Nurma Hanim Hadie², Norsuhana Omar¹

¹Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, MALAYSIA

²Department of Anatomy, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, MALAYSIA

To cite this article: Yeoh BS, Hadie SNH, Norsuhana O. *Phy-Antastic* teaching: an innovative landscape for Malaysian anatomical education. *Education in Medicine Journal*. 2018;10(3):57–62. <https://doi.org/10.21315/eimj2018.10.3.6>

To link to this article: <https://doi.org/10.21315/eimj2018.10.3.6>

ABSTRACT

Phy-Antastic is the pioneering horizontally-integrated pedagogy that adopts physiology-oriented anatomy teaching. A decline in time allocation for basic medical sciences (BMS) modules triggers the conflict of interests among educators. “Physiology-then-Anatomy” temporal synchronisation (and therefore *Phy-Antastic*) facilitates deep learning. The five highlighted features of *Phy-Antastic* are: (i) explicit declaration of learning outcomes and prerequisite knowledge as groundwork for the forthcoming topics; (ii) explanation of subject-related glossary to improve comprehension; (iii) elucidation of the related physiological mechanism to calibrate the learners into appreciating the cardinal anatomical features; (iv) the creative utilisation of multimodal teaching aids to simulate consolidated learning experience; (v) lesson was concluded by revisiting learning objectives, reflection on principal inquiry questions and recapitulating fundamental elements. The strength of *Phy-Antastic* depends on homeostatic teaching with rigorous educational outcome set-point and interdisciplinary feedback mechanisms. Small group discussion, problem-based learning and technology-assisted teaching can easily incorporate *Phy-Antastic*. Inertia among BMS educators in embracing interdisciplinary collaborative teaching remains the institutional barrier to the implementation of *Phy-Antastic*. This article proposes a prospective advancement in anatomical education for the contemplation of educators.

Keywords: *Integrated medical curriculum, Outcome-based education, Interdisciplinary teaching, Deep learning*

CORRESPONDING AUTHOR

Boon Seng Yeoh, Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia | Email: ybseng93@outlook.com

INTRODUCTION

A sharp decline in credit hours allocation to anatomy courses in medical school, from about 800 hours to an average of 149 hours over a century, is the significant landmark in the evolution of anatomical education (1). At the same time, there was a report on poor knowledge retention in anatomy

among medical students entering surgical rotation (2). Besides, the loss of laboratory-based learning impacted the physiology education (3). However, the community of physiologists reacting swiftly to these changes by introducing clinically oriented physiology teaching to improve students’ performance (4).

There was an article that recommended the integration of physiology and anatomy to cultivate reasoning ability for improved understanding of anatomy as preparation for clinical application (5). The positive result from a recent prospective study cohort that had only about 60 instruction hours achieved a remarkable 90% knowledge retention in anatomy (6). A lack of known effective pedagogy in teaching and learning of anatomy in Malaysian context coupled with the emerging evidence of possible effective changes condenses into the design of *Phy-Antastic* teaching.

FRAMEWORK OF *PHY-ANTASTIC*

The context to apply the *Phy-Antastic* teaching in the medical education roadmap was shown in Figure 1 using the molecular medicine central dogma analogy.

The proposed workflow for the gradual implementation of *Phy-Antastic* teaching are:

1. The discussion and dialogue between the content experts of anatomy and physiology to brainstorm the educational concern relevant to the contemporary training of a medical doctor.
2. Invite consensus on the integrative learning outcome among anatomists and physiologists.

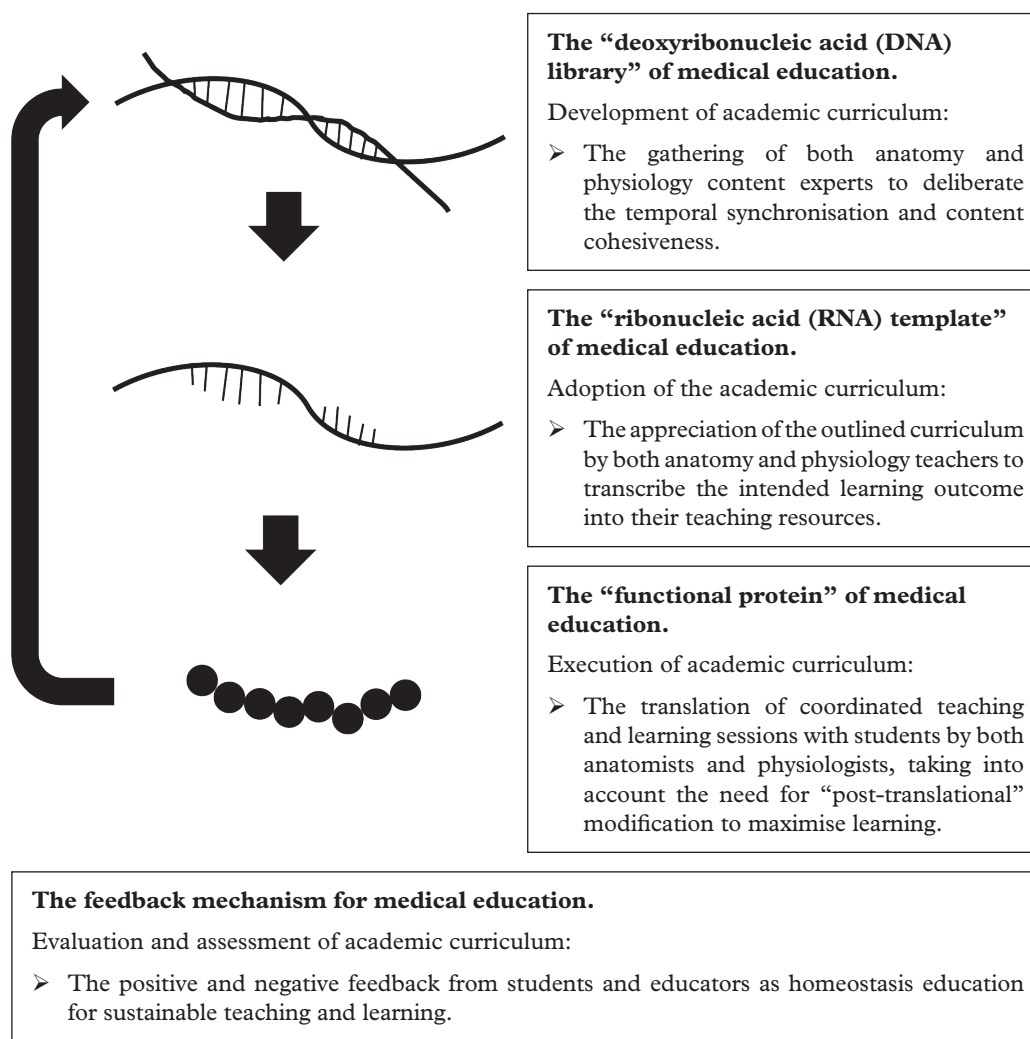


Figure 1: The “central dogma” analogy of medical education using *Phy-Antastic* teaching.

3. Facilitate the inter-departmental coordination for temporal synchronisation of teaching and learning schedule.
4. Streamline of teaching contents between anatomists and physiologists assigned with the related topic.
5. Activate brainstorming on the teaching modalities to improve students' engagement.
6. Implementation of lessons with the explicit statement of learning outcome as the educational agreement between educator(s) and students.
7. Clarification of topic-related glossary as building blocks for sequential lessons.
8. Tactical delivery of physiological basis of living structures **before** detailing the human anatomy with the creative utilisation of diagrammatical presentation at multiple levels of spatial relation to consolidate conceptual formation for deep learning.
9. Debriefing at the end of the lesson by revisiting the learning outcomes, contemplating on the essential queries and recapping fundamental principles.
10. Integrated knowledge assessment with proactive students' feedback to complete the loop of homeostasis teaching and learning in *Phy-Antastic*.

Figure 2 summarises the sustainable framework of *Phy-Antastic* teaching. This teaching scheme was designed in the manner that it allows timely subject matters revisit throughout candidature by exploiting technology-assisted learning.

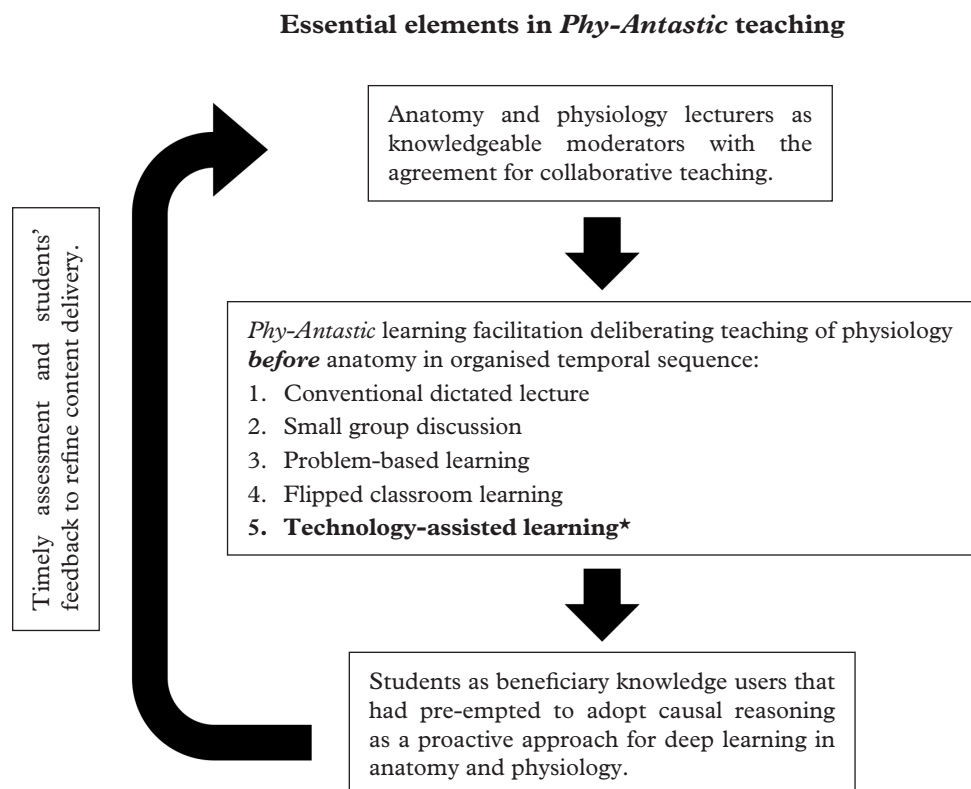


Figure 2: Educators-students-teaching pedagogy axis in homeostatic medical education.

Note: *Employment of technology-assisted learning made revisiting of relevant anatomy and physiology easier and possible for students advancing into their clinical years.

IMPLICATION AND DISCUSSION

Phy-Antastic teaching was shortlisted for “Innovation in Anatomy Teaching Competition” in the Malaysian Anatomical Association Education Symposium 2018 (MAAES 2018). The lack of a generalist medical educator who can teach both anatomy and physiology in tandem is the primary concern raised by most Malaysian anatomists. Also, the administrative difficulty for students’ assessment remains the primary hindrance for this new implementation. On the other hand, there is a constructive suggestion for organising a combinative lecture or forum spearhead by both anatomists and physiologists. During the running-in period, the curricular reformation that gears towards anatomy-physiology horizontal integration may be drastic and unpleasant for both lecturers and students, causing the former to resort to their conventional teaching approach as resistance for full implementation. A lack of appreciation of the integrative education and their non-compliance reported previously (7). Knowledge integration will not develop out of vain, that development and implementation of an integrated medical curriculum are dynamic processes with robust coordination, evaluation, and refinement (8).

In China, there was reported benefits of emerging curricular reformation moving into the integration of histology (a component of anatomy) and physiology (9). Improvement of test performance in reformation cohort compared traditional curriculum coupled with greater students’ satisfaction are suggesting the feasibility of *Phy-Antastic* teaching among Asian students. Moreover, the creative repurposing of the available medical facility into the teaching of anatomy and physiology gaining the limelight. There had been teaching of anatomy and physiology using echocardiography on the intricate cardiovascular system; ultrasonography-based teaching received positive reverberation from both educators and students (10). This finding encouraged

interdisciplinary educators to collaborate in preparing high-impact education modules that eventually benefits and satisfies both students and teachers.

Au contraire, *Phy-Antastic* teaching needs to consider the flexible methods of content delivery to accommodate the variation in learning approaches among students. Superficial learners were more prevalent in pre-clinical students, and the portion reduced substantially in clinical years (11). It is yet delineated whether the gaining of maturity and mastery by students, the changing learning environments or the impact of basic medical sciences education foster these changes. Correspondingly, *Phy-Antastic* teaching needs to adopt a more instructive approach in content delivery at the first instance, while motivating students to modify their study behaviours as eventual transformation into the independent life-long learners. By doing so, educators bring out the synergistic effect of revisiting *Phy-Antastic* teaching with clinical sciences in the later part of their formative years as senior medical students. The advent of technology-assisted education (12) and the tactical use of students’ assessment (13) are the essential tools in the pocket of medical educators.

CONCLUSION

As the closing remark, *Phy-Antastic* teaching is the sound physiology-then-anatomy horizontal integration pedagogy that encompasses the pre-emptive measures to enhance the students’ readiness for revisiting basic sciences in their later years. *Phy-Antastic* teaching adopts homeostatic education through collaborative interdepartmental teaching, employment of multiple modalities, and students-lecturers partnership in refining the processes of teaching and learning. *Phy-Antastic* teaching proposes a prospective advancement in anatomical education within the Malaysian landscape as a proactive action plan for medical education in the Fourth Industrial Revolution.

CONFLICT OF INTEREST

“*Phy-Antastic: Revolutionizing Basic Medical Sciences Education*” was filed for copyright under the ownership of the first author to be viewed by the public for research and educational purpose.

ACKNOWLEDGEMENTS

Attendance of the first author to “Innovation in Anatomy Teaching Competition” in the MAAES 2018 was supported financially by Postgraduate Conference Fund from Institute of Postgraduate Studies, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia.

REFERENCES

1. Drake RL, McBride JM, Lachman N, Pawlina W. Medical education in the anatomical sciences: the winds of change continue to blow. *Anat Sci Educ.* 2009;2(6):253–9. <https://doi.org/10.1002/ase.117>
2. Jurjus RA, Lee J, Ahle S, Brown KM, Butera G, Goldman EF, et al. Anatomical knowledge retention in third-year medical students prior to obstetrics and gynecology and surgery rotations. *Anat Sci Educ.* 2014;7(6):461–8. <https://doi.org/10.1002/ase.1441>
3. Hotez PJ. Loss of laboratory instruction in American medical schools: erosion of Flexner’s view of “scientific medical education”. *Am J Med Sci.* 2003;325(1):10–4. <https://doi.org/10.1097/00000441-200301000-00003>
4. Abraham RR, Upadhy S, Torke S, Ramnarayan K. Clinically oriented physiology teaching: strategy for developing critical-thinking skills in undergraduate medical students. *Adv Physiol Educ.* 2004;28(3):102–4. <https://doi.org/10.1152/advan.00001.2004>
5. Miller SA, Perrotti W, Silverthorn DU, Dalley AF, Rarey KE. From college to clinic: reasoning over memorization is key for understanding anatomy. *Anat Rec.* 2002;269(2):69–80. <https://doi.org/10.1002/ar.10071>
6. McBride JM, Drake RL. Longitudinal cohort study on medical student retention of anatomical knowledge in an integrated problem-based learning curriculum. *Med Teach.* 2016;38(12):1209–13. <https://doi.org/10.1080/0142159X.2016.1210113>
7. Silverthorn DU, Thorn PM, Svinicki MD. It’s difficult to change the way we teach: lessons from the integrative themes in physiology curriculum module project. *Adv Physiol Educ.* 2006;30(4):204–14. <https://doi.org/10.1152/advan.00064.2006>
8. Malik AS, Malik RH. Twelve tips for developing an integrated curriculum. *Med Teach.* 2011;33(2):99–104. <https://doi.org/10.3109/0142159X.2010.507711>
9. Sherer R, Wan Y, Dong H, Cooper B, Morgan I, Peng B, et al. Positive impact of integrating histology and physiology teaching at a medical school in China. *Adv Physiol Educ.* 2014;38(4):330–8. <https://doi.org/10.1152/advan.00071.2014>
10. Hammoudi N, Arangalage D, Boubrit L, Renaud MC, Isnard R, Collet J-P, et al. Ultrasound-based teaching of cardiac anatomy and physiology to undergraduate medical students. *Arch Cardiovasc Dis.* 2013;106(10):487–91. <https://doi.org/10.1016/j.acvd.2013.06.002>
11. Mirghani HM, Ezimokhai M, Shaban S, van Berkel HJ. Superficial and deep learning approaches among medical students in an interdisciplinary integrated curriculum. *Educ Health.* 2014;27(1):10–4. <https://doi.org/10.4103/1357-6283.134293>

12. Jwayyed S, Stiffler KA, Wilber ST, Southern A, Weigand J, Bare R, et al. Technology-assisted education in graduate medical education: a review of the literature. *Int J Emerg Med.* 2011;4(1):51. <https://doi.org/10.1186/1865-1380-4-51>
13. Newble DI, Jaeger K. The effect of assessments and examinations on the learning of medical students. *Med Educ.* 1983;17(3):165–71. <https://doi.org/10.1111/j.1365-2923.1983.tb00657.x>