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The Yin and Yang of 24 Season Drums for Physical and Musical Literacy among Medical Students: A Narrative Review

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ABSTRACT

Physical literacy can be defined as having an individual's mind and body in a state of harmony. Previous studies introduced circus arts and actor training as a way to encourage physical literacy. Musical literacy is the "perception of music as a whole", where it requires the interpretation of its meaning, the aesthetic values and the ideas that the musician wanted to convey. Correspondingly, the yin-yang was a representation of two polar forces coming together and harmonising together as one in Eastern tradition. This study aimed to introduce new ways and possibilities in endorsing physical and musical literacy, through the extensive use of 24 Season Drums. This study would further explore how 24 Season Drums, a musical performance originated from Malaysia, can enhance one's development in terms of their musical (the yin) and physical (the yang) embodiment. This is followed by a comprehensive explanation of why drumming training is relevant in developing a holistic and well-rounded medical student. The literature search was performed using databases from PubMed, ResearchGate, ScienceDirect, Google Scholar and Google search engine using specific keywords, ranging from May 2000 to September 2020. We hope that this article could pave the way for more future studies on the effects of 24 Season Drums training in terms of an individual's physical and musical literacy.

Keywords: *Physical literacy, Musical literacy, Medical student, Physical activity, Drumming*

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INTRODUCTION

The 24 Season Drums or more commonly known as "er shi si jie ling gu" in Mandarin romanisation as "二十四节令鼓" is a musical performance that has been widely seen in South East Asia, particularly in Malaysia (1). The performance is often performed on festivals, special occasions, the opening ceremony of events and business start-ups by the local Chinese community. The rolling stone of this exquisite art does not stop there. It has played a significant role in the educational system of nurturing future generations among the Chinese community (2).

Physical literacy has been a relatively new topic in the field of sports, education and health (3). It can be described as having an individual's mind and body being in a state of harmony (4). An Australian framework has identified four domains: physical, psychological, social and cognitive and 30 elements across these domains (5). According to Chan (6), musical literacy is the "perception of music as a whole", where it requires the interpretation of its meaning, aesthetic values and ideas that the musician wanted to convey in terms of tradition, humanism and function to the society. Correspondingly, the yin-yang was a representation of two opposite forces coming together and harmonising together as one in Eastern tradition (7). The concept is frequently used to describe two opposite entities co-existing as one; in this context, the physical and musical development of an individual through 24 Season Drums training.

This study would further explore how 24 Season Drums, a musical performance originated from Malaysia, can enhance one's development in terms of their musical (the yin) and physical (the yang) embodiment. Conversely, it could be used to offer a new paradigm for researchers to synergise and realise the possible correlation between different fields, typically education, sports and health through the extensive use of this art in endorsing the promotion of physical and musical literacy. It will provide insight into how this form of training helps to develop a holistic and well-rounded individual, particularly for medical students.

METHODS

This narrative review draws upon research in the field of sports and music. Eligible study characteristics were: (a) non-interventional and interventional studies involving drums and physical activity; and (b) conducted among children, adults or special population regardless of ethnicities, cultural background and nationality. Meanwhile, the eligible report characteristics were: (a) published in English; (b) publication range from May 2000 to September 2020; and (c) published articles, review papers and meta-analysis (on dates mentioned above). Validation studies, dissertations, thesis, conference abstracts, monographs, commentaries and brief reports were excluded to narrow down the search category.

Firstly, in the literature search, PubMed, ResearchGate, ScienceDirect, Google Scholar and Google search engine were used to retrieve relevant articles. The keyword "24 Season Drums" produces 15 results; the combination of "drums" and "physical literacy" produces 58 results; the combination of "drums", "musical literacy" and "physical" produces 729 results; while the combination of "medical student" and "physical literacy" produces 22 results. After applying the exclusion criteria, 475 articles were retrieved. Secondly, titles of potential studies were screened by the researchers. References cited by each of journals were examined to identify other potential studies for inclusion.

Figure 1 illustrates the flow diagram of the search methodology. After reading the title, 213 articles were found to be relevant to the purpose of this study; and 149 articles were removed during the abstract reading as the articles did not illustrate the correlation with this study. Afterwards, a full copy of 64 articles that met initial screening criteria were selected to proceed to the reading stage. Twenty-two articles were excluded due to its availability and 42 articles were read thoroughly by the author. After full reading, only 22 articles were included in the final writings.

The narrative review writings follow the six elements listed in the Scale for the Assessment of Narrative Review Articles (SANRA) to produce a quality and critical appraisal writing as follows:

a. Justification of the article's importance for the readership: the importance of the writing is stated and justified.

b. Statement of concrete aims or formulation of questions: a concrete aim is formulated at the beginning of the writing.

c. Description of literature search: search strategy is presented.

d. Referencing: statements presented are supported by references.

e. Scientific reasoning.

f. Appropriate presentation of data: relevant evidence is presented together with the supporting data.

BACKGROUND

The origin of this drum ensemble can be traced back as early as 1988 at a local high school, where two talented Malaysians, Tan Hooi Song, a cultural activist, and Tan Chai Puan, a musician. Both of them shared the same impeccable desires and dreams in the pursuit of preserving and promoting Chinese culture (8). The duo initially designed a team of nine drummers as an exceptional performance at the opening ceremony of the 9th National Dance Festival in Johor Bahru, Malaysia. They chose to incorporate not just one but nine traditional drums, used initially as an integral musical accompaniment for the lion dance, to symbolise and represent the 9th National Dance Festival (9). The results enthralled the audience and impressed the spectators, leading them to refine their initial ideas. Since its debut, the presentation has been further strengthened by a fusion of music, dance, poetry and drumming.

Today, the 24 Season Drums performance has continued to foster and grow, being embraced positively and loved by locals and the international community. Since its inception, there are over 6,000 groups and a total of 25,000 drummers in Malaysia (10). Its captivating rhythm and uplifting beats have earned recognition from the Malaysia National Department for Culture and Arts Ministry and has gained popularity among people of different ethnicity and social status. Till this date, 24 Season Drums have grown into an international musical

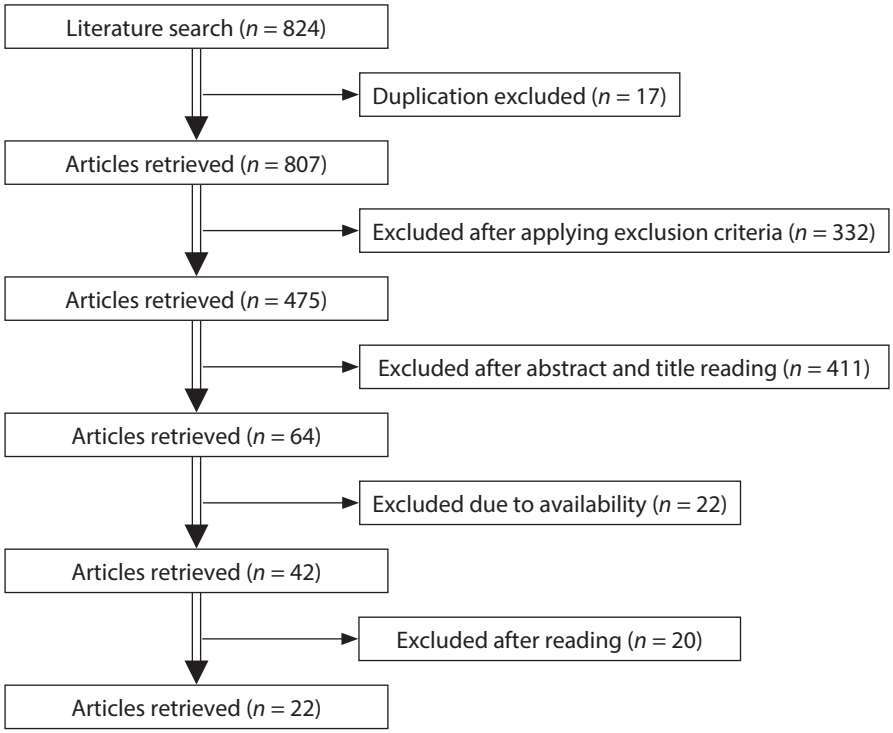

Figure 1: Flow diagram of the search methodology.

performance, with more than 300 troops of professional drummers worldwide, coming from Singapore, Thailand, Taiwan, Switzerland, United States and United Kingdom, competing against each other at the International Drum Festivals once every two years (10).

THE DAUNTLESS DRUMMERS AND DISTINGUISHED DOCTORS

The burning passion and enthusiasm of the 24 Season Drums have spread its wings to Universiti Sains Malaysia (USM) Kubang Kerian, one of the leading medical schools in the East Coast of Malaysia. The 24 Season Drums of USM Kubang Kerian established in the early 2000s and had been a sensational performing troupe in Kelantan. It has over 250 members and had performed in numerous events around the East Coast, thrilling the audience and throwing a spectacular performance.

The majority of the members are students aged between 19 to 24 years old and are studying either as a medical, dental or health sciences students. Many alumni of the team are now specialists in different fields of medicine, such as cardiologists, surgeons and neurologists. The training employed by the team had successfully nurtured holistic individuals in which they are more prepared to face the challenges and demands in their future career.

The life of a junior doctors are demanding and stressful, caused emotional burnout and turmoil among them. Approximately 70.6% of Brazilian medical students reported high levels of emotional exhaustion (11). A study conducted by Ishak et al. (12) found that 28% to 45% of medical students and 27% to 75% of medical residents suffered burnout. Over one-third of the Malaysian medical residents feel emotionally burnout (13) and the prevalence of 67.9% of medical students in USM experienced burnout (14). The Star (15) reported that a young doctor was found dead due to overdose on prescription medication, and another doctor who had injected himself had been found dead in a hotel room.

Obesity is a widespread global chronic health issue. Centres for Disease Control and Prevention revealed that one-third of the United States population are obese (16). In contrast, the National Health and Morbidity Survey by the Institute for Public Health reported that one in two adults are either overweight or obese (17). Bleich et al. (18) found that physicians are more confident to provide exercise and diet counselling towards patients who are obese if they have a regular BMI. Also, the probability of an obese patient being diagnosed is higher when the bodyweight of the patient met or exceeded the physicians' perception of personal weight.

Vigilance, "a state of maximal physiologic and psychological readiness to react", is often deteriorating along with complex memory, attention and decision-making in fatigue, and sleep-deprived physician (19). Sustained attention is defined as a core element of attention driven by the ability to recognise signals occasionally and unpredictably over a period of time (20), while Cohen (21) states that it is a process that allows continuous performance on specific tasks for a prolonged period. In essence, attention is closely related to vigilance to sustain an activity or performance for an extended period. Activities like surgery or even studying for examinations requires one's sustained attention. However, one cannot maintain their attention for a prolonged period without getting fatigued (22). Mental fatigue affects our attention level and concentration. It limits the capacity to suppress unnecessary information and changes of attention to external stimuli, leading to the increase in reaction time and the frequency of incorrect responses (23). As we know, being in the medical field, one is dealing with human lives and mistakes are best to be kept at a minimal level. One cannot be brought down by mental fatigue and caused them to be losing concentration

while working. A study by Palmer et al. (24) shows that a short period of exercises is able to enhance sustained attention in pre-schoolers based on the picture deletion task performance omission. These findings are similar in other studies involving children aged from 13 to 16 years old (25), as well as students in the 2nd, 3rd and 4th grade (26). Ballester et al. (27) revealed that athletes have better vigilance capacities than non-athletes, whereby athletes tend to be faster with fewer lapses and are able to sustain a consistent level of performance throughout the psychomotor vigilance test (PVT) task as compared to non-athletes. This finding is inclined with the findings by Luque-Casado et al. (28) stated that individuals with high physical fitness were known to have better-sustained attention and were able to distribute their attentional resources better.

Physical activity is crucial and pertinent in maintaining good productivity at work. A study by Coulson et al. (29) showed that employees who exercised on a specific day had a 21% increase in self-reported work performance, 41% increase in motivation to work and 80% increase in interpersonal social skills compared to the days when they did not exercise. Sammy (30) mentioned that exercising helps to "make you a better doctor". Regular exercise helps to improve sleep (31–33), improve short-term memory (34), reduce stress (35), and regulate immune system performance (36). For all of these reasons, to be a better doctor, one must have an excellent physical and robust mental capacity to cope with the demanding workload and stress. Thus, this calls for an approach in which both the physical and mental aspect of a person should be developed holistically.

WHY IS DRUMMING PHYSICALLY EXHAUSTING?

According to the Compendium of Physical Activities (37), where the intensity of a specific physical activity is defined by "the ratio of work metabolic rate to a standard resting metabolic rate (MET)". The MET intensity of playing the drum is 4.0, comparable to jogging on a mini-tramp and an occupation that requires one to continuously lift an item of 10–20 lbs, whereby the MET intensities are 4.5 and 4.0, respectively. A study by De La Rue (38) described that drumming is both mentally and physically exhausting. It would seem to be more of a mental challenge as the brain would be tasked with adapting and coordinating subsequent sets of movements, similar to learn and control a new vehicle. He mentioned that an hour of drumming in concert could burn between 400 to 600 calories, equivalent to playing competitive amateur badminton or a tennis tournament.

Intending to develop an outreach programme for overweight children who are not keen on sports, the researchers invited Clem Burke, the drummer of the American rock band, Blondie, to participate in the eight years project (38). Clem's heart rate, oxygen uptake and lactate levels were measured. The findings were similar to the readings of a top athlete where his average heartbeat is between 140–150 bpm, peaking at 190 bpm. Based on the study, they found that footballers in a Championship League gameplay 40 to 50 games per year, but a professional rock drummer played 90 minutes sets at 100 concerts when they are on tour every day. Later on, he would quantify 14 male drummers' energy cost and peak heart rate of rock/pop drumming during a live performance; as well as compare the maximal oxygen uptake produced from the cycle ergometer ramp test and the oxygen uptake during an incremental drumming test. The results show that rock/pop drumming is considered to be a high-intensity form of physical activity, incurring a high amount of energy expenditure, which induces high heart rate and requires an extensive amount of maximal oxygen uptake. Hence, drumming could be as exhausting as exercising, suggesting a possible inclusion to enhance the physical aspect of an individual as well as encompassing the other elements comprehensively (38).

PHYSICAL LITERACY

Whitehead (4) suggested that physical education tends to see the body as a separate entity from other facets of a person. She mentioned that we exist through our interaction with the environment and our surroundings. Furthermore, she suggested that to understand our surroundings, satisfying our needs to pursue growth, connection, control and thriving, one needs to utilise the body and its physical movements. The objective of physical education can only be achieved when an individual integrated their body and mind with their surroundings.

> It is perhaps hard for those concerned with improving aspects of our physical attributes to accept that their ultimate goal is to enable pupils to disregard the complexities of bodily control and coordination in the pursuance of a close and articulate liaison with the world. The real value of the capacities of our embodied dimension is not realised in isolation from our surroundings but an intimate relationship with them (4).

Subsequently, Cairney et al. (39) describe these ideas as an experiential convergence, where the theories in motivational psychology could be linked to the theory of motor development. Cairney suggested the intersection of a variety of approaches, including the theories of sports pedagogy, motor development and motivation, to further expand on Whitehead's views on physical literacy (39). Besides, Deci and Ryan (40) adopted the intrinsic-extrinsic continuous sequential of motivational regulation in the self-determination theory and suggested that motivation is when an individual perceives values in the task and thus gaining rewards or enjoyment from the activity without an external inducement. There is a need to experience succession or progression in a given task; experience the sense of belonging or affiliation to a group, and the need to be in control and autonomy. At the same time, the idea of physical literacy is in line with the dynamic systems theory, which states that the most efficient physical movement for each task is generated through the integration of different sub-systems between the "learner, task and environment" (40). Any changes in anyone of the sub-system will shift the system as a whole, creating a relatively new motor behaviour. The study also suggested that an individual's physical literacy is not developed in a linear process. Therefore, it evokes the need to evaluate and consider every person, task-related and environment aspect of developing one's physical literacy skills. As such, it is clear that the development of physical literacy cannot depend solely on physical education and sports itself, but on activities that push and harness the extent of a person's capabilities and experiences through the engagement of our physical embodiment. For this purpose, it provides the possibility and realisation of arts (24 Season Drums) in the promotion of physical literacy.

PROMOTING PHYSICAL LITERACY THROUGH ARTS AND PERFORMANCE

Recognising that physical education is still a well-established approach in the promotion of sports activities or sports model of a conveyance, researchers are caution that it may be off-putting to specific athletes and hence adversely sway their interest and participation (41). Thus, researchers are increasingly intrigued in search for alternatives that may be more comprehensive.

One of these relatively recent alternatives is the teaching of circus art. Circus art training is a mixture of creative artistic expression, group-based movements and the fusion of multiple disciplines: manipulation, aerials, acrobatics, equilibrium and clowning (42). To be competent in this field, one needs to learn how to handle equipment/implements such as rola bola, trapeze, flower sticks,

ropes and silks, balls, pins, diabolo and balls. Circus arts instruction was introduced as an alternative intervention to new physical education workshops in Montreal, Canada (43). Participants who attended the training lessons in circus arts instruction classes were shown to have improved competencies, understanding of movement vocabularies and confidence compared to those in the control group. Similar to any other expressive arts performance, movements of the individual involved in a circus art is commonly used to convey a state of feelings, express emotions and narrate a story. It is not sufficient for a child to only know how to juggle but do not know how to use juggling as a form of expression. The myriad of activities in a circus, ranging from acrobatics to clowning, provides "something for everyone". Thus, allowing more than one set of skill progression, whereas sports provide a limited progression in terms of skills sets (43). Moreover, learning to perform in front of the crowd is essentially different from playing sports in front of others, whereby the audience or crowd is not a vital part of the process, but rather a by-product. Barnett et al. (42) implied that preparing for a particular target audience may positively influence one's development in physical literacy. Therefore, circus arts instruction is intentionally good for the development of physical literacy.

The physical practice is a vital aspect of actor training. The two most essential elements, habits and abilities are both created and enhanced by repetitive practices with a firm intention of expanding the inner world of performers (44). This practice encourages the simultaneous perception of sensory stimuli, physical endurance, technique and stamina, as well as creativity, linguistic and abstract thinking. Moreover, an actor-training approach assimilates a complex view of the human body concerning the environment – a belief whereby "senses, vision, imagination and physical behaviour" are created and held archived within their body through the method of incarnated consciousness (45). "Actor training" refers to the extent of activities carried out to train and nurture an actor that has been recognised over the 20th century. The activities of actor training in this communication are restricted to exercises that concentrate on creating an exceptional "extra-daily" repertoire to perfect a performance, that is adjacent to Stanislavski's (46) statement on the approach of embodied imagination, articulation of famous clown/mime mentor Lecoq (47), the description of Bartenieff and Lewis (48) on the "Efforts of Laban's Movement Analysis" and the improvisational practices for an ensemble by Bogart and Landau (49). A famous articulation of this concept can also be found in Barba's founding production of "The Paper Canoe", which describes the theme of "extra-daily tasks" as a road to movement (50). According to Barnett et al. (42), an actor's preparation, while varying and focused on various sources, share several elements. These activities are comprehensive and are based on kinesthetic, linguistic and creative processes. Actors are trained daily to develop their knowledge, flexible mastery and technical competence. This is in essence and similar to how a professional musician's hard work in their daily practice to master a specific musical instrument. These activities may require a certain extent amount of physical movements and not require sitting around a script reading table.

MUSICALITY

Oxford English Dictionary defines musicality as "having characteristics of good music such as tuneful, melodious melody, pleasing in sound, good rhythm and harmony" (51). The development of musicality in a 24 Season Drums involves two main elements: rhythm and movement. The rhythmic movements of one's body, as depicted through the choreography are empowered by one's rhythmic senses. Rhythmic movement helps to develop the rhythmic and tonal senses, further

enhancing the enjoyment and understanding of the performance (52). Similar to Dalcroze's approach of music education (52), the 24 Season Drums incorporate the connection between body movements and rhythmic patterns to maximise one's potentials in terms of musical sensitivity. A drum needs to achieve a high dimension of musical perception to transcend the musicality of the "story" or "event" that it wants to convey to the audience. Also, musicality is also often transpired and taught to the drummers through the interpretation and representation of the music and choreography. The music and choreography are usually programmed and designed through a higher level of perception and cognitive thoughts. A typical story that a drum performance would be the depiction of agricultural events, common festivals and rituals in China.

According to Chan (6), she describes her experiences while she was learning the arts at a few Chinese secondary schools. Musical literacy has been emphasised in the early stages of learning. Drummers were taught the fundamentals of musical theory and beat counting for them to be able to perceive more complex rhythms of a song. Meanwhile, some schools teach based on rote learning with mnemonics without focusing on musical literacy. Similar to the Nashville numbering system (53), the syllabus focuses on internalising "dung", "dak" and "tik" to allow the drummers and easier way to memorise songs. At USM, the drummers were taught based on rote learning, mnemonics and a complimentary video, which was uploaded to a closed Facebook group, similar to how the Brain Breaks activities were conducted (54–56).

The 24 Season Drums team would apply the rote-learning method, whereby senior drummers will be in charge of coaching and training the juniors. Senior drummers would demonstrate the techniques, and the juniors or newcomers would try to imitate them while memorising the rhythm and drum patterns, which is similar to Lee et al. (1) had described in their study examining the teaching method of 24 Season Drums employed in a secondary school in Malaysia. Similarly, Chan (6) mentioned the same training system used in a few schools, namely the Chong Hwa School Association in Pulau Pinang. However, there are a few schools that value the concept and fundamental essence of musical theory, hoping that the students will be able to understand more complex drumming patterns and propel them further in their performance. School such as Chong Hwa Independent High School and SRJK (C) Naam Cheung in Kuala Lumpur, and Pin Hua High School in Selangor, stressed on the teaching of musical notation to help them establish archiving, references and composition. Nonetheless, the combination of rhythmic memorisation and rote learning are pertinent to enhancing musical literacy of a drummer.

Musical literacy is essential for musical composition. The composer needs to have a good understanding of rhythmic patterns and creativity. First, the composer will need to come up with a general theme or concept that they wanted to present at the performance. After verifying the key message they wanted to express, the composer would browse through the various styles and patterns taught by their seniors. Furthermore, they may use the standard drumming patterns inherited from their teachers or seniors and adapt it to their upcoming performance or build their variations to suit the theme better. One needs to bring together the various rhythmic patterns and styles and test it to see if the combination is viable and musically "palatable". Besides, the composer needs to synchronise body movements with the rhythmic patterns as well. Coordination between musical rhythms and body movements is critical since the two elements are the critical message used to show the thoughts and aesthetics feelings to the audience, giving them a mixture of visual, auditory and spiritual extravaganza through the performance.

CONCLUSION

The purpose of this study is to bring forward a relatively new idea of using 24 Season Drums training as an approach to promote both physical and musical literacy. The evidence reviewed herein supports the development of one's physical literacy through the extensive use of this art. The training of 24 Season Drums encompasses a great range of development in the physical, cognitive, social and psychological domains, in which these domains remain absent from the existing physical literacy literature. Nonetheless, the authors also describe the relevance of this form of training in nurturing a medical student. It helps to prepare them to face future challenges and adversity while seemingly training them to be mentally and physically tough. In conclusion, this study highlights the need to performance-based arts to develop and explore physical literacy. We hope that it can attract more scope of future collaborations between experts from different disciplines to construct an ideal and holistic approach in developing a well-rounded individual.

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REFERENCES

1. Lee SM, Loo FY, Saidon ZL. Team-building in the 24 seasons drums education: from physical exercise to music. Procedia Soc Behav Sci. 2015;174:2331–4. https://doi.org/10.1016/j.sbspro.2015.01.895

2. Cheung J. Mapping music education research in Hong Kong. Psychol Music. 2004;32(3):343–56. https://doi.org/10.1177/0305735604043265

3. Edwards LC, Bryant AS, Keegan RJ, Morgan K, Jones AM. Definitions, foundations and associations of physical literacy: a systematic review. Sports Med. 2017;47:113–26. https://doi.org/10.1007/s40279-016-0560-7

4. Whitehead M. Meaningful existence, embodiment and physical education. J Philos Educ. 1990;24(1):3–14. https://doi.org/10.1111/j.1467-9752.1990.tb00219.x

5. Green NR, Roberts WM, Sheehan D, Keegan RJ. Charting physical literacy journeys within physical education settings. J Teach Phys Educ. 2018;37(3):272–9. https://doi.org/10.1123/jtpe.2018-0129

6. Chan CSC. The 24 jie ling gu (24 season drums): towards discipline, musicality and creativity in the Chinese schools of Malaysia. In: Mohd Tahir R, Chan CJ, Mohd Shah S, Pan KC, editors. Perspective on music education in Malaysia. Shah Alam: University Publication Centre, Universiti Teknologi MARA; 2006.

7. Henderson KA. The yin-yang of experiential education research. J Exp Educ. 1993;16(3):49–54. https://doi.org/10.1177/105382599301600309

8. The Sun Daily. Dying art of "24 seasons drums". 2017 February 1 [cited 2020 Sept 2020]. Available from: https://www.thesundaily.my/archive/2147217-JTARCH424872

9. Leonghoe Workshop. 二十四节令鼓记录片 24 festive drum documentary part 1. YouTube. 2009 November 24 [cited 2020 Sept 2020]. Available from: https://www.youtube.com/watch?v=AnTDVUEhExQ&ab_channel=leonghoeWorkshop

10. Loh P. Go: gega drum fest. News Straits Times. 2018 August 16 [cited 2020 Sept 2020]. Available from: https://www.nst.com.my/lifestyle/jom/2018/08/401815/go-mega-drum-fest

11. Boni RADS, Paiva CE, de Oliveira MA, Lucchetti G, Fregnani JHTG, Paiva BSR. Burnout among medical students during the first years of undergraduate school: prevalence and associated factors. PLoS One. 2018;13(3):e0191746. https://doi.org/10.1371/journal.pone.0191746

12. Ishak WW, Lederer S, Mandili C, Nikravesh R, Seligman L, Vasa M, Ogunyemi D, Bernstein CA. Burnout during residency training: a literature review. J Grad Med Educ. 2009;1(2):236–42. https://doi.org/10.4300/JGME-D-09-00054.1

13. Al-Dubai SAR, Ganasegeran K, Perianayagam W, Rampal KG. Emotional burnout, perceived sources of job stress, professional fulfillment, and engagement among medical residents in Malaysia. The Scientific World Journal. 2013:1–9. https://doi.org/10.1155/2013/137620

14. Chin RWA, Chua YY, Chu MN, Mahadi NF, Yusoff MSB, Wong MS. Prevalence of burnout among Universiti Sains Malaysia medical students. Education in Medicine Journal. 2016;8(3):61–74. https://doi.org/10.5959/eimj.v8i3.454

15. The Star. Doctor burnout is cause for concern. 2019 November 16 [cited 2020 Sept 2020]. Available from: https://www.thestar.com.my/opinion/letters/2019/11/06/doctor-burnout-is-cause-for-concern

16. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity and severe obesity among adults: United States, 2017–2018. NCHS data brief, no 360. Hyattsville, MD: National Center for Health Statistics; 2020.

17. Institute for Public Health. National Health and Morbidity Survey (NHMS) 2019: non-communicable diseases, healthcare demand, and health literacy—key findings. Putrajaya: National Institute of Health, Ministry of Health Malaysia; 2020.

18. Bleich SN, Bennett WL, Gudzune KA, Cooper LA. Impact of physician BMI on obesity care and beliefs. Obesity. 2012;20(5):999–1005. https://doi.org/10.1038/oby.2011.402

19. Ramsay MA. Physician fatigue. Baylor University Medical Center Proceedings. 2000;13(2):148–50. https://doi.org/10.1080/08998280.2000.11927659

20. Sarter M, Givens B, Bruno JP. The cognitive neuroscience of sustained attention: where top-down meets bottom-up. Brain Res Brain Res Rev. 2001;35(2):146–60. https://doi.org/10.1016/s0165-0173(01)00044-3

21. Cohen RA. Sustained attention. In: Kreutzer JS, DeLuca J, Caplan B, editors. Encycl Clin Neuropsychol. New York: Springer; 2011. p. 2440–3.

22. Mackworth NH. The breakdown of vigilance during prolonged visual search. Q J Exp Psychol. 1948;1(1):6–1. https://doi.org/10.1080/17470214808416738

23. Boksem MA, Meijman TF, Lorist MM. Effects of mental fatigue on attention: an ERP study. Brain Res Cogn Brain Res. 2005;25(1):107–16. https://doi.org/10.1016/j.cogbrainres.2005.04.011

24. Palmer KK, Miller MW, Robinson LE. Acute exercise enhances preschoolers' ability to sustain attention. J Sport Exerc Psychol. 2013;35(4):433–7. https://doi.org/10.1123/jsep.35.4.433

25. Luque-Casado A, Perakakis P, Ciria LF, Sanabria D. Transient autonomic responses during sustained attention in high and low fit young adults. Sci Rep. 2016;6:27556. https://doi.org/10.1038/srep27556

26. Caterino MC, Polak ED. Effects of two types of activity on the performance of second-, third-, and fourth-grade students on a test of concentration. Percept Mot Skills. 1999;89(1):245–8. https://doi.org/10.2466/pms.1999.89.1.245

27. Ballester R, Huertas F, Yuste FJ, Llorens F, Sanabria D. The relationship between regular sports participation and vigilance in male and female adolescents. PLoS One. 2015;10(4):e0123898. https://doi.org/10.1371/journal. pone.0123898

28. Luque-Casado A, Zabala M, Morales E, Mateo-March M, Sanabria D. Cognitive performance and heart rate variability: the influence of fitness level. PLoS One. 2013;8(2):e56935. https://doi.org/10.1371/journal.pone.0056935

29. Coulson JC, McKenna J, Field M. Exercising at work and self-reported work performance. Int J Workplace Health Manag. 2008;1:176–97. https://doi.org/10.1108/17538350810926534

30. Sammy M. MDLinx [Internet]. Washington, PA: M3 USA Corporation; 2019 September 27 [cited 2020 Sept 20]. How exercise can make you a better doctor. https://www.mdlinx.com/article/how-exercise-can-make-you-a-better-doctor/lfc-4552

31. Kline CE. The bidirectional relationship between exercise and sleep: implications for exercise adherence and sleep improvement. Am J Lifestyle Med. 2014;8(6):375–9. https://doi.org/10.1177/1559827614544437

32. Iftikhar IH, Kline CE, Youngstedt SD. Effects of exercise training on sleep apnea: a meta-analysis. Lung. 2014;192(1):175–84. https://doi.org/10.1007/s00408-013-9511-3

33. Yang PY, Ho KH, Chen HC, Chien MY. Exercise training improves sleep quality in middle-aged and older adults with sleep problems: a systematic review. J Physiother. 2012;58(3):157–63. https://doi.org/10.1016/S1836-9553(12)70106-6

34. Hajar MS, Rizal H, Muhamad AS, Kuan G. The effects of brain-breaks on short-term memory among primary school children in Malaysia. In: Hassan MHA, Che Muhamed AM, Mohd Ali NF, Denise K CL, Kok LY, Safii NS, Md Yusof S, Mohamad Fauzi NF, editors. Enhancing health and sports performance by design. Singapore: Springer; 2020. https://doi.org/10.1007/978-981-15-3270-2

35. Stults-Kolehmainen MA, Sinha R. The effects of stress on physical activity and exercise. Sports Med. 2014;44(1):81–121. https://doi.org/10.1007/s40279-013-0090-5

36. Falkenberg RI, Eising C, Peters ML. Yoga and immune system functioning: a systematic review of randomized controlled trials. J Behav Med. 2018;41(4):467–82. https://doi.org/10.1007/s10865-018-9914-y

37. Ainsworth BE, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ, et al. Compendium of physical activities: an update of activity codes and MET intensities. Med Sci Sports Exerc. 2000;32(9):498–516.

38. De La Rue SE, Draper SB, Potter CR, Smith MS. Energy expenditure in rock/pop drumming. Int J Sports Med. 2013;34(10):868–72. https://doi.org/10.1055/s-0033-1337905

39. Cairney J, Dudley D, Kwan M, Bulten R, Kriellaars D. Physical literacy, physical activity and health: toward an evidence-informed conceptual model. Sports Med. 2019;49(3):371–83. https://doi.org/10.1007/s40279-019-01063-3

40. Deci EL, Ryan RM. Self-determination theory: a macrotheory of human motivation, development, and health. Can Psychol/Psychologie Canadienne, 2008;49(3):182–5. https://doi.org/10.1037/a0012801

41. Thelen E. The (re)discovery of motor development: learning new things from an old field. Dev Psychol. 1989;25(6):946–9. https://doi.org/10.1037/0012-1649.25.6.946

42. Barnett LM, Dennis R, Hunter K, Cairney J, Keegan RJ, Essiet IA, Dudley DA. Art meets sport: what can actor training bring to physical literacy programs? Int J Environ Res Public Health. 2020;17(12):4497. https://doi.org/10.3390/ijerph17124497

43. Kriellaars DJ, Cairney J, Bortoleto MC, Kiez TM, Dudley D, Aubertin, P. The impact of circus arts instruction in physical education on the physical literacy of children in grades 4 and 5. J Teaching Phys Educ. 2019;38(2):162–70.

44. Dennis R. Viewpoints, creativity and embodied learning: developing perceptual and kinaesthetic skills in non-dancers studying undergraduate university drama. Theatre, Dance and Performance Training. 2013;4(3):336–52. https://doi.org/10.1080/19443927.2013.840675

45. Dennis R, Lewis L. Diderot's body and cognitive science: sensation, impulse and action in performer training. Studies in Theatre and Performance. 2018;38(1):36–47. https://doi.org/10.1080/14682761.2016.1269510

46. Stanislavski C. An actor prepares. Vol. 1. New York: Routledge; 1964.

47. Lecoq J. The moving body (Le Corps Poetique): teaching creative theatre. London, UK: A&C Black; 2009.

48. Bartenieff I, Lewis D. Body movement: coping with the environment. New York: Routledge; 1980.

49. Bogart A, Landau, T. The viewpoints book: a practical guide to viewpoints and composition. New York: Theatre Communications Group; 2005.

50. Barba E. The paper canoe: a guide to theatre anthropology. New York: Routledge; 1995.

51. Simpson W. Music. In: The Oxford English Dictionary. Vol. 10. Walton Street: Oxford University Press; 1989. p. 126–7.

52. Anderson W. The Dalcroze approach to music education: theory and applications. General Music Today. 2012;26:27–33. https://doi.org/10.1177/1048371311428979

53. de Clercq T. A music theory curriculum for the 99%. Engaging Students: Essays in Music Pedagogy. 2019;7. https://doi.org/10.18061/es.v7i0.7359

54. Kuan G, Rizal H, Hajar MS, Chin M-K, Mok M. Bright sports, physical activity investments that work: implementing brain breaks in Malaysian primary schools. Br J Sports Med. 2019;53(14):905–6. https://doi.org/10.1136/bjsports-2018-100146

55. Rizal H, Hajar MS, Muhamad AS, Kueh YC, Kuan G. The effect of brain breaks on physical activity behaviour among primary school children: a transtheoretical perspective. Int J Environ Res Public Health. 2019;16(21):4283. https://doi.org/10.3390/ijerph16214283

56. Hidrus A, Kueh YC, Norsaadah B, Chang YK, Hung TM, Naing NN, et al. Effects of brain breaks videos on the motives for the physical activity of Malaysian with type-2 diabetes mellitus. Int J Environ Res Public Health. 2020;17(7):2507. https://doi.org/10.3390/ijerph17072507