SPECIAL COMMUNICATION
Volume 10 Issue 1 2018
DOI: 10.21315/eimj2018.10.1.8
ARTICLE INFO
Submitted: 21-02-2018
Accepted: 04-03-2018
Online: 30-03-2018

Integrated Cumulative Grade Point Average (iCGPA): Benefits and Challenges of Implementation for the Medical Faculty

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To cite this article: Sanip S, Abdul Rahman NF. Integrated cumulative grade point average (iCGPA): benefits and challenges of implementation for the medical faculty. Education in Medicine Journal. 2018;10(1):69–80. https://doi.org/10.21315/eimj2018.10.1.8

To link to this article: https://doi.org/10.21315/eimj2018.10.1.8

ABSTRACT

The Ministry of Higher Education introduced the integrated cumulative grade point average (iCGPA) system in 2016 as an aspiration to produce holistic and well-balanced graduates based on Malaysian Qualification Agency's (MQA) learning domains. In this article, we provide a comparison of iCGPA with other established medical competency frameworks and share our experience in implementing iCGPA in the medical faculty. Throughout the process, it was noted that medical educators require several core competencies in order to successfully implement iCGPA in their courses. Two of the most important core competencies are understanding the pedagogies of the 21st century (heutagogies, paragogies, and cybergogies) and apprehending the concept of outcome-based education. On top of the requirement of core competencies, there were also challenges in tailoring teaching and learning to meet the requirement of the Industrial Revolution 4.0. We also describe in detail the benefits and other challenges of iCGPA implementation in our faculty. We conclude this article with our recommendation for successful iCGPA implementation in the future for the medical faculty.

Keywords: *iCGPA, Outcome-based education, Medical faculty, Industrial Revolution 4.0*

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BACKGROUND

The Ministry of Higher Education introduced the integrated cumulative grade point average (iCGPA) system in 2016 as an aspiration to produce holistic and well-balanced graduates based on Malaysian Qualification Agency's (MQA) learning domains. Although iCGPA has been fully implemented in other faculties, its application in Faculty of Medicine and Health Sciences of Universiti Sains Islam Malaysia remains incomplete. It was discovered that there were no other medical faculties that implemented the system during a medical educators' network meeting in Universiti Malaya in November 2017.

When the Minister of Higher Education announced in 2016 that iCGPA will be implemented to all higher institutions in Malaysia, several faculties from several universities were selected to pilot the

implementation. The results of the pilot implementation were presented in the iCGPA conference in 2017. However, the initial implementation of the system did not involve any medical faculty from any university. Therefore, when the Minister makes another announcement that iCGPA will be fully implemented in 2019, we were left befuddled in deciding the mechanism and anticipating the dire implications behind the implementation of the system. Despite that, we decided to spearhead the implementation of iCGPA in our very own faculty.

The initial trials to implement iCGPA in the Faculty of Medicine and Health Sciences, USIM started in January 2017 even though it has yet compulsory for medical faculties to do so. Throughout the trial process, it was noted that medical educators need several core competencies to be able to execute iCGPA successfully in which two of the most important core competencies are understanding educational principles (such as pedagogies, heutagogies, paragogies and cybergogies) and the concept of outcome-based education. On top of the requirement of core competencies, there were also current challenges that hampers successful implementation, as well as future challenges of tailoring teaching and learning to meet the requirement of the Industrial Revolution 4.0. Although it is understandable that iCGPA is conventionally applicable to graduates of higher institutions from all disciplines, questions arise as to whether such a framework is applicable to medical graduates.

WHAT IS iCGPA?

The iCGPA is a system or mechanism for assessing and reporting learner's integrated development and learning gains of their ethics and values, their declarative and functional knowledge and their disciplinary skills and technical abilities. The reporting illustrates attainment of attributes outlined in the six student aspirations stipulated in the Malaysian Education Blueprint (Higher Education) as well as the eight domains of learning outcomes listed in the Malaysian Qualifications Framework (MQF) (1). The attainment of learning outcomes is mapped in a spider web as illustrated in Figure 1. The pattern in the spider web will change accordingly depending on the learning outcomes attained by the student in each semester. The pattern will indicate which domain the student should develop in the coming semester in order to become a holistic graduate. The students cumulative achievement attained throughout the entirety of his/her study will be depicted in the final spider web diagram.

MEDICAL EDUCATION COMPETENCY FRAMEWORKS VERSUS iCGPA COMPETENCY DOMAINS

In medical education, there are established frameworks for determining the competencies required of a medical graduate. In Canada, the CanMEDS 2005 Physician Competency Framework (2) defines clearly the key and enabling competencies for the seven overlapping roles of a medical graduate. The seven roles are medical expert, communicator, collaborator, manager, health advocate, scholar, and professional. In the United States, the competency framework is defined by the Accreditation Council for Graduate Medical Education (ACGME) in their Outcome Project (3). The framework contains six domains; patient care, medical knowledge, practice-based learning and improvement, inter-personal and communication skills, professionalism, and systems-based practice. In Malaysia, although iCGPA is non-specific to medical graduates, it is very likely that the framework will also be used to assess the competencies obtained by medical graduates at the end of their study as there are currently no established framework specific to medical education available to be compared to CanMEDS and ACGME within the Asian region. A comparison of the competency domains required of a medical graduate between iCGPA, CanMEDS and ACGME is tabulated in Table 1.

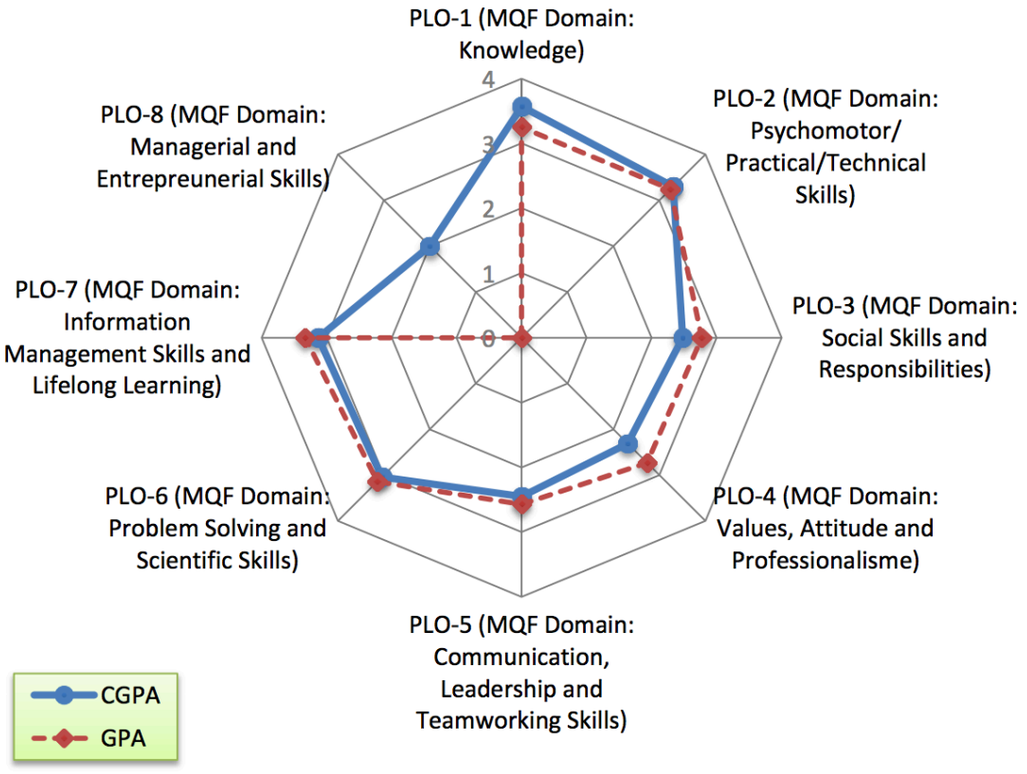

Figure 1: An example of spider web for a student's learning outcome iCGPA attainment (iCGPA Rubric Learning Outcomes Assessment Guide, p. 129).

Table 1: A comparison of iCGPA with CanMEDS and ACGME

iCGPA, Malaysia (1)	CanMEDS 2005 Physician Competency Framework, Canada (2)	ACGME's Outcome Project, The United States of America (3)
• Knowledge • Psychomotor/practical/ technical skills • Communication, leadership and team working skills • Social skills and responsibilities • Values, attitude and professionalisme • Problem solving and scientific skills • Information management skills and lifelong learning • Managerial and entrepreneurship skills	• Medical expert • Professional communicator • Collaborator • Manager • Health advocate • Scholar	• Medical knowledge • Professionalism • Inter-personal and communication skills • Patient care • Practice-based learning and improvement • Systems-based practice

In Table 1, knowledge and communication skill are two competencies that are well documented across the three frameworks. Professionalism is required in iCGPA and ACGME, whereas managerial skill is required in iCGPA and CanMEDS. The other documented competencies are somewhat different although they belong within the same domain. For example, team working skill in iCGPA can be somewhat similar to collaborator in CanMEDS as both are within the affective domain. However, the learning outcomes of both competencies are different. Team work outcomes can be achieved by working within the same team while outcomes for collaborator require graduate to collaborate with other teams. The only striking difference between the three frameworks is the requirement for entrepreneurship competency documented in iCGPA. Before we further extend our discussion on the entrepreneurship domain, we will first focus on the relevance of each domain related to medical education.

One of the domain in which it's mastery by a medical graduate is of unequivocal important is knowledge or cognitive skill. Experts in medical field are known to have a well-organised knowledge base and a "superior perceptions to patterns" leading to smoother, more efficient and automated execution of tasks (4) in managing clinical problems. In medical education, a well-organised knowledge base is also commonly tied strongly with better psychomotor or practical skills. Through engagement in deliberate practice, medical graduates develop competency in practical (clinical) skills by executing clear part-task instructions, receiving immediate feedback and feed-forward (5) by the teacher and having ample opportunities to gradually improve with repetitions on the part-task that require more practice (6). Realising that practical skills development requires refinement over a longer period of time, a programmatic assessment that serves as holistic "time-lapse" shots makes the judgement more meaningful, compared to a conventional "snapshots" style (7). Some excellent clinical teachers were noted to deliberately sequence students' learning experience by selecting the teaching activities based on learners' level, an important strategy to consolidate students' clinical skills (8–10). Therefore, it was unsurprising that high achieving medical students were found to have more deliberate practice characteristics than their low achieving counterparts (11). Although knowledge is a required competency in the three domains, practical skill is only documented in iCGPA, CanMEDS requirement of a medical expert could be defined as expertise in both knowledge and clinical skills while ACGME's practical skill could be stipulated in the "practice-based learning and improvement" competency.

In the same vein, communication skills competency determine the successfulness of a doctor-patient relationship. Studies have shown that a doctor-patient relationship can be a strong predictor of a patient's clinical outcome (12–13). Other aspects of communication such as the acquisition, interpretation and communication of information, also form a critical aspect of medical care provision (14). The rapidly changing nature of clinical work requires students to "think on their feet" and improvise their communication direction based on the latest information in hand (15). Therefore, it is well understood why communication skill is required in the three frameworks.

Professionalism portrays the conduct of a medical professional. It is an important aspect of medical education that requires a clinician to constantly learn and redefine what professionalism means for themselves. Ensuring students become adept in professionalism is no easy feat. Exposure to uncertainties and discomfort may be crucial but students may struggle with this daunting challenge (16). Students may face the transitional period from "who they are" to "who they wish to become" during the exposure and this period must be explicitly addressed, if competency in this domain is expected at the end of the programme (17).

Some studies recommend the importance for professional identity development beginning from the pre-clinical years (18) while others have suggested that since it is more difficult to be taught, it is better to pre-select students for this purpose (19), for instance, via interviews. In USIM, there was also a challenge of portraying the religious aspect of our graduate's professionalism. If iCGPA is made compulsory for medical schools in Malaysia, we foresee that professionalism will be the hardest domain for us to measure since there is no established code of professionalism for Muslim medical doctors.

Social skills and responsibility competency is defined as the commitment and initiative to carry out professional duties and roles in accordance to ethical principles. As such, depending on the context of each society, competency in this particular domain may be the hardest to acquire during medical school (20). Information management and lifelong learning is inherent to medical education. Medical graduates are expected to be able to be critical in evaluating clinical information, practice lifelong learning to kept abreast with the latest treatment guidelines in their field and be able to treat their patients through evidence-based practice.

Although managerial skill is required in iCGPA and CanMEDS framework, this competency, as well as entrepreneurial skill is less researched in medical education. A possible explanation for this is reflected in a paper by Phillips and Garman (21). Some of the significant issues in medical entrepreneurship is related to how to ensure that pursuing opportunities does not present unacceptable risks to the core activities of the enterprise and also how to minimise role conflicts and how to reward initiative that is consistent with the personnel policies of the healthcare organisations. With the limited funding available to medical faculties and teaching hospitals, entrepreneurship is seen as an important skill that health professionals should possessed, in order to help healthcare organisations to generate its own income or manage its financial resources more effectively. In our medical faculty, entrepreneurship is introduced to the student as a stand-alone course, conducted by our fellow lecturers from the Faculty of Economic and Muamalat. In this course, the students learn how to set-up and run a small business project in a group. None of the project so far had been related to entrepreneurial activities of a healthcare organisation. We often question how to best conduct this course to make it more relevant to our students. We have yet to find a solution to this predicament at the moment but hopefully it will be resolved in the near future.

CORE COMPETENCIES NEEDED

From our attempt in implementing iCGPA in the medical faculty, we noted that the medical academicians are lacking in their understanding of educational principles (pedagogies, heutagogies, paragogies and cybergogies) and the concept of outcome-based education. In our medical faculty, the basics of teaching and learning were delivered as a general course to all academicians in the university. There was no training specifically tailored to medical academicians despite some difference in the teaching and learning activities (TLAs) used such as bedside teaching.

Although empirical evidences are abundant in supporting the notion that good educators can be made (22), and that good teachers improves students' outcomes (23–25). Griffith et al. reported that good attending physicians, who manage to make learning fun, enjoyable and exciting for the residents, were able to help residents score better during the United States Medical Licensing Examination (USMLE) examination (23). Roop and Pangaro also found that teaching behaviours that reflected good teaching (leadership style, fostering understanding and retention, providing feedback and good learning climate) had a positive effect on students' academic performance (24). It is also reported that educators with poor

teaching skills can hinder students' learning. Young et al. found that educators who were lacking in clinical teaching skills were unable to promote high-level cognitive processing or deep learning among the students (25). It is therefore crucial to develop competent medical educators as they will provide quality learning to the students and subsequently improve the students' academic performance. Unfortunately, the current lack of manpower and financial resources has rendered it difficult for our medical education unit to run teaching and learning courses specific to medical education as a means of producing the aforementioned good medical educators.

PEDAGOGIES FOR THE 21ST CENTURY

In line with the era of Industrial Revolution 4.0, the higher education institutions are expected to refine its curriculum to suit the pedagogies for the 21st century. The medical curriculum should also be prepared to provide teaching and learning activities which supported heutagogies (self-directed learning), paragogies (co-learning and co-creation of knowledge), and cybergogies (engagement in online learning). These forms of pedagogies may sound fancy to some medical educators but some of it has already been practiced in medical education. In our faculty, self-directed learning is formally carried out through self-learning packages, fixed learning modules, problem-based learning (PBL) tutorials or team-based learning (TBL) on topics that have been chosen by the course coordinator. These topics will not be taught in lectures but it will be formally assessed in the examination. For paragogy, medical students are commonly given tasks to present in a guided seminar on *Naqli* (revealed) and *Aqli* (human) integration in medical education. Through group work, they co-learn and co-create the content of the presentation. However, the application of cybergogy in our TLAs leaves much to be desired. This is partly contributed by the lack of internet connectivity in the students' hostel, making it difficult for them to participate in online learning outside of their class hours from the comfort of their homes.

Moving forward, continuous exposure and training in these pedagogies are essential, in order for medical academics to be able to tailor their TLAs to suit the pedagogies of the 21st century. There are also other pedagogies used in medical education, hence it is not solely confined to the three previously mentioned. Experiential learning, andragogy and other pedagogies still play a role in the development of skills deemed essential for Industrial Revolution 4.0 among medical students.

UNDERSTANDING THE CONCEPT OF OUTCOME-BASED EDUCATION (OBE)

Competency is defined as "a complex set of behaviours built on the components of knowledge, skills attitudes, and 'competence' as personal ability", where progression of competence is reflected in the spectrum of ability from novice to mastery (26). To understand this matter further, let us look at how past literatures have brought insights into current knowledge of outcome-based education (OBE) or competency-based medical education (CBME). There are essentially four critical features of a competence-based education; a commitment to outcomes, a focus for assessment on developmental milestones, a mechanism to promote a true continuum of medical education and a method to promote learner-centred curricula (27). CBME is commonly advocated because its assessment framework include competences establishment, as well as promotion of accessibility, affordability and transparency. In addition to these, CBME is seen to have a clear alignment with health care needs to ensure patient safety through the creation of competency-based framework (27–30). In this instance, iCGPA is seen as a suitable framework to assess medical competency as it was developed based on the concept of OBE.

A CBME curricular design must include competency identification, determination of competency components and performance levels, competency evaluation and overall assessment of the process (26). CBME framework is meant to prepare future doctors to manage the transition between medical school onto early working career. By providing experiences within a more flexible time frame and focusing on the learner's development, CBME can help focus on outcomes and abilities; and promotes reduction of time-based training (27). There are numerous empirical evidence pertaining to the benefits of CBME. CBME was reported to influence teachers' planning and teaching through the learning and lesson outcomes (31), prepare students better for teaching sessions (32), and lead to a higher post-clerkship tests scores (33). However, whether CBME does indeed produce better clinicians remains unknown.

Despite its advantageous propositions, CBME has also received criticisms. In the UK, the adoption of postgraduate CBME framework was pressurised as to fulfill the "promise of the electoral votes" for a shorter graduate training time (34). In the US, the pressure was reported to be from a decline in students' test scores. This prompted the "back to basics" competence-based education recommendation at all levels (26). CBME adoption at least in these two countries were due to some form of authoritative external pressure. An implementation issue of CBME is pertaining to the essence of time. Frank and colleagues, described this challenge as "logistical chaos" (27). Policy makers justified CBME adoption to shorten program length because students can be assessed based on attainment of competency, not time. Students should be able to graduate earlier if they are able to attain all the competencies earlier. Yet, time also has become one of the biggest challenge in CBME implementation. Despite attaining the competencies earlier, students are still required to fulfil a minimum classroom attendance rate. Personalised education is difficult to achieve with limited resources and manpower. Therefore, the CBME concept still cannot be fully executed in the Malaysian medical education system.

Another point to ponder is the complexity of professional learning which is limitedly encompassed by CBME. Professional learning is inherently adaptive yet heuristic at the same time, which could limit reflection and intuition if the curricula is confined within the space of academic or operational competences (34). Furthermore, "threats of reductionism" in the forms of objective task checklists (for example during objective structured clinical examination) seemed to be degrading the essence of human health and the requirement of different approach for different case. Globally, lack of frameworks and definitions remain a significant obstacle to CBME implementation, juxtaposed against the expectations to deliver a better value of health care by "holding the current educational structures and architecture of learning in place while concomitantly withdrawing the resources" (10, 35).

BENEFITS OF iCGPA IMPLEMENTATION

Several benefits were noted during our trial of iCGPA implementation in the faculty. First, we could see a clearer mapping of student learning time (SLT) to the assessment weightage. Second, as our previous understanding of how the course outline should be prepared was different than how it should be prepared in iCGPA, there was no standardisation of the SLT based on MQA's recommendation. Re-writing of the course outline following iCGPA format made it easier for us to realise if we have inflicted an unnecessary burden to the students' by looking at the total SLT. We also made a point to standardise the SLT for each teaching and learning activity, across all courses in the medical programme, something that we did not do prior to our trial of iCGPA

implementation. Finally, the plotting of course/programme learning outcomes attainment made it easier for us to provide feedback to the students on which learning outcome or domain they need to work on in the coming semester. It was also easier for the course coordinators to identify the learning outcomes in their course which requires further improvement.

CHALLENGES OF IMPLEMENTATION

We faced several challenges when trying to implement iCGPA. First and probably the most important challenge was the fact that there was no proper medium for the trainers to assess their understanding of iCGPA prior to training other academics and implementing it in the faculty. The exposure that we received was only a mere two-day introduction course to iCGPA at the university level. Our medical education training background probably allowed us to understand the concept of iCGPA easier but the same cannot be said to other basic sciences and clinician educators.

Second, the re-writing of the course outline was a struggle. In our faculty, the traditional conception was to cover as much learning outcomes as possible in a course. As the recommended learning outcomes were between three to five in iCGPA, the re-writing of the learning outcome was the biggest hurdle we had to overcome. The re-writing of the learning outcomes also resulted in a change in the teaching-learning activities, assessment strategies and assessment weightage. As our faculty still adopts a traditional medical curriculum approach, some of the basic sciences courses such as anatomy, faced difficulty in assessing students in the affective domain. For the clinical subjects, we faced difficulty in determining which domain bedside teaching should fall into. A typical bedside teaching would entail coverage on several learning outcomes domain, for example, knowledge, physical examination skill, communication skill and professionalism. Should we divide the student learning time equally into four to cover each learning outcome or should we choose just one? If so, which of the four learning outcome should we select? Since there is no guideline in calculating the SLT with regard to bedside teaching in iCGPA, it is possible that different medical faculties will choose differently depending on their assessment strategies and weightage. In our faculty, as the component and weightage of each assessment is defined in the Examination Regulation, changing any component or weightage of the assessment will require an amendment in the Examination Regulation. Minor changes only require University's Senate approval, but major changes would require MQA's approval.

Third, achieving constructive alignment can be challenging with learning outcomes in the affective domains. Academicians need to know how to diversify TLAs that are aligned with learning outcomes and assessment strategies. This is especially important when the requirements of Industrial Revolution 4.0 are taken into consideration. The use of simulation, gamification and augmented reality in teaching and learning will possibly be a norm in the future. The use of 3D printing technology to produce prosthesis could probably be a skill that is required of all doctors. Therefore, academicians need to also update their knowledge on the best methods to achieve the learning outcomes. It is also important to familiarise the students with such new methods of teaching and learning activities and assessments in order to achieve smoother implementation.

Fourth, there was a low buy-in from the academics as they could not see the benefit of implementation in the medical faculty. Recently, two of our trainee lecturers' scholarship application were refused because their CGPA were printed in their scroll and it was less than the minimum requirement. The other trainee lecturers' applications were accepted because the usual examination result in medical school did not use CGPA system. Although this could be an isolated case, it is enough to discourage any medical school from adopting iCGPA.

DISCUSSION

As far as we are aware of, the medical faculty was never consulted with regard to the implementations of iCGPA. Having gone through the process of trying to implement it in our faculty, several dilemmas came to our mind. First, what will happen to our medical graduates when government jobs for doctors are no longer guaranteed? Will our medical graduates stand a chance at being called for other job interviews when they do not have a CGPA in their academic transcript? Comparing medical and non-medical transcript is difficult for the employers when the grades are written differently.

Second, the different way in which medical students are assessed during examination makes it slightly difficult for them to get good grades despite them being at the top of their class prior to entering medical school. In clinical examination for example, it is almost impossible to score full marks because physical examination skill and professionalism, for example, are difficult to measure and quantify in a scale. As a result, their CGPA will be lower and their program learning outcomes' attainment (spider web) will appear shrunken. Consequently, they may face problems at getting funding to further their studies and this can affect their university's graduate employability rate.

Finally, the lack of coverage on entrepreneurship learning outcomes in medical curriculum will also contribute to medical graduate's spider web skewing to the centre in that particular domain. The current coverage on entrepreneurship skill in our faculty unfortunately, does not reflect the entrepreneurial skill required in a healthcare organisation in terms of income generation. A review of the course content in this domain is therefore necessary. However, finding the right academics to teach the course can be challenging because no medical academics are trained to teach entrepreneurship skill while the entrepreneurship academics are not familiar with the entrepreneurial aspects of healthcare organisations, possibly due to reasons as argued earlier (21).

RECOMMENDATION FOR SUCCESSFUL IMPLEMENTATION

To conclude this paper, we would like to offer several recommendations which we think could contribute to successful implementation of iCGPA in the medical faculty. First and foremost, there must be a dedicated team of trainers who are willing to steer iCGPA implementation. The team preferably should consist of basic sciences and clinical academics as iCGPA implementation in the basic sciences courses and clinical courses are different. Second, these trainers must properly be trained in iCGPA by MQA accredited trainers, to ensure that the comprehension of the concept of iCGPA of that institution is in line with Ministry of Higher Education's iCGPA requirement. Third, although as absurd as it may sound, we would like to propose to the ministry that the iCGPA domains for the medical faculty should be realigned to the domains of established medical competency framework. If this measure is implemented, it is possible that Malaysian medical graduates will be able to work in other countries globally as they have attained the international, instead of merely the local, competency outcomes. Finally, a formal pilot implementation of iCGPA in the medical faculty is necessary prior to imposing it to all medical faculties in Malaysia as the stakes for the students and medical faculties are high.

ACKNOWLEDGEMENTS

We would like to acknowledge all medical academics in USIM who have given their commitment in trying to implement iCGPA in the faculty.

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