Dropping the non-core subjects from undergraduate final professional examination: How it would impact the results

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ABSTRACT

Introduction: Observing the dearth of distinctions in the two decades of final professional medical examinations (FPE) caused concern. Multiple True False (MTF) tests with penalty scoring pulling down the scores was considered one reason. Another possible reason was having too many subjects covered in the MTF and Best Answer Question (BAQ) papers. This study aimed to explore the impact of dropping the non-core subjects with minimal inputs from MTF and BAQ papers and the students' views in this regard.

Materials and Methods: We examined the students' performance in the core and non-core subjects in MTF and BAQ papers and the impact of dropping the non-core subjects' contribution to the students' scores of the recent four final professional examinations. We also surveyed the opinions of the students, who took the FPE in the year 2000.

Results: The failure rates were significantly higher in non-core than core subjects ($p < 0.001$) except in one MTF paper. The mean scores were significantly lower in non-core than core subjects in all the four FPEs ($p < 0.05$) except in one MTF paper. Dropping the non-core subject items from MTF and BAQ showed an improvement in the scores of MTF, theory total, and most grand totals resulting in two more students reaching distinction status. A mere 3.8% of the students could thoroughly revise the non-core subjects before the FPE. Two-fifth of them believed that non-core subjects had a significant impact on theory performance. Only 31.5% favoured dropping the non-core subjects, and an equal number preferred a status quo, while the rest suggested a reduction in their weightage.

Conclusion: Most of the students considered the non-core subjects important in their career. However, very few of them could revise these subjects for the professional examination. The study demonstrated that dropping the non-core subjects from MTF and BAQ improved the students' final scores and helped more students to attain distinction status.

KEYWORDS:
Medical graduation criteria, Medical subjects tested, Core subjects, Non-core subjects, Distinction in Medicine,

INTRODUCTION

The goal of medical education is to produce capable medical professionals.[1] Students must undergo valid assessments in the final professional examination.[2,3] Such assessments should include evaluation of knowledge, its application, and clinical competence.[4] Our medical faculty at Universiti Malaysia Sarawak conducts a Final Professional Examination (FPE) and a Supplementary Final Professional Examination every year.[5] These examinations determine the medical students' eligibility to graduate, their grades, and their distinction status. The criteria for passing the FPE include 50% scores in each theory total, patient-based clinical, clinical total, and grand total. The faculty's FPE theory papers include MTF (15%), BAQ (15%), and MEQ (20%), besides the clinical components of OSCE, short cases, and a long case. The grand total (GT) comprises theory and clinical in a 50–50 proportion. The subjects included in the FPE theory papers of MTF and BAQ can be categorised as core subjects and non-core subjects. The number of questions of MTF and BAQ of each subject are given in brackets. The core subjects are Medicine (10-11), Surgery (10-8), Obstetrics and Gynaecology (8-8), Paediatrics (8-7), Orthopaedics (4-2), and Psychological Medicine (4-2); and the non-core subjects are Geriatrics (1), Dermatology (1), Anaesthesiology (1-1), Emergency Medicine (1-1), Radiology (1-1), Community Medicine & Public Health (3-2), Family Medicine (3-2), ENT (1-1), Ophthalmology (1-1), Clinical Diagnostic Laboratory (1-1), Forensic Medicine (1), and Ethics (1-2) in both the papers with minimal variations from year to year. All these subjects were taught and examined in the clinical years of year-3, year-4, and year-5, and obtaining reasonable scores in them was required for the eligibility to take the FPE. The candidates become eligible for distinction if they scored 75% of the grand total.

During this study period of four years (2017–2020), only two students out of the 458, who took the FPE, scored 75% marks. Several students, who deserved distinction based on their performance in the blocks and postings examinations during the five-year course, were deprived of it, as they fell short by a few marks. This raised questions about the assessment model followed by the faculty. It was noticed that the MTF with penalty scoring was consistently pulling down the scores in almost all examinations since the inception of the faculty, and the FPEs were no exception. Another likely reason was the overwhelming number of subjects covered in the MTF and

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BAQ papers, which carry 30% out of the 50% theory component. Fifty percent mark in the theory total is one criterion to pass the FPE, also 50% mark in the clinical total. It was considered that dropping the non-core subjects from the FPE's MTF and BAQ papers, while retaining them in the MEQ paper, would make a significant upgrade in the theory total and the final scores of the graduates.

In the instance of havinge more subjects, there was less coverage of topics in the theory papers. An all-inclusive final examination with minimal coverage of many topics within all subjects will not be a reliable and valid assessment.[6] The intention behind covering all the clinical subjects in the FPE was to make the exit examination comprehensive and horizontally integrated. However, including questions from the sub-specialities in negligible numbers would not achieve the desired goal. On the contrary, the need to revise the above-mentioned 18 subjects in a limited period of time overburdened the students. Would it not be better to cover the core subjects more broadly and leave out the non-core subjects already tested in the clinical postings? This study explored the impact of dropping the non-core subjects from the MTF and BAQ papers of the recent four FPEs and the students' views in this regard.

MATERIALS AND METHODS

Settings, Participants, and Sample Size

This cross-sectional study was conducted in the Faculty of Medicine and Health Sciences, Universiti Malaysia, Sarawak. The study consisted of two parts. Part one analysed the results of four FPEs of the years 2017 to 2020. The scores in MTF and BAQ were sorted to evaluate the students' performance in core subjects versus non-core subjects, and how dropping the non-core subjects would affect the theory total (TT) and GT scores. Part two was an online survey of the students, who participated at the FPE in the year 2020. We sought the students' opinions about the subjects covered in the FPE, and how much effort they could put into each subject during revision. Out of the 106 students, 104 participated in the survey with a response rate of 98.1%.

Data Collection Instruments and Data Collection Procedure

The FPEs' official results, question papers, and MTF optical mark reader (OMR) sheets were obtained from the academic office with administrative approval. For sorting the core and non-core item scores of MTF and BAQ tests, each student's OMR sheets of all the four FPEs were used. The faculty practised a penalty scoring system of minus one mark for every incorrect answer in MTF, which was not carried from one question to the next. We developed a questionnaire to assess the students' perceptions and opinions about the core and non-core subjects covered in the FPEs. It consisted of 18 questions about how important they considered each subject while preparing for the FPE. Specifically, 14 questions were about their preparation of six core subjects and eight non-core subjects and two questions on their opinions about how the inclusion of non-core subjects would have affected their final scores. One question was about their views on dropping the non-core subjects from FPE papers.

Data Analysis

Each student's MTF and BAQ scores were divided into those of core subjects and non-core subjects in the four FPEs. Students obtaining scores below 50% were counted as failed. The percentage mean scores with SD in all the categories, as below 50%, 70≤75% and 75% and above, total theory, and the grand total were calculated. Two-proportion z-test was done to determine the statistical difference in the pass and fail in core and non-core subjects. Independent t-test was done to compare the difference in mean scores in all the categories. A *p*-value less than 0.05 was considered statistically significant. The second part of the analysis was on students' views on the subjects covered in the FPE. The data from Microsoft Excel was imported to the IBM SPSS platform.[7] Descriptive analysis was done for the students' subject-wise preparation for FPE. On the Likert scale, '1' represented nil and '4' a thorough preparation. We analysed the subject-wise mean scores for FPE; the composite mean scores were calculated for core and non-core subjects. An independent t-test was done to determine the mean difference in preparation for core and non-core subjects. The students' opinions are presented in a frequency table. The student's opinions on keeping or dropping the non-core subjects in the FPE were analysed manually. We categorised the students' opinions about keeping or dropping the non-core subjects into four: 'no change', 'drop', 'reduce', and 'neutral'. The results are presented in six tables.

RESULTS

Table I demonstrated that the failure rates in MTF and BAQ were remarkably higher in the non-core division than in the core division in all the four FPEs ($p < 0.001$) except in the MTF paper of the year 2019 ($p > 0.05$), which was statistically insignificant.

Table II demonstrated that the MTF mean scores were significantly lower in the non-core division than in the core division in all the four FPEs ($p < 0.05$) except in the year 2019, in which the score was slightly higher in the non-core division, which was not statistically significant ($p > 0.05$). In BAQ, the mean scores were significantly lower in the non-core division than in the core division in all four years, although the difference was not significant in 2018 ($p > 0.05$).

Table III demonstrated that in all the non-core included vs non-core dropped comparisons, NCD mean scores were higher, except in the MTF of 2019, which was not significant. Theory totals and grand totals also showed higher values in the NCD, although not significant except in the TT of 2017. Theory total and grand total showed an improvement in the scoring trend and a decrease in the failure rates on dropping the non-core division. Theory failures decreased by 9, and high scorers increased by 17 in NCD. In GT number of failures decreased by four, and number of distinctions increased by two. One candidate moved from high scorer to distinction in 2018, which explains the drop from 6 to 5 in the GT of 2018.

Table I: Failure rates (percentage) in core and non-core divisions of MTF and BAQ

Year	St. N	MTF		*p*-value	BAQ		*p*-value
		Core Fail %	Non-core Fail %		Core Fail %	Non- core Fail %	
2017	112	66.96	100	$p < 0.001$	27.68	62.5	$p < 0.001$
2018	118	61.02	94.07	$p < 0.001$	0	10.17	$p < 0.001$
2019	122	79.51	68.85	$p > 0.05$	0	24.59	$p < 0.001$
2020	106	83.96	99.06	$p < 0.001$	4.72	26.42	$p < 0.001$

Notes. *p*-value reached from two-proportion z-test; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. St. N = number of students; MTF = multiple true false; BAQ = best answer questions; Core = core division; Non-core = non-core division. Fifty percent was the pass score.

Table II: Mean scores (percentage) in core and non-core divisions of MTF and BAQ

Year	N	MTF		*p*-value	BAQ		*p*-value
		Core Mean (SD)	Non-core Mean (SD)		Core Mean (SD)	Non-core Mean (SD)	
2017	112	46.17(8.6)	29.74(6.8)	$p < 0.001$	55.57(9.6)	42.63(11.3)	$p < 0.001$
2018	118	48.39(8.0)	39.05(6.8)	$p < 0.001$	63.49 (9.5)	61.08 (12.7)	$p > 0.05$
2019	122	44.36(7.1)	45.14(7.6)	$p > 0.05$	73.00 (8.5)	56.79 (13.0)	$p < 0.001$
2020	106	45.96(8.9)	31.79(7.7)	$p < 0.001$	60.58(8.0)	57.84 (11.8)	$p < 0.05$

Notes. p-value reached from independent t-test; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
N = number of students; MTF = multiple true false; BAQ = best answer questions; SD = standard deviation.

Table III: The impact of dropping the non-core subjects in the four FPEs: mean scores, failures, and high scorers

Year (N)	MTF	BAQ	TT				GT			
			NCI vs. NCD				NCI vs. NCD			
	NCI vs. NCD	NCI vs. NCD	Mean	<50	70-75	≥75	Mean	<50	70-75	≥75
2017 (112)	41.79 - 46.17***	52.46 - 55.57**	55.1 – 57.31*	19 – 12	2 - 6	0 - 0	56.90 – 58.00	9 – 6	1 - 4	0 - 0
2018 (118)	45.79 - 48.39**	62.81 - 63.49	58.56 - 59.55*	8 – 6	4 - 7	0 - 2	59.18 – 59.67	2 – 2	6 - 5	0 - 1
2019 (122)	44.7 - 44.36	68.46 - 73.00***	60.84 – 62.1	0 – 0	8 - 9	0 - 4	60.64 – 61.27	0 – 0	6 - 8	0 - 1
2020 (122)	42.28 - 45.96**	59.87 – 60.58	57.67 – 5 8.99	5 – 5	4 - 6	0 - 1	59.05 – 59.71	4 – 3	4 - 7	2 - 2

Notes. *p*-value reached from independent t-test; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. N = student numbers; MTF = multiple true false; BAQ = best answer questions; TT = theory total; GT = grand total; NCI = non-core included (as it is currently practised); NCD = non-core dropped (as explored in this study).

Table IV: Students' subject-wise preparation for the examination of 2020

	Subjects	Mean	SD	Mean(SD)
Core subjects	Surgery	3.24	0.63	3.06(0.49)
	Obstetrics and Gynaecology	3.19	0.62	
	Paediatrics	3.21	0.57	
	Internal Medicine	3.17	0.58	
	Orthopaedics	2.87	0.70	
	Psychological Medicine	2.69	0.70	
Non-core subjects	Emergency Medicine	2.94	0.80	2.34(0.65)
	Radiology	2.50	0.82	
	Family Medicine	2.39	0.82	
	CMPH	2.29	0.80	
	ENT	2.22	0.72	
	Ophthalmology	2.14	0.76	
	CDL	2.12	0.82	
	Anaesthesiology	2.11	0.87	

Table V: Students' opinions about the inclusion of non-core subjects in the final professional examinations

Opinions	N	%
About time spent on non-core subjects		
I did a thorough revision of all of them	4	3.8
I did revise some of them partly	75	72.1
I had no time to look them up	22	21.2
Not bothered much	3	2.9
About the perceived impact of non-core subjects on theory performance		
Little impact	8	7.7
Some impact	36	34.6
Significant impact	46	44.2
Substantial impact	14	13.5
To keep or drop non-core subjects		
Keep them as usual	42	40.4
Drop them from FPE	41	39.4
Reduce them	15	14.4
Neutral	6	5.8

The students, who favoured keeping the non-core subjects in FPE, wrote:

"….. For me, non-core subjects should not be removed as some of the diseases listed on the non-core subjects are common, and students should a least have some knowledge of the disease".

"…….I think a non-core subject should still be included as it is also a part of medical 'things' even though only a small part of it but still important".

"…….I do not agree if non-core subjects are removed from FPE as those subjects are also important in medicine, but the questions must be more focused on common cases".

"…..I do not think it should be removed. We were not prepared because we did not know what to expect from the questions since we were too focused on the core subjects. Maybe the important topics from the non-core can be highlighted for us to focus more on that. I think the coverage for the core subjects is fair enough, which is even more than the non-core subjects".

The students, who were in favour of dropping the non-core subjects, wrote:

"…….Non-core subjects can just be omitted since the marks weightage is also little. Students will have more time to revise thoroughly on the core subjects".

"……..Just remove them. Why bother testing on those when core subjects are much more important clinically".

"…….I think core subjects are important in theory examination. Non-core subjects already covered during the end of posting examination should be good enough".

The students, who gave mixed opinions on non-core subjects, wrote:

"……It is better to include non-core subjects as well, as it is what commonly seen in our community. Personally, I am afraid that I might miss a patient's particular condition; for example, in ENT posting, the patient presented with epistaxis, NPC must come first in my mind".

"…….It is essential to include non-core subjects. We need that knowledge when we start working later on. Of course, core subjects are the highlight, but non-core subjects should not be forgotten".

"…….The non-core subject should not be removed, but questions can be asked to correlate with the core subjects. For example, thyroid eye disease or diabetic retinopathy in ophthalmology (related to an endocrine problem in medicine), nasal polyp in ENT (related to bronchial asthma in medicine), food poisoning in the public health aspect, etc. rather than having those unrelated things like researches in public health".

DISCUSSION

Directly pertaining to our study findings

At the outset, we must admit that this study stands alone with no other studies of its kind to compare with. Our attempts to gather information regarding the subject coverage in FPE of other universities also did not bear fruit. However, we could reach important conclusions from the data of our faculty's four FPE results. Our study focused on the students' performance in the core and non-core divisions of theory assessments in four recent FPEs and explored the impact of dropping the non-core division from MTF and BAQ on the failure rates (<50% scores), theory total, and grand total scores. In all the MTF data, penalty scoring was used, as in the official results. The apparent reason for the significant differences between NCI and NCD scores was the students' better performance in the core subjects. The results showed significantly higher failure rates and significantly lower mean scores in the non-core division compared to the core division in MTF and BAQ tests of the four examinations with one insignificant exception in the MTF of 2019 (Tables I and II). It was also illustrated that in all the NCI-NCD comparisons, NCD mean scores were higher except in the MTF of 2019 (Table III). The absence of a statistically significant increase in the theory totals, except in 2017, and grand totals could be explained as the total contribution of MTF and BAQ were only 30%. The theory total includes MEQ with 20% and the grand total includes clinical components of 50%. An increase in the number of students scoring 75% or above in the GT (distinction) with NCD was seen in 2018 and 2019, while the theory total improved in 2018, 2019, and 2020. Improvement in scores and decrease in failure rates were seen in all the years with NCD (Table III). These findings support our conclusion that dropping the non-core subjects from MTF and BAQ in the FPE would improve the overall student performance and help more students to attain deserving higher scores and distinction status in the FPEs.

Students' preparation for the final professional examination of 2020, and their views

Table IV illustrated the subject-wise preparation for the FPEs on a Likert scale. Among core subjects, the highest score was for Surgery (Mean = 3.24, SD = 0.63) followed by Obstetrics and Gynaecology (Mean = 3.19, SD = 0.62), and the lowest score was for Psychological Medicine (Mean = 2.69, SD = 0.70). In contrast, in non-core subjects, the highest score was for Emergency Medicine (Mean = 2.94, SD = 0.82) followed by Radiology (Mean = 2.50, SD = 0.82), and the lowest for Anaesthesiology (Mean = 2.11, SD = 0.87). The difference between the overall mean scores of core subjects (Mean = 3.06, SD = 0.49) and non-core subjects (Mean = 2.34, SD = 0.65) was statistically significant ($p < 0.001$) indicating that the students devoted more time and attached more importance to the core subjects. Students devoted more time to revising core subjects than non-core subjects, as they might have correctly estimated the latter's lower impact on the final scores. Although they could not find enough time to revise them sufficiently, they did not underestimate the importance of non-core subjects in their career. Their freely expressed opinions supported these findings. Most of the students favoured dropping the non-core subjects altogether or reducing their content in the FPE (Table V).

Why this issue regarding student preparedness for FPE deserves attention

The intention of including all important subjects in the FPE for making it a comprehensive assessment was understandable. However, how it affected students' preparations and performance in the FPE appeared to be overlooked. The current trend is towards relying more on continuous assessment than a single all-inclusive final examination.[6,8] It is worth noting that our medical faculty has a well-structured continuous assessment throughout the course. We suggest modifying the FPE by dropping the non-core subjects and replacing them with more questions from the core subjects in MTF and BAQ papers would be beneficial. This change would enable students to focus more and revise the core subjects better helping them to secure higher scores. It would also improve the reliability and validity of these tests as broader coverage of the core subjects will be possible.[9,10] Our results showed that such an amendment in the FPE would reward the deserving candidates with distinctions, too. Officially dropping the non-core subjects from MTF and BAQ does not mean that these subjects would not be tested at all in the FPE. The MEQ papers include parts of non-core subjects, while many MTF and BAQ items also would contain parts of non-core subjects in line with the faculty's philosophy of vertical and horizontal integration in the curriculum.

LIMITATIONS OF THE STUDY

This was a novel single-institution study with no possible comparisons to be made as there were no similar studies having been published prior to this study. Our attempts to gather more information about the practices in other medical schools were not successful enough to be presented here. Nor could we find publications dealing with the issue of the number of subjects covered in the final medical degree professional examinations.

CONCLUSION

This study establishes that including the non-core subjects in the final professional theory examination overburdens the students, impedes adequate revision of the subjects, and lowers their scores in the final professional examination. Most students consider the knowledge of non-core subjects equally important as that of the core subjects for their future career as doctors. However, more students favour dropping the non-core subjects altogether or reducing their weight in the MTF and BAQ papers. Our study concludes that dropping the non-core subjects and augmenting the coverage of core subjects in the final professional examination's MTF and BAQ papers would help to improve the students' preparations and their theory total and grand total scores, and moreover would help the deserving students to graduate with distinction.

ETHICAL APPROVAL

The Institutional Review Board approved this study (Ref # FME/21/72 Dated: 26 April 2021). We obtained informed consent, maintained data confidentiality and anonymity of the survey participants.

CONFLICT OF INTEREST

All authors have declared no competing interests.

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