

Students' Self-reported Confidence Level Post Completion of General Surgery and General Medicine Module: Preliminary Study in UiTM

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ABSTRACT

Objectives: There is a lack of information about the self-confidence levels of third-year dental students in the General Medicine and General Surgery (GMGS) module. Hence, this study aimed to measure the self-assessed confidence of third-year dental students in the GMGS course.

Methodology: Cross-sectional study conducted in Faculty of Dentistry, UiTM. The calculated sample size was 46 and convenient sampling was used. 74 Students were recruited at the beginning of Year Four to participate in this study. A questionnaire consisting of 26 items was adopted, modified, and distributed through the Google Forms platform. The questionnaire had three parts: demographic characteristics, clinical skills, and cognitive skills. Data from respondents were tabulated in Excel and analysed using SPSS (Version 30) with descriptive statistics and item correlation.

Results: Response rate was 79.7%. Responses were provided by 59 students (15 male and 44 female, 25.42% and 74.58%, respectively). The mean score was slightly higher in male compared to female (92.67% vs. 89.16%). However, the independent t-test showed no significant difference between male and female ($p > 0.05$). The results showed that students' confidence in their clinical skills mostly ranged from "average" to "good," with four components showing a low percentage of "very poor" responses. Meanwhile, the cognitive skills of students showed better results, with higher responses in each component, more "very good" responses, and no "very poor" responses.

Conclusions: The students' "Poor" level of confidence in their clinical skills (ECG set up, ECG interpretation, Intravenous catheterization and venipuncture performance) might be to their recent transition from

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preclinical to clinical years. Therefore, further research is required to link students' clinical skill performance results to their confidence responses. Furthermore, this preliminary study resulted in a new questionnaire tool, which can be implemented nationally and internationally for comparing students' responses.

1. INTRODUCTION

Self-confidence is the belief in oneself that one can complete activities accurately or effectively on one's own without help (Almohefer et al., 2025). Dental students' confidence should be increased as they advance through their studies (Elmanaseer et al., 2023).

Self-assessment is described as a process in which learner initially identify the relevant performance criteria, then actively seek feedback, engage in self-reflection, and progressively adjust their judgments. The process is repetitive, as this continuous adjustment can influence how individuals redefine or refine their performance criteria, requiring the steps to be repeated continuously (Yan & Brown, 2017). Self-assessment has been described as learners being able to evaluate their own work according to set standards or criteria (Burrows, 2018). Self-assessment is an important lifelong introspective skill that dental practitioners are trained to have and utilise continually throughout their professional career (Colthart et al., 2008). The personal capability as a clinician to be able to identify their own knowledge gaps and clinical skills is an important skill developed during undergraduate and postgraduate training (Epstein, 2007; Eva & Regehr, 2005). Therefore, dental curriculum must include an education element of self-assessment throughout clinical practice to lead students to develop by reflection and keeping clinical record. A study done by (Burrows, 2018) which discussed the benefits and pitfalls of self-assessment in undergraduate dental education and concluded that teachers and students should receive training to develop skills in its use. Ability to compose, execute, implement and self-evaluate their own learning is an essential element of adult learner (Mott & Lohr, 2014). According to Knowles' theory of andragogy advocates six core principles in adult learning that account for learner's: (a) need to know, (b) self-concept (self-directed), (c) prior experience, (d) readiness to learn, (e) orientation to learn (problem based) and (f) motivation to learn (internal) (Malcolm S. Knowles et al., 2014). Dental education incorporates these adult learner attributes into the curriculum design (Cate, 2016).

Globally, dental practitioners are required to keep themselves updated. There have been many wide ranges of continuing education opportunities that cater to the diverse needs of dental professionals, including hands-on workshops, online courses, conferences, seminars, as well as mentorship and peer review activities (Barnes et al., 2012; Cvijic et al., 2025). Malaysian Dental Council requires dental practitioners to undergo continuous professional development through conferences, seminars, workshops, discussions groups, publications and other exercises. The ability to determine learning needs to develop knowledge and clinical skills is important to decide the suitable Continuous professional development event for dental practitioner professional career development. In dentistry, the dental regulatory body in each country sets accreditation standards (learning outcomes) for dental training to ensure a newly qualified dental graduate is capable of providing high-quality dental care to patients (Rajan et al., 2020).

University Teknologi MARA (UiTM) dental undergraduate program was established in 2006, and over decade dental postgraduate programs (research and clinical training) were established. In the third year of undergraduate training, dental students are exposed to general surgery and general medicine (GMGS) subject in which they learn theoretical and clinical skills. The clinical skills comprised of patient clerking and performing basic clinical skills (i.e: intramuscular injections, intravenous catheterization). UiTM used student outcome-based Education (OBE) principles, national higher education frameworks, and contemporary learning theories. While UiTM does not rely on a single specific theory, its curriculum design is guided by the following major foundations: outcome-based education (OBE), constructivist learning theory, integrated & competency-based approach and experiential and work-based learning which are

structured according to the Malaysian Qualifications Agency standards under the Malaysian Qualifications Framework. Currently, most of the curricula of dental faculties follow competency-based structure in which the numbers of requirements may not be the most important factor in evaluation of students' performance (Gaballah et al., 2023). However, the minimal requirements are still followed generally in dental undergraduate syllabus.

The success of clinical procedure shapes the perception of students which is widely dependent on student confidence. Lack of student confidence may affect their interaction with the patients which in turn impact students' efficacy and hence students' self-esteem (Dolly et al., 2005). There are multiple factors that affect the clinical skills of the students depending on the type of procedure they perform which are patient's related, students practice (F.D. Hicks et al., 2009), and critical thinking (Larew et al., 2006). The dental graduates are expected to be competent in providing quality holistic patient care and should also be prepared to adapt to the needs of society and be competent in the practice management (Manakil & George, 2013).

GMGS course is the first course in dentistry that exposed dental students to patient clerking, diagnosis and treatment planning which enforce students' confidence and shaped their capability to do self-assessment during their transition from pre-clinical to clinical subjects. Thus, it is essential to comprehend student's capabilities and self-confidence in GMGS course. However, there is a lack of information about dental student self-confidence level assessment in GMGS. Therefore, this study measures self-assessed confidence of the third-year dental students in the GMGS course.

2. METHODS

2.1. Research Ethics

Ethical Approval was obtained from UiTM Research Ethics Committee, Malaysia [REC/10/2024 (ST/MR/226)]. Each participant had the right to withdraw from the study at any given time. Any information collected from the participants was kept confidential and secure.

2.2. Study design & Sample size

It is a cross-sectional study that involves distributing questionnaire to fourth year students. Sample Size calculated as 46 by using G*Power software (Version 3.1.9.7), setting alpha to 0.05, power statistical level to 0.95 and effect size to 0.5 Table (1). Convenience sampling was used involving fourth-year dental students who just completed their GMGS in their third year. The inclusion criteria comprised year 4 students who had passed the GMGS professional examination and were willing to participate in the study. The exclusion criteria included students who did not pass the GMGS professional examination or were unwilling to participate in the study.

Table 1.

Exact - Correlation: Bivariate normal model		
Options:		Exact distribution
Analysis:		A priori: Compute required sample size
Tail(s)		Two
Input	Correlation ρ H1	0.5
	α err prob	0.05
	Power ($1-\beta$ err prob)	0.95
	Correlation ρ H0	0
Output	Lower Critical r	-0.2907065
	Upper Critical r	0.2907065
	Total Sample Size	46
	Actual Power	0.9535111

2.3. Questionnaire Development

The questionnaire development was conceptually based by Dental Undergraduates Preparedness Assessment Scale DU-PAS (Ali, Slade, Kay, Zahra, Chatterjee, et al., 2017). DU-PAS tool assesses final year students' self-reported preparedness in clinical dentistry. DU-PAS consist of Part A and Part B. Part A contains 24 items which measure clinical skills and has three-point scale ranging from (0) to (2). Part B contains 26 items which measure cognitive and behavioural attributes and three-point scale ranging from (0) to (2). DU-PAS has a total score may range from 0-100.

In this study, the questionnaire assesses students' self-reported confidence in the GMGS skills. The questionnaire consists of three parts; demographic of the participants, part A consists of 16 items focusing on clinical skills and part B consists of 10 items focusing on cognitive and behavioural attributes. It used Likert scale ranging from very poor (1), poor (2), average (3), good (4), and very good (5), and total score of 130 points.

The questionnaire was developed by both authors, one of whom is coordinator of the GMGS course for more than 10 years and teaching GMGS for more than 15 years. Content validity was evaluated by ten experts who rated each item for. Pilot study involving 10 participants to perform Face Validation. The participants rated the items for clarity and comprehension. Reliability Testing using Cronbach's alpha was done.

2.4. Data Collection

The participants were recruited from year 4 students who just completed year 3 as students had their GMGS exam at the end of year 3. The questionnaires were distributed online using Googleform to 74 students. The data collection was done in January 2025. Demographic data related to age and gender were obtained. The participants responses were recorded anonymously.

2.5. Data Analysis

Data were created using Microsoft Excel. The data were analyzed using SPSS 26. Content validation was done for item relevance and Face validation was done for items clarity and comprehension. Descriptive statistics,

T-Test between genders were done. Reliability statistics were done using Cronbach's Alpha and Inter-Item Correlation Matrix.

3. RESULT

There were 59 participants who joined the study and responded to the online survey. All the participants completed their responses (100%). There were 25.4% male and 74.6% female participants.

3.1. Content and Clarity and Comprehension Validation

The Item-level content validation ranged from 0.8 to 1.0, and scale-level face validity index based on the universal agreement method (S-CVI/UA) was 0.884.

The Item-level face validity index ranged from 0.8 to 1.0, and scale-level face validity index based on the universal agreement method (S-FVI/UA) was 0.807. It can be concluded that I-FVI, S-FVI/Ave, and S-FVI/UA meet satisfactory level, and thus the scale of questionnaire has achieved satisfactory level of response process validity of content and clarity and comprehension. (Table 2 and Table 3).

Table 2. Content Item Validation.

Item	Rater 1 AZK	Rater 2 MAZ	Rater 3 ABH	Rater 4 Anna	Rater 5 ASM	Rater 6 MZM	Rater 7 MAF	Rater 8 RNA	Rater 9 WHA	Rater 10 AAJ	Rater in Agreement	I-CVI	UA
Clinical Skills													
Q1	1	1	1	1	1	1	1	1	1	1	10	1	1
Q2	0	0	1	1	1	1	1	1	1	1	8	0.8	0
Q3	1	1	1	1	1	1	1	1	1	1	10	1	1
Q4	1	1	1	1	1	1	1	1	1	1	10	1	1
Q5	1	1	1	1	1	1	1	1	1	1	10	1	1
Q6	1	1	1	1	1	1	1	1	1	1	10	1	1
Q7	1	1	1	1	1	1	1	1	1	1	10	1	1
Q8	1	1	1	1	1	1	1	1	1	1	10	1	1
Q9	1	1	1	1	1	1	1	1	1	1	10	1	1
Q10	1	1	1	1	1	1	1	1	1	1	10	1	1
Q11	1	1	1	1	0	1	1	1	0	1	8	0.8	0
Q12	1	1	1	1	1	1	1	1	1	1	10	1	1
Q13	1	1	1	1	1	1	1	1	1	1	10	1	1
Q14	1	1	1	1	1	1	1	1	1	1	10	1	1
Q15	1	1	1	0	1	1	1	1	1	1	9	0.9	0
Q16	1	1	1	1	1	1	1	1	1	1	10	1	1
Cognitive and Behavioural attributes													
Q17	1	1	1	1	1	1	1	1	1	1	10	1	1
Q18	1	1	1	1	1	1	1	1	1	1	10	1	1
Q19	1	1	1	1	1	1	1	1	1	1	10	1	1
Q20	1	1	1	1	1	1	1	1	1	1	10	1	1
Q21	1	1	1	1	1	1	1	1	1	1	10	1	1
Q22	1	1	1	1	1	1	1	1	1	1	10	1	1
Q23	1	1	1	1	1	1	1	1	1	1	10	1	1
Q24	1	1	1	1	1	1	1	1	1	1	10	1	1
Q25	1	1	1	1	1	1	1	1	1	1	10	1	1
Q26	1	1	1	1	1	1	1	1	1	1	10	1	1
											S-CVIAve	0.980769	
Proportion Content Validity	0.961538	0.961538	1	0.961538	0.961538	1	1	1	0.961538	1	S-CVUIA		0.884615
Average proportion of Item judged content validation across 10 rater											0.980769		

Table 3. Content Clarity and comprehension Validation.

Item	Rater 1 AZK	Rater 2 MAZ	Rater 3 ABH	Rater 4 Anna	Rater 5 ASM	Rater 6 MZM	Rater 7 MAF	Rater 8 RNA	Rater 9 WHA	Rater 10 AAJ	Rater in Agreement	I-FVI	UA
Clinical Skills													
Q1	1	1	1	1	1	1	1	1	1	1	10	1	1
Q2	0	1	1	0	1	1	1	1	1	1	8	0.8	0
Q3	1	1	1	1	1	1	1	1	1	1	10	1	1
Q4	1	1	1	1	1	1	1	1	1	1	10	1	1
Q5	1	1	1	1	1	1	1	1	1	1	10	1	1
Q6	1	1	1	1	1	1	1	1	1	1	10	1	1
Q7	1	1	1	1	1	1	1	1	1	1	10	1	1
Q8	1	1	1	1	1	1	1	1	1	1	10	1	1
Q9	1	1	1	1	1	1	1	1	1	1	10	1	1
Q10	1	1	1	1	1	1	1	1	1	1	10	1	1
Q11	1	0	1	1	1	1	1	1	1	1	9	0.9	0
Q12	1	1	1	1	1	1	1	1	1	1	10	1	1
Q13	1	1	1	1	1	1	1	1	1	1	10	1	1
Q14	1	0	1	1	1	1	1	1	1	1	9	0.9	0
Q15	0	1	1	1	0	1	1	1	1	1	8	0.8	0
Q16	1	1	1	0	1	1	1	1	1	1	9	0.9	0
Cognitive and Behavioural attributes													
Q17	1	1	1	1	1	1	1	1	1	1	10	1	1
Q18	1	1	1	1	1	1	1	1	1	1	10	1	1
Q19	1	1	1	1	1	1	1	1	1	1	10	1	1
Q20	1	1	1	1	1	1	1	1	1	1	10	1	1
Q21	1	1	1	1	1	1	1	1	1	1	10	1	1
Q22	1	1	1	1	1	1	1	1	1	1	10	1	1
Q23	1	1	1	1	1	1	1	1	1	1	10	1	1
Q24	1	1	1	1	1	1	1	1	1	1	10	1	1
Q25	1	1	1	1	1	1	1	1	1	1	10	1	1
Q26	1	1	1	1	1	1	1	1	1	1	10	1	1
											S-FVIAve	0.973077	
Proportion Clarity & Comprehension	0.923077	0.923077	1	0.923077	0.961538	1	1	1	1	1	S-FVUIA		0.807692
Average proportion of Item judged clarity and comprehension across 10 rater											0.973077		

3.2. Mean Scores by item

Each item descriptive statistics (mean score, standard deviation, and lowest and highest answer) was analysed. The items divided in Part A (Clinical Skills) and Part B (Cognitive) as shown in Table 4 and Table 5.

These were calculated by converting the categorical responses to numerical values (1: Very Poor, 2: Poor, 3: Average, 4: Good, 5: Very Good)

The distribution of scores of Part A is shown in Figure 1 and Part B is shown in Figure 2.

Table 4. Mean scores of each Item for Part A.

	N	Mean	Std Dev.	Minimum	Maximum
I am able to obtain a complete medical history from my patients	59	3.64	0.609	3	5
I am able to understand how the patient's medical history reflects on their general condition	59	3.53	0.626	3	5
I am able to obtain a valid consent from my patients prior to undertaking any treatment	59	3.98	0.682	2	5
I am able to conduct physical examination on patients (Inspection, palpation, percussion, auscultation)	59	3.41	0.591	2	5
I am able to interpret common findings of physical examination (Inspection, palpation, percussion, auscultation)	59	3.25	0.512	2	4
I am able to conduct a comprehensive, clinical oral examination	59	3.64	0.637	3	5
I am able to accurately measure vital signs (Temp, Blood Pressure, Pulse, Respiratory rate)	59	3.69	0.650	2	5
I am able to interpret common vital sign findings (Temperature, Blood Pressure, Pulse, Respiratory rate)	59	2.78	0.744	1	5
I am able to perform intravenous catheterization and venipuncture (blood sampling)	59	3.03	0.694	1	4
I am able to interpret blood investigation results.	59	3.08	0.566	2	4
I am able to set up an electrogram (ECG) for a patient	59	2.46	0.795	1	4
I am able to interpret patient's electrocardiogram results	59	2.53	0.796	1	4
I am able to understand and perform basic suturing and knot tying	59	3.19	0.754	2	5

I am able to understand and perform scrubbing and gowning for surgery	59	3.56	0.623	2	5
I am able to interpret radiographs	59	3.69	0.676	2	5
I am able to understand the significance of medical conditions in relation to the dental field	59	3.69	0.676	3	5

Table 5. Mean scores of each Item for Part B.

	N	Mean	Std Dev.	Minimum	Maximum
I feel confident in motivating my patients to practice self-care	59	3.59	0.591	2	5
I feel comfortable seeking help from a supervisor or colleague when needed	59	3.78	0.767	2	5
I have sufficient knowledge of scientific principles that support my GMGS clinical practice	59	3.36	0.637	2	5
I use an evidence-based approach in my clinical practice.	59	3.61	0.670	3	5
I can communicate effectively with my patients	59	3.85	0.665	3	5
I feel confident addressing communication barriers with patients appropriately	59	3.76	0.625	3	5
I feel confident communicating potential treatment risks to patients	59	3.59	0.646	2	5
I feel confident communicating effectively with my colleagues	59	3.75	0.756	2	5
I restrict my relations with my patients to a professional level	59	3.69	0.701	2	5
I take appropriate measures to protect patient confidentiality	59	4.00	0.743	3	5

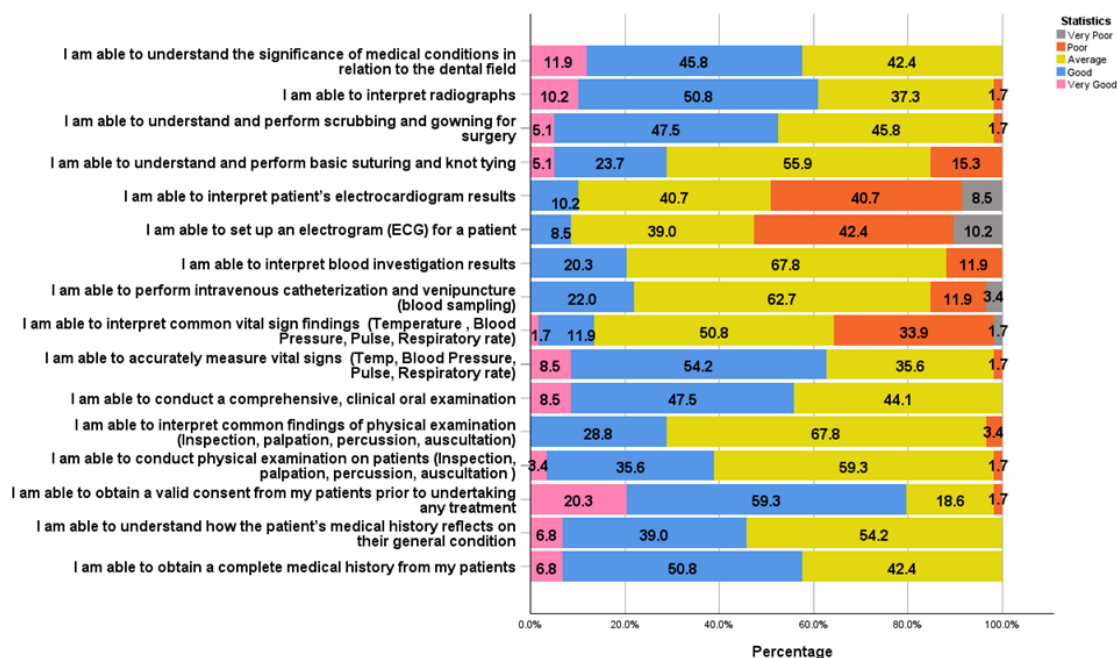


Fig. 1. Score distribution of Part A Items.

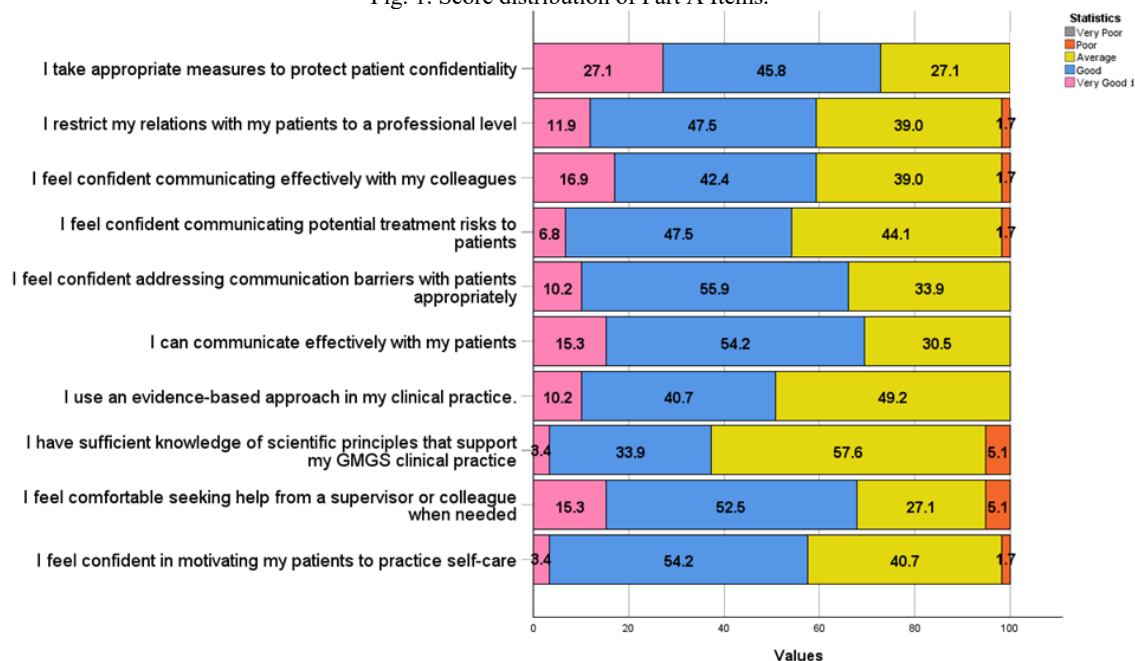


Fig. 2. Score distribution of Part B Items.

3.3. Overall Scores

The overall score of Part A, Part B and total score of both parts combined are shown in Table 6. The assumption of homogeneity of variances was violated for Part A for males and females, as assessed by Levene's test for equality of variances ($p = 0.005$). There was no statistical significance difference in mean of Part A score between males and females, with males (55.07) scoring higher than females (52.52), 2.54 ($p > 0.05$, $t(18.3) = 1.013$, $p = 0.162$) with mean difference of 2.5. (Table 7).

There was homogeneity of variances for Part B for males and females, as assessed by Levene's test for equality of variances ($p = 0.122$). There was no statistical significance difference in mean of Part B score between males and females, with males (38) scoring higher than females (36.6), 1.36 ($p > 0.05$, $t(57) = 0.887$, $p = 0.189$) with mean difference of 1.3. (Table 7)

The assumption of homogeneity of variances was violated for Total score combination of both parts for males and females, as assessed by Levene's test for equality of variances ($p = 0.003$). There was no statistical significance difference in mean of total score between males and females, with males (92.67) scoring higher than females (89.16), 3.5 ($p > 0.05$, $t(18.375) = 0.835$, $p = 0.207$) with mean difference of 3.5. (Table 7)

Table 6. Overall score of Part A, Part B and total score of both.

Gender		Score Part A	Score Part B	Total Score
Male	N	15	15	15
	Mean	55.07	38.0000	92.67
	Std. Deviation	9.075	6.27922	15.164
	Minimum	44	30.00	72
	Maximum	69	49.00	116
Female	N	44	44	44
	Mean	52.52	36.6364	89.16
	Std. Deviation	5.990	4.71559	10.053
	Minimum	41	27.00	68
	Maximum	66	47.00	111
Combined	N	59	59	59
	Mean	53.17	36.9831	90.05
	Std. Deviation	6.909	5.13437	11.524
	Minimum	41	27.00	68
	Maximum	69	49.00	116

Table 7. Independent Samples Test.

		<i>Levene's Test for Equality of Variances</i>				<i>t-test for Equality of Means</i>					
		F	Sig.	t	df	Significance		Mean Differen ce	Std. Error Differen ce	95% Confidence Interval of the Difference	
						One- Sided p	Two- Sided p			Lower	Upper
Score Part A	Equal variances assumed	8.497	.005	1.237	57	0.111	0.221	2.544	2.056	-1.574	6.661
	Equal variances not assumed			1.013	18.336	0.162	0.324	2.544	2.511	-2.725	7.813
Score Part B	Equal variances assumed	2.462	0.122	0.887	57	0.189	0.379	1.36364	1.53795	-1.71606	4.44334
	Equal variances not assumed			0.770	19.664	0.225	0.450	1.36364	1.77030	-2.33319	5.06046
Total Score	Equal variances assumed	9.624	0.003	1.018	57	0.156	0.313	3.508	3.445	-3.390	10.405
	Equal variances not assumed			0.835	18.375	0.207	0.414	3.508	4.198	-5.300	12.315

3.4. Correlations between items

A questionnaire was employed to measure different, underlying parts. Part A showed a high level of internal consistency, as determined by a Cronbach's alpha of 0.907, while Part B showed high level of internal consistency as well, as determined by a Cronbach's alpha of 0.915

Figures 3 and 4 present the correlations between item ratings in Parts A and B. Only statistically significant correlations ($p < 0.05$) are displayed, with stronger positive correlations highlighted in lighter shades. The results indicate that most items in Part A and all items in Part B showed significant positive correlations.

Inter-Item Correlation Matrix

	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	A13	A14	A15	A16
A01		0.635	0.483	0.457	0.406	0.512	0.287	0.28	0.192	0.289	0.057	0.179	0.41	0.261	0.402	0.36
A02	0.635		0.506	0.578	0.437	0.477	0.401	0.216	0.355	0.456	0.271	0.336	0.447	0.383	0.304	0.508
A03	0.483	0.506		0.445	0.408	0.502	0.571	0.23	0.256	0.272	0.015	0.017	0.409	0.509	0.437	0.512
A04	0.457	0.578	0.445		0.679	0.483	0.374	0.325	0.386	0.462	0.331	0.344	0.369	0.448	0.402	0.402
A05	0.406	0.437	0.408	0.679		0.494	0.341	0.331	0.461	0.52	0.472	0.301	0.367	0.357	0.427	0.378
A06	0.512	0.477	0.502	0.483	0.494		0.441	0.123	0.379	0.42	0.191	0.375	0.464	0.467	0.624	0.664
A07	0.287	0.401	0.571	0.374	0.341	0.441		0.179	0.406	0.259	0.008	0.015	0.435	0.471	0.373	0.608
A08	0.28	0.216	0.23	0.325	0.331	0.123	0.179		0.482	0.413	0.494	0.344	0.351	0.233	0.275	0.241
A09	0.192	0.355	0.256	0.386	0.461	0.379	0.406	0.482		0.827	0.378	0.436	0.548	0.394	0.353	0.427
A10	0.289	0.456	0.272	0.462	0.52	0.42	0.259	0.413	0.827		0.372	0.474	0.407	0.401	0.294	0.429
A11	0.057	0.271	0.015	0.331	0.472	0.191	0.008	0.494	0.378	0.372		0.731	0.431	0.066	0.2	0.072
A12	0.179	0.336	0.017	0.344	0.301	0.375	0.015	0.344	0.436	0.474	0.731		0.581	0.197	0.271	0.303
A13	0.41	0.447	0.409	0.369	0.367	0.464	0.435	0.351	0.548	0.407	0.431	0.581		0.581	0.553	0.587
A14	0.261	0.383	0.509	0.448	0.357	0.467	0.471	0.233	0.394	0.401	0.066	0.197	0.581		0.494	0.616
A15	0.402	0.304	0.437	0.402	0.427	0.624	0.373	0.275	0.353	0.294	0.2	0.271	0.553	0.494		0.623
A16	0.36	0.508	0.512	0.402	0.378	0.664	0.608	0.241	0.427	0.429	0.072	0.303	0.587	0.616	0.623	

Fig. 3. Inter-Item correlations of student scores for Part A items. Correlation's coefficients are shown for those that are statistically significant at $p < 0.05$.

Inter-Item Correlation Matrix

	B01	B02	B03	B04	B05	B06	B07	B08	B09	B10
B01		0.522	0.437	0.377	0.542	0.528	0.462	0.459	0.486	0.472
B02	0.522		0.516	0.534	0.575	0.464	0.581	0.645	0.258	0.303
B03	0.437	0.516		0.694	0.538	0.476	0.358	0.442	0.325	0.328
B04	0.377	0.534	0.694		0.522	0.557	0.543	0.55	0.366	0.416
B05	0.542	0.575	0.538	0.522		0.783	0.575	0.642	0.527	0.594
B06	0.528	0.464	0.476	0.557	0.783		0.653	0.636	0.54	0.705
B07	0.462	0.581	0.358	0.543	0.575	0.653		0.772	0.368	0.503
B08	0.459	0.645	0.442	0.55	0.642	0.636	0.772		0.566	0.644
B09	0.486	0.258	0.325	0.366	0.527	0.54	0.368	0.566		0.662
B10	0.472	0.303	0.328	0.416	0.594	0.705	0.503	0.644	0.662	

Fig. 4. Inter-Item correlations of student scores for Part B items. Correlation's coefficients are shown for those that are statistically significant at $p < 0.05$.

4. DISCUSSION

The developed questionnaire is a comprehensive novel tool that is used to evaluate students' self-confidence and preparedness in GMGS course. It includes core clinical examinations, scientific knowledge and the cognitive and behavioural abilities of the students. Previously, there were multiple tools that were developed to assess Dental students as whole or clinical subjects in dentistry (Altan et al., 2024; Elmanaseer et al., 2023; Mat Yudin et al., 2020).

The Bachelor of Dental Surgery in UiTM is a professional undergraduate course of 5 years duration. The basic medical sciences and oral sciences are taught in the first and second years, dental simulation is taught in the second year, GMGS course is taught in the third year, and dental clinical courses are taught from the third year to the fifth year using evidence-based approach learning. The teaching in the dental faculty is student focused learning, and it is based on specific learning outcomes for each topic, course learning outcomes and program learning outcomes.

The questionnaire used in this study utilizes Likert scale (Likert, 1932) which has a prolonged history of use in kinesiology research (Utter et al., 2004). The study is a psychosocial type of research that lies in the inherently subjective nature of the assessment (Hasson & Arnetz, 2005). The fourth-year students were chosen for the study as they just completed their final exams for the GMGS course at the end of their third year, and they completed their exams, which include written exams and objective structure clinical examination (OSCE). They had fresh information, and there was no issue with information retention, as information retention degrades over time (Varga & Bauer, 2017). The questionnaire was developed based on the handbook of the GMGS course which complies with Malaysian Qualification Agency (MQA) requirements, and the BDS in UiTM was assessed and approved by MQA.

The self-assessed confidence and actual competency observed were assessed in a systematic review (Davis et al., 2006) and found there was no, little, or an inverse association. Meanwhile, a meta-analysis study by (Blanch-Hartigan, 2011) found there was a correlation between students' self-assessment and external objective assessment, and that students were capable of accurately self-assessing their performance, with decreased their over-estimation of self-assessing when set against external objective assessment. However, the study reported mean correlation of $r=0.21$ which indicates the students were capable of self-assessment but with restricted accuracy.

The limitations must be recognized while analyzing the data of the study. Underperforming students are incapable of self-evaluation and self-reflection accurately, and they are inclined to over-appraise their capabilities (Lee et al., 2017); hence, there is discrepancy between their perception and the evaluator/lecturer. Another point is that underperforming students demonstrated insufficient skills to recognize their learning gaps and deficiencies in their competence, thereby hindering their ability to engage in effective self-directed learning (Kruger & Dunning, 1999). Additionally, their lack of metacognitive skills exacerbates the problem as they tend to be resistant to accept feedback that is vital for improvement. Some students fail to recognize gaps in knowledge, while others may refuse to acknowledge them altogether (Kruger & Dunning, 1999). In contrast, high-performing students usually underestimate their competence (Lee et al., 2017) hence this analysis might affect the correlation between self-assessment and objective assessment by educators. Therefore, self-assessment is an essential skill to develop for healthcare providers, and the dental curriculum should incorporate elements that develop these skills such as: videos accompanied by verbal feedback, instructional methods delivered through printed materials, video, and hands-on practice, providing more clinical practice opportunities, and progression across clinical skill stages (beginner, advanced beginner, and competent) for precision (Colthart et al., 2008).

The students' level of confidence was good in their capability to understand medical conditions and its relation to dentistry, radiograph interpretation, measurements of vital signs, conducting oral examination, obtaining consent, performing scrubbing and gowning and medical history-taking skills. These skills can

be taught and studied and do not require experience or advanced analytical and critical thinking skills. Meanwhile, their confidence is average in interpreting blood investigation, analyzing vital signs, interpreting physical examinations, and reflecting medical history on the general condition of the patient. These points require exposure to plenty of patients to build up the experience. Additionally, they require critical thinking and analytical skills. However, the students' self-perceived confidence was poor in conducting and interpreting ECG. This might be due to limitation of students' exposure to conduction of the ECG as they rarely perform ECG and rely on the patients' file information, furthermore the students do not have enough time to be proficient in ECG interpretation as cases in GMGS course cover wide range of variety of cases hence there might not be enough exposure for each student to do interpretation of ECG. Therefore, incorporating competency-based learning on venipuncture, laboratory interpretation and ECG interpretation is vital to the medical curriculum, as it develops the competencies of graduates (Varghese et al., 2023). Perhaps, educators are required to explore new teaching methods and approach to teaching these aspects by incorporating competency elements.

The students showed high level of "Very Good" and "Good" responses regarding their cognitive and behavioral attributes, which is reflective of their training in the GMGS course, introduction to dental practice, and dental clinical courses. Hence, students developed their skills and confidence in performing these tasks. However, the student showed a high number of "Average" response regarding sufficient scientific principles in GMGS. This response might be due to the GMGS course is comprehensive course given within one year in addition to dental clinical courses which might affect students' self-study time and grasping of the knowledge of the course; hence, more exploration of this response should be performed to investigate it through focus group or interviewing in future research.

While self-assessment has inherent limitations, encouraging students to reflect on their readiness for dental practice offers valuable opportunities to evaluate their performance holistically in relation to program learning outcomes. It also prompts them to anticipate the expectations placed upon dental graduates, thereby fostering the development of a professional identity (Du et al., 2023; Kwon et al., 2022). Addressing existing gaps in undergraduate dental education is critical to ensure that future graduates are adequately prepared for independent clinical practice and capable of delivering safe, effective dental care to the community. The findings of this study may serve to guide the ongoing development of undergraduate dental curricula, enhancing graduates' preparedness. Moreover, future research should prioritize evaluating students' readiness through assessments conducted by their supervisors, providing a more authentic measure of clinical competence and enabling individualized, structured feedback to support student growth (Altan et al., 2024).

In conclusion, this study highlighted several areas of students' self-confidence and weaknesses in preparedness after completion of the GMGS course. Additionally, this preliminary study resulted in a new questionnaire tool, which can be implemented nationally and internationally to compare students' responses in GMGS self-reported confidence (Ali et al., 2017; Altan et al., 2024; Elmanaseer et al., 2023; Mat Yudin et al., 2020; Sari & Derdiyok, 2021; Yusoff, 2019; Yusoff et al., 2021).

It is recommended that future research further examine students' academic performance in the GMGS course and explore its association with their self-confidence levels and personality traits, as measured by validated psychometric assessments.

This finding can be recommended to the Centre of Studies to conduct further investigation of the curriculum of the GMGS course and implement new teaching methods in order to improve students' performance and, consequently their self-confidence.

Finally, it is recommended to further investigate students' self-confidence levels and pattern in GMGS patterns in GMGS across other dental teaching centres and compare students' performance and reflection on their curricula.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of any conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Mohammed Gh Al-Naser carried out the research, conceptualized the idea, wrote the article. Andrean Husin advised and guided on the questionnaire development and methodology formulation, as well as revised the article.

REFERENCES

- Ali, K., Slade, A., Kay, E. J., Zahra, D., Chatterjee, A., & Tredwin, C. (2017). Application of Rasch analysis in the development and psychometric evaluation of dental undergraduates preparedness assessment scale. *European Journal of Dental Education*, 21(4), e135–e141. <https://doi.org/https://doi.org/10.1111/eje.12236>.
- Ali, K., Slade, A., Kay, E., Zahra, D., & Tredwin, C. (2017). Preparedness of undergraduate dental students in the United Kingdom: a national study. *British Dental Journal*, 222(6), 472–477. <https://doi.org/10.1038/sj.bdj.2017.272>.
- Almohefer, S. A., Alkattan, R. K., Aldakhayel, G. D., & Madfa, A. A. (2025). Perception and Confidence Levels of Dental Students and Newly Graduate Dentists during Prosthodontic Procedures. *The Open Dentistry Journal*, 19(1). <https://doi.org/10.2174/0118742106361704241230072807>.
- Altan, H., Gönder, H. Y., Demirel, E., Altan, A., Tunçdemir, A. R., Zahra, D., Al Maweri, S. A., & Ali, K. (2024). Readiness for clinical practice: Self-perceived confidence of final year dental students in Turkey - A multi-institutional study. *MedEdPublish*, 14(9), 2-15. <https://doi.org/10.12688/mep.20115.2>.
- Barnes, E., Bullock, A. D., Bailey, S. E. R., Cowpe, J. G., & Karaharju-Suvanto, T. (2012). A review of continuing professional development for dentists in Europe. *European Journal of Dental Education*, 16(3), 166–178. <https://doi.org/10.1111/j.1600-0579.2012.00737.x>.
- Blanch-Hartigan, D. (2011). Medical students' self-assessment of performance: Results from three meta-analyses. *Patient Education and Counseling*, 84(1), 3–9. <https://doi.org/10.1016/J.PEC.2010.06.037>.
- Burrows, R. S. (2018). Understanding self-assessment in undergraduate dental education. *British Dental Journal*, 224(11), 897–900. <https://doi.org/10.1038/sj.bdj.2018.437>.

- Cate, Th. J. ten. (2016). Competency-based medical education and its competency frameworks. In martin Mulder (Ed.), *Competence-based vocational and professional education: bridging the worlds of work and education* / Martin Mulder, editor. (pp. 903–929). Springer International Publishing AG. <https://hdl.voced.edu.au/10707/420142>.
- Colthart, I., Bagnall, G., Evans, A., Allbutt, H., Haig, A., Illing, J., & McKinstry, B. (2008). The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Medical Teacher*, 30(2), 124–145. <https://doi.org/10.1080/01421590701881699>.
- Cvijic, A., Kvernenes, M., Åström, A., Tsilingaridis, G., & Bletsa, A. (2025). Approaches to Continuing Professional Development in Dental Traumatology—A Qualitative Study of General Dentists' Experiences. *Dental Traumatology*, 42(1), 32. <https://doi.org/10.1111/edt.13079>.
- Davis, D. A., Mazmanian, P. E., Fordis, M., Van Harrison, R., Thorpe, K. E., & Perrier, L. (2006). Accuracy of Physician Self-assessment Compared With Observed Measures of Competence: A Systematic Review. *JAMA*, 296(9), 1094–1102. <https://doi.org/10.1001/JAMA.296.9.1094>.
- Dolly, G., Mary-Anne, A., & Carroll, I. (2005). The Effect of Classroom Simulation on Nursing Students' Self-Efficacy Related to Health Teaching. *Journal of Nursing Education*, 44(7), 310–314. <https://doi.org/10.3928/01484834-20050701-04>.
- Du, X., Al Khabuli, J. O. S., Ba Hattab, R. A. S., Daud, A., Philip, N. I., Anweigi, L., Matoug-Elwerfelli, M., & Ali, K. (2023). Development of professional identity among dental students – A qualitative study. *Journal of Dental Education*, 87(1), 93–100. <https://doi.org/https://doi.org/10.1002/jdd.13092>.
- Elmanaseer, W. R., Al-Omoush, S. A., Alamoush, R. A., Abu Zaghlan, R., & Alsoleihat, F. (2023). Dental Students' Perception and Self-Perceived Confidence Level in Key Dental Procedures for General Practice and the Impact of Competency Implementation on Their Confidence Level, Part I (Prosthodontics and Conservative Dentistry). *International Journal of Dentistry*, 2023(1), 2015331. <https://doi.org/10.1155/2023/2015331>.
- Epstein, R. M. (2007). Assessment in Medical Education. *The New England Journal of Medicine*, 356(4), 387–396. <https://doi.org/10.1056/NEJMra054784>.
- Eva, K. W., & Regehr, G. (2005). Self-Assessment in the Health Professions: A Reformulation and Research Agenda. *Academic Medicine*, 80(10suppl), S46–54. <https://doi.org/10.1097/00001888-200510001-00015>.
- F.D. Hicks, Coke L., & Li S. (2009). *The effect of high-fidelity simulation on nursing students' knowledge and performance: A pilot study*. National Council of State Boards of Nursing, Inc. (NCSBN®) vol. 40.
- Gaballah, K., Ali, K., Zahra, D., Abou Neel, E., & Ibrahim, E. (2024). Perceived confidence of dental students and new graduates in performing tooth extractions—An exploratory study. *European Journal of Dental Education*, 28(1), 191–205. <https://doi.org/10.1111/eje.12936>.
- Hasson, D., & Arnetz, B. B. (2005). Validation and Findings Comparing VAS vs. Likert Scales for Psychosocial Measurements. *International Electronic Journal of Health Education*, 8, 178–192. www.ceos.nu.

- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121–1134. <https://doi.org/10.1037//0022-3514.77.6.1121>.
- Kwon, J. H., Shuler, C. F., & von Bergmann, H. (2022). Professional identity formation: The key contributors and dental students' concerns. *Journal of Dental Education*, 86(3), 288–297. <https://doi.org/10.1002/jdd.12810>.
- Larew, C., Lessans, S., Spunt, D., Foster, D., & Covington, B. G. (2006). Innovations in clinical simulation: Application of Benner's Theory in an Interactive Patient Care Simulation. *Nursing Education Perspectives*, 27(1), 16–21.
- Lee, C., Asher, S. R., Chutinan, S., Gallucci, G. O., & Ohyama, H. (2017). The relationship between dental students' assessment ability and preclinical and academic performance in operative dentistry. *Journal of Dental Education*, 81(3), 310–317. <https://doi.org/10.1002/J.0022-0337.2017.81.3.TB06276.X>.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 22 140, 55.
- Malcolm S. Knowles, Elwood F. Holton III, & Richard A. Swanson. (2014). *The Adult Learner: The definitive classic in adult education and human resource development* (8th Edition). Routledge.
- Manakil, J., & George, R. (2013). Self-perceived work preparedness of the graduating dental students. *European Journal of Dental Education*, 17(2), 101–105. <https://doi.org/10.1111/eje.12016>.
- Mat Yudin, Z., Ali, K., Wan Ahmad, W. M. A., Ahmad, A., Khamis, Mohd. F., Brian Graville Monteiro, N. 'Aliya, Che Ab. Aziz, Z. A., Saub, R., Rosli, T. I., Alias, A., Abdul Hamid, N. F., & Harun, N. A. (2020). Self-perceived preparedness of undergraduate dental students in dental public universities in Malaysia: A national study. *European Journal of Dental Education*, 24(1), 163–168. <https://doi.org/10.1111/eje.12480>.
- Mott, V. W., & Lohr, K. D. (2014). Co-constructed curricula: an adult learning perspective. In *Andragogical and Pedagogical Methods for Curriculum and Program Development* (pp. 81–100). IGI Global. <https://doi.org/10.4018/978-1-4666-8246-7.ch059>.
- Nieman, D. C., McAnulty, S. R., Suminski, R. R., Green, J. M., Robertson, R. J., & Utter, A. C. (2004). Validation of the Adult OMNI Scale of Perceived Exertion for Walking/Running Exercise. *Medicine & Science in Sports & Exercise*, 36(10), 1776–1780. <https://doi.org/10.1249/01.MSS.0000142310.97274.94>.
- Rajan, S., Chen, H. Y., Chen, J. J., Chin-You, S., Chee, S., Chrun, R., Byun, J., & Abuzar, M. (2020). Final year dental students' self-assessed confidence in general dentistry. *European Journal of Dental Education*, 24(2), 233–242. <https://doi.org/10.1111/eje.12489>.
- Sari, M., & Derdiyok, U. (2021). The self-confidence of dental students in oral surgery. *Odovtos*, 23(3), 209–222. <http://dx.doi.org/10.15517/ijds.2021.47854>.
- Varga, N. L., & Bauer, P. J. (2017). Young adults self-derive and retain new factual knowledge through memory integration. *Memory & Cognition*, 45(6), 1014. <https://doi.org/10.3758/S13421-017-0711-6>.
- Varghese, R. G., Manickam, N., & Mohanraj, A. (2023). Enhancing the interpretational skills of complete blood count reports by second year medical students using competency based learning method. *Journal*

of Current Research in Scientific Medicine, 9(1), 48–52.
https://doi.org/10.4103/JCRSM.JCRSM_21_23.

Yan, Z., & Brown, G. T. L. (2017). A cyclical self-assessment process: towards a model of how students engage in self-assessment. *Assessment and Evaluation in Higher Education*, 42(8), 1247–1262. <https://doi.org/10.1080/02602938.2016.1260091>.

Yusoff, M. S. B. (2019). ABC of Response Process Validation and Face Validity Index Calculation. *Education in Medicine Journal*. <https://doi.org/10.21315/eimj2019.11.3.6>.

Yusoff, M. S. B., Arifin, W. N., & Hadie, S. N. H. (2021). ABC of Questionnaire Development and Validation for Survey Research. *Education in Medicine Journal*, 13(1), 97–108. <https://doi.org/10.21315/eimj2021.13.1.10>.



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5. APPENDIX

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