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The Effects of Medical Students' Learning Approach and Career Values on Their Specialty Preference

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Abstract: Recent studies have identified various factors influencing how medical students choose medical specialties. An important factor that has been overlooked is learning approach. For Qatar-based medical students aspiring to train overseas, specialty preference often hinges on the relationships between learning approach and career values. Structural equation modelling (SEM) was employed to explore the relationships between learning approach, career values, and specialty preference. Data were collected from two surveys of 108 medical students at Weill Cornell Medicine-Qatar (WCM-Q): the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) to assess learning approach and the adapted version of the How Medical Students Choose Questionnaire (HMSCQ) to assess career values and specialty preferences. The results showed significant correlations between learning approach, career values, and specialty preference. Surface learning approach correlated with seeking prestige, imitating role models, and valuing a varied scope of practice while deep learning approach correlated with interest in research and hospital-based careers. Our model accounted for variances in specialty preference to the following degrees: internal medicine (38%), family medicine (25%), neurology (27%), and psychiatry (18%). Medical students in Qatar adopt the learning approach that helps them achieve their career goals and matches their perceptions of medical specialties. Medical educators can foster a deeper learning approach by helping students to clarify their aims for pursuing a medical career, providing early exposure to medical specialties, and fostering a research mindset to enhance intrinsic curiosity. Students interested in physician research careers should be provided opportunities to pursue independent research.

Keywords: medical education; specialty choice; learning approach; career values; structural equation modelling; R-SPQ-2F; Qatar

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1. Introduction

Medical educators aim to understand how medical students choose medical specialties to ensure that sufficient graduates enter the different specialties to meet the demand for health services. Previous research has identified a variety of individual (ethnicity, gender, age, socioeconomic status, etc.), institutional (medical school mission, faculty composition, admissions criteria, curriculum, etc.), and career factors (patient contact, workload, flexibility, income, prestige, etc.) that shape career choice [1–4]. Another line of research has highlighted the role of learning approach—the learning strategy students adopt based on their subjective perceptions of learning tasks—for understanding why students respond differently to different teaching contexts [5–7]. According to this research, students adopt 'surface' or 'deep' learning approaches according to their objectives and expectations. Thus, surface learners employ strategies like rote memorisation, while deep learners aim to understand meaning and overall intent [8]. Research into learning approach

has found correlations between learning approach and behaviour towards learning tasks in classroom settings, but its relationship to behaviours like choosing a career has been overlooked. This is the primary motivation for the present study.

Research exploring learning approaches in medical education has indicated that medical schools attract students with deep learning approaches [9] and that medical students transition to deeper learning approaches during their clinical years [10]. However, the learning approach students adopt can vary according to contextual factors like setting (classroom or clinic), subject, perceived workload, and study patterns [11–13]. Another significant body of research has explored the relationship between curriculum and learning approach. One study explored the role of teaching format and found that integrated lecturing and PBL both foster a deep learning approach [14]. Other studies have identified a positive correlation between PBL teaching and deep learning approaches in pre-clinical students [15,16]. Regarding the relationship between learning approach and career choice, intercalated-degree students—medical students who pursue a separate research degree—had significantly lower surface learning approach scores and greater academic achievement than students on the typical track [17]. They preferred laboratory medicine and expressed lower interest in general medicine, which suggest that students who prefer a deep learning approach value careers in research and specialised medical fields. However, this study was limited in scope and did not explore the relationship between learning approach and career expectations and values more broadly.

Medical students in different national contexts encounter similar individual, institutional, and career factors, but the local context shapes how these factors inter-relate. Researchers investigating specialty choice in the Middle East, the site of the present study, emphasised two key factors: international mobility and gender. Middle Eastern graduates often seek postgraduate training in another country, enhancing their international mobility. International medical graduates (IMGs) fill training options left vacant by domestic students in many European and North American countries, which constrains choice [18]. Gender is another important factor in the Middle East, as perceived gender roles influence how medical students choose specialties. A study from Jordan found that female medical students valued specialties like paediatrics and obstetrics and gynaecology while male medical students preferred surgery [19], and a study from Saudi Arabia indicated that gender roles interact with career motivation and life goals to determine career satisfaction [20]. In short, these studies suggest that factors may apply cross-culturally, but their effects are shaped by the local context. However, no studies to date have examined how learning approach and career values influence the career decisions medical students in the Middle East make.

This study explores the relationships between the learning approach, career values, and specialty preference of students at a medical school in Qatar using structural equation modelling (SEM) [14,21]. The following questions guided the inquiry:

1. What medical specialties do medical students in Qatar choose, and how do they rank their specialty choices?
2. What factors influence how male and female medical students from different national backgrounds choose medical specialties?
3. How do learning approach and career values inter-relate?
4. How can SEM illustrate the dynamic relationships between learning approach and career values to account for students' specialty choices?

Previous studies report that individual factors and career values influence how medical students choose careers [1,3,4]; however, few explored how learning approach correlates with career values and specialty preference. To address this gap, SEM was used to model the relative influence of the causal variables (learning approach and career values) on the effect variable (specialty choice). This study offers a novel approach for understanding how learning approach and career values influence specialty choice in a Middle Eastern context.

2. Materials and Methods

2.1. Setting

The study occurred at Weill Cornell Medicine-Qatar (WCM-Q), the first medical school in Qatar and the first American medical school established outside the United States. WCM-Q was founded in 2001 as a venture between Cornell University and the Qatar Foundation with a mission to 'develop outstanding physicians, scientists, and future healthcare leaders; generate significant discoveries that transform healthcare; and promote population health through deeply rooted community engagement' [22]. WCM-Q grants an American medical degree, and its graduates pursue postgraduate training in both Qatar and the United States.

2.2. Participants

The recruitment phase lasted from mid-2020 to the end of 2021. This phase took longer than expected because of the challenges of the COVID-19 pandemic. During this phase, medical students aged 18 and older enrolled at WCM-Q were invited to participate (n = 108). The participants came from all four years of the medical school, represented a variety of national backgrounds, and were both female (56%, n = 61) and male (44%, n = 47), offering a cross-sectional view of the medical education experience.

The relatively small sample size resulted from WCM-Q's limited seats (200 students in total). However, although the sample was small, it remains beneficial for two reasons: (1) the study's aim was to explore the relationships between learning approach, career values, and specialty preference rather than effect size, and (2) the researchers have extensive experience with the social and cultural factors that influence medical students' learning approach and career values.

Participants received an email invitation that described the study, obtained informed consent, and explained that participation was voluntary. The email provided a link to the questionnaires, which used Qualtrics XM survey software 1.0 (Provo, Utah, and Seattle, WA, USA). Students who were unwilling to provide informed consent were excluded from the study. The study was conducted in accordance with the Declaration of Helsinki (1975) and its later amendment (2013) and received ethical approval from the WCM-Q Institutional Review Board (18-0009).

2.3. Instruments

2.3.1. How Medical Students Choose Questionnaire

The How Medical Students Choose Questionnaire (HMSCQ) was adapted from a 25-item questionnaire that explored the factors leading medical students to choose primary care specialties [23]. The authors demonstrated the original instrument's construct validity through factor analyses conducted on data collected from 519 participants. The HMSCQ collected information about student demographics, career values, and specialty preference. Specialties identified by the State of Qatar as national priorities, including primary care and medical research, were also included. The content validity of the additional items was carefully reviewed by the researchers and medical education experts at WCM-Q for accuracy, representativeness, and significance. The reliability of the data obtained from the HMSCQ was examined to identify the internal consistency of the items.

The adapted version of the HMSCQ comprised 43 items on a five-point Likert scale with six underlying constructs representing career values: (1) Medical Lifestyle, (2) Social Orientation, (3) Prestige, (4) Hospital Orientation, (5) Role Model, and (6) Varied Scope of Practice. Medical Lifestyle identified the extent to which participants value the lifestyle a specialty affords, while Social Orientation measured the extent to which participants hope to align their careers and social commitments. Prestige assessed how much the participants value social status and income potential, and Hospital Orientation explored their interest in working in hospital environments that offer challenging cases and research opportunities. Role Model evaluated the impact of role models, while Varied Scope of Practice measured the extent to which participants value working with diverse patient populations and varied disease presentations. Participants also ranked their specialty preferences from a provided

list, which included anaesthesiology, biomedical research, emergency medicine, family medicine, internal medicine, neurology, obstetrics and gynaecology, paediatrics, psychiatry, public health, and surgery. They could write in a specialty not listed. Write-in specialties included dermatology, pathology, ophthalmology, and radiology.

2.3.2. Revised Two-Factor Study Process Questionnaire

Learning approach was measured using the two-factor revised version of the Study Process Questionnaire (R-SPQ-2F) [24]. The R-SPQ-2F comprises 20 items on a five-point Likert scale based on the Presage–Process–Product (3P) model [24]. *Presage* items measure student factors like prior knowledge and ability, *Process* items assess ongoing approaches to learning, and *Product* items measure the effects of teaching contexts [24]. The R-SPQ-2F displays results on a matrix of two main scales—Deep Approach (DA) and Surface Approach (SA)—and four subscales, including Deep Motive (DM), Deep Strategy (DS), Surface Motive (SM), and Surface Strategy (SS) [24]. Motive signifies the reasons students take part in learning tasks, such as achievement, intrinsic interest, or fear of failure. Strategy refers to how students perform learning tasks, such as rote memorisation or relating new knowledge to previous learning [25]. The R-SPQ-2F provides a snapshot of how students perceive and approach learning tasks in diverse teaching contexts. The data from the R-SPQ-2F subscales were used to produce a latent variable that contributed to the current model. This study explored the relationships between learning approach, career values, and specialty preference, but the R-SPQ-2F was statistically validated from a Qatar-based data set [16].

2.4. Data Analysis

The results were analysed using IBM SPSS v27 (Armonk, New York, NY, USA) for conventional statistical analysis and IBM AMOS Graphics v26 for SEM and path analysis. SEM was chosen because it offers a bifocal lens—for both theoretical and empirical evidence—to examine the relative influence of the causal variables (learning approach and career values) on the effect variable (specialty preference). The model comprises three latent constructs representing (1) learning approach for the R-SPQ-2F constructs, (2) areer values for the HMSCQ constructs, and (3) specialty preference for students' desired career pathways. Maximum likelihood estimates were computed using AMOS to generate chi-square (χ^2) statistics, associated degrees of freedom (dfs), and probability values. Hoelter's critical 'N' (CN) is often used to estimate sample adequacy for SEM analyses [26]. AMOS reports CN significance-level values of 0.05 and 0.01. Acceptable scores for 0.05 and 0.01 CN values were 76 and 81, respectively, and the sample size for this SEM analysis was 108. The data are reliable according to the following Cronbach's alpha values: (1) HMSCQ (0.905), (2) R-SPQ-2F DA (0.781), and (3) R-SPQ-2F SA (0.785).

3. Results

3.1. Career Destinations of WCM-Q Graduates

De-identified institutional records listing the actual postgraduate career destinations of WCM-Q graduates between 2019 and 2021 were collected (see Table 1), and these historical data were compared to the survey findings for validation. Between 2019 and 2021, WCM-Q graduates entered residencies in internal medicine (35.2%), paediatrics (15.6%), neurology (9.4%), psychiatry (7.0%), and surgery (5.5%). The rate for all other specialties was less than 5%. Participation in internal medicine increased from 30.6% in 2019 to 39.5% in 2020 and then declined slightly in 2021 to 36.6%. Meanwhile, participation in paediatrics declined from 20.4% in 2019 to 13.2% in 2020, levelling off to 12.2% in 2021. Participation in neurology increased from 4.1% in 2019 to 13.2% in 2020, followed by a slight decline in 2021. Participation in psychiatry declined from 8.2% in 2019 to 2.6% in 2020 before rebounding in 2021 to 9.8%. Finally, participation in surgery decreased from 8.2% in 2019 to only 2.4% by 2021. These data offered a useful point of comparison for the specialty preference rankings elicited by the HMSCQ.

Table 1. Percentage of WCM-Q graduates by specialty, 2019–2021.

Specialty	2019	2020	2021	Overall
Internal Medicine	30.6	39.5	36.6	35.2
Paediatrics	20.4	13.2	12.2	15.6
Neurology	4.1	13.2	12.2	9.4
Psychiatry	8.2	2.6	9.8	7.0
Surgery	8.2	5.3	2.4	5.5
Other career paths	4.1	5.3	4.9	4.7
Anaesthesiology	6.1	-	4.9	3.9
Dermatology	4.1	7.9	-	3.9
Diagnostic Radiology	2.0	5.3	4.9	3.9
Emergency Medicine	2.0	-	2.4	1.6
Ob-Gyn	2.0	-	2.4	1.6
Ophthalmology	-	2.6	2.4	1.6
Pathology	4.1	-	-	1.6
Other specialty Otolaryngology, Physical Medicine and Rehabilitation, etc.	-	5.3	4.9	3.1
Research	4.1	-	-	1.6

3.2. Specialty Choice Ranking

In the HMSCQ, participants ranked their preferences from a list of medical specialties (see Table 2). Table 2 shows the top three choices for participants from each year. Most participants chose internal medicine (28%) followed by paediatrics (20%), surgery (14%), and neurology (10%). When the rankings were aggregated by adding individual rankings within a desired specialty, a similar pattern emerged. However, the 'Other' category, which includes write-in specialties like dermatology and pathology, rose to the second position overall because many participants ranked 'Other' as their third choice. The participants' specialty preferences broadly reflect the historical data reported in Table 1, but more students eventually entered internal medicine (28% versus 35.2%) while fewer entered paediatrics (20% versus 15.6%) and surgery (14% versus 5.5%). The preference for neurology closely reflects actual participation rates (10% versus 9.4%).

Table 2. Specialty preference ranking.

Career Choice	Med 1			Med 2			Med 3			Med 4			All Cohorts			Total
	Rank			Rank			Rank			Rank			Rank			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Emergency Medicine	4	3	4	0	0	4	1	3	1	1	1	2	6	7	11	24
Anaesthesiology	1	3	2	2	0	0	0	0	1	3	1	0	6	4	3	13
Family Medicine	1	3	1	0	3	1	0	2	1	1	2	0	2	10	3	15
Internal Medicine	9	8	9	6	1	5	6	5	6	9	8	0	30	22	20	72
Ob-Gyn	4	3	2	0	2	0	0	1	1	1	1	3	5	7	6	18
Paediatrics	4	4	2	5	3	3	3	2	1	10	3	2	22	12	8	42
Psychiatry	2	0	1	2	1	2	2	2	2	2	0	0	7	3	5	15
Surgery	6	6	7	2	2	0	4	2	0	3	0	2	15	10	9	34
Neurology	3	3	3	3	5	3	2	3	2	3	1	0	11	12	8	31
Biomedical Research		1	1									1	0	1	2	3
Public Health	1	1	1				0	0	1	0	6	2	1	7	4	12
Other	1	1	5	4	6	8	1	4	6	2	2	4	3	13	29	45
Total													108	108	108	324

Note: Med 1–4 refers to student cohorts attending the four-year medical programme.

3.3. National Origin and Gender

Participants from different national groups chose different specialties (see Table 3). Participants were classified into four regional groups that reflect the national origins of

WCM-Q students: (1) Qatar, (2) Other Arab (Syria, Jordan, Palestine, Lebanon, Iraq, Egypt, Tunisia, Algeria), (3) Asian (India, Pakistan, Bangladesh, Sri Lanka, South Korea), and (4) North American. All groups preferred internal medicine. However, Qatari participants also preferred surgery (42%) and emergency medicine (30%), Arab participants preferred emergency medicine (38%) and paediatrics (38%), Asian participants preferred neurology (40%) and other specialties (68%), and North American participants preferred paediatrics (53%) and other specialties (71%).

Table 3. National origin and specialty preference.

Specialty Preference	Qatari	Other Arab	Asian	North American	Others	Overall
n	33	24	25	17	9	108
Emergency Medicine	10	9	3	1	1	22
Anaesthesiology	3	1	6	3	-	12
Family Medicine	4	4	6	1	-	14
Internal Medicine	21	17	13	13	8	67
Ob-Gyn	7	5	3	1	2	17
Paediatrics	17	9	3	9	4	39
Psychiatry	2	3	7	2	1	14
Surgery	14	4	9	5	2	31
Neurology	5	6	10	8	2	29
Biomedical Research	1	-	2	-	-	3
Public Health	1	1	5	2	3	11
Other	4	5	17	12	7	42

Gender featured less prominently than national origin. However, male participants preferred surgery marginally more than female participants, while female participants preferred paediatrics, family medicine, and anaesthesiology. Regarding career values, male participants (mean = 2.78) valued Prestige slightly more than female participants (mean = 2.43), but female participants (mean = 2.82) valued Medical Lifestyle slightly more than male participants (mean = 2.59). All other career values were nearly identical (see Table 4).

Table 4. Relationship between gender and career values.

Career Values	Female (n = 61)		Male (n = 46)	
	Mean	Std. Dev.	Mean	Std. Dev.
Medical Lifestyle	2.82	0.87	2.59	0.79
Social Orientation	3.04	0.66	3.06	0.54
Prestige	2.43	1.14	2.78	0.92
Hospital Orientation	3.44	0.63	3.43	0.64
Role Model	2.79	0.71	2.83	0.69
Varied Score of Practice	2.55	1.10	2.65	1.00

3.4. Correlations Between Learning Approach and Career Values

The second research question explored how learning approach and career values interrelate. Pearson correlation coefficient values were calculated for learning approach and career values (see Table 5). Surface learning approach correlated significantly with Prestige (0.425), Role Model (0.236), and Varied Scope of Practice (0.250). Thus, participants who preferred the surface learning approach preferred specialties offering prestige, developed career interests through personal relationships with role models, and valued a varied scope of practice. Deep learning approach correlated significantly with Hospital Orientation (0.394); so, participants who preferred a deep learning approach chose specialties that provide opportunities for greater specialisation, exposure to rare cases, and research. Interestingly, when surface and deep approaches were grouped into one factor (learning

approach), we found positive and significant correlations for all career values except Medical Lifestyle.

Table 5. Pearson correlation coefficients between medical students' learning approach and their career values.

	Medical Lifestyle	Social Orientation	Prestige	Hospital Orientation	Role Model	Varied Scope of Practice
Deep Approach (DA)	0.062	0.189	0.041	0.394 **	0.181	0.139
Surface Approach (SA)	0.168	0.185	0.425 **	0.066	0.236 *	0.250 **
Learning Approach (DA and SA)	0.189	0.305 **	0.385 **	0.375 **	0.348 **	0.319 **

* $p < 0.05$ (two-tailed); ** $p < 0.01$ (two-tailed).

3.5. Modelling Specialty Choice

SEM was used to model relationships between learning approach, career values, and specialty preference (see Figure 1). Path coefficient values were estimated to assess both the magnitude and statistical significance of the relationships between the variables in the structural equation model. These coefficients quantify the direct and indirect effects of one variable on another, allowing for a nuanced understanding of how learning approach influences career values and how these affect specialty preferences. The strength and direction of these relationships provide insights into the complex interplay of factors shaping medical students' career decisions.

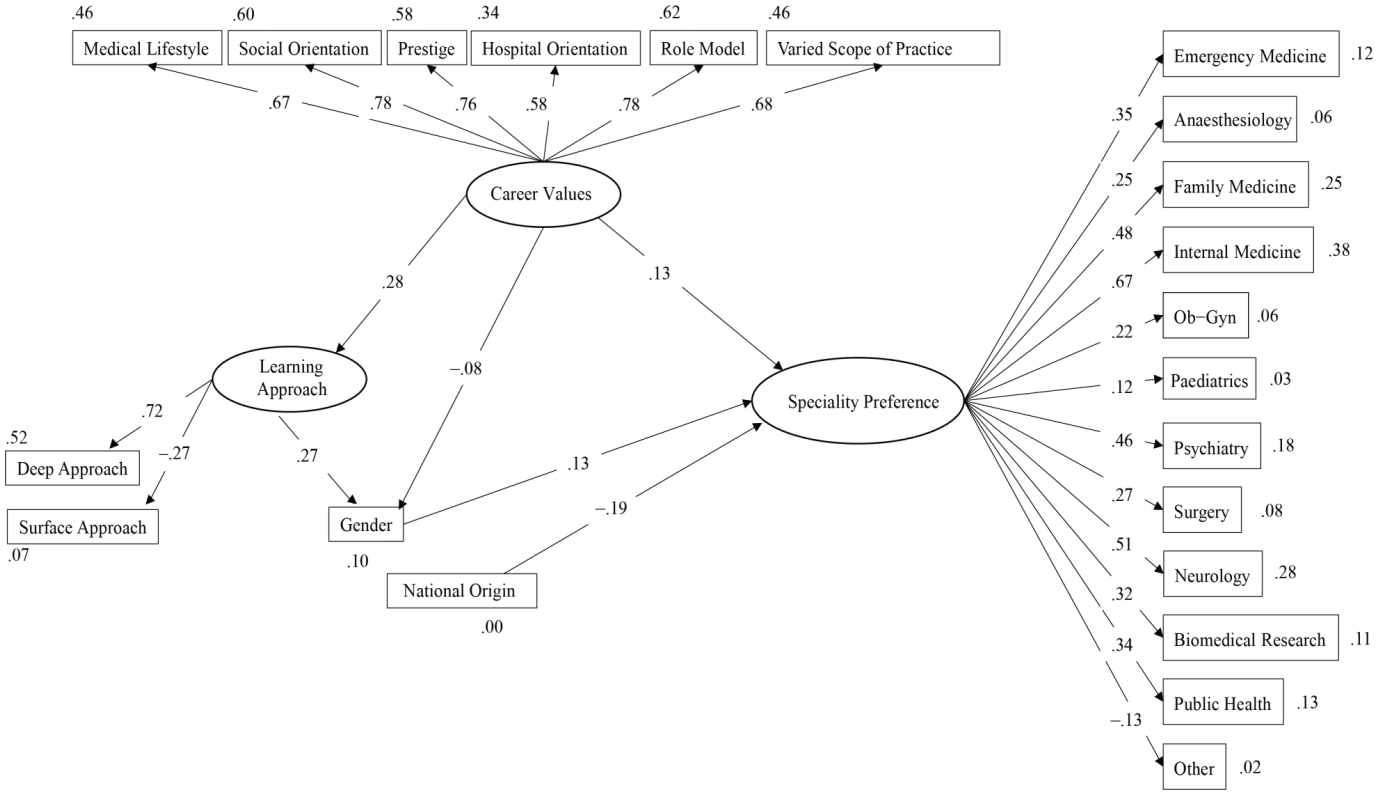

Figure 1. A causal model of learning approach, career values, and specialty preference.

Next, the fit indices were computed to evaluate the fitness of the data to support the hypothesised model. This multi-faceted approach to model evaluation is crucial, as it provides a comprehensive assessment of how well the proposed theoretical structure aligns with the observed data. The fit indices, including chi-square (χ^2), comparative fit

index (CFI), and root mean square error of approximation (RMSEA), each offer unique perspectives on model fit. The model given in Figure 1 satisfies the conditions of reasonable fit according to the following fit indices: $\chi^2 = 257.889$ (df = 199, $p = 0.003$), $\chi^2/df = 1.30$, CFI = 0.876, and RMSEA = 0.05. The explanatory power of the model was assessed by computing the coefficient of determination (R2) for the endogenous constructs. Significantly, the path coefficient values between learning approach and career values represent the variance levels needed to influence the participants' specialty preferences. The percentages of variation in specialty preference attributed to career values are Medical Lifestyle (46%), Social Orientation (60%), Prestige (58%), Hospital Orientation (34%), Role Model (62%), and Varied Scope of Practice (46%). The model explained substantial variation in specialty preference when associated with the participants' learning approach and career values: internal medicine (38%), family medicine (25%), neurology (27%), and psychiatry (18%).

4. Discussion

An important pattern that emerged from the data involved preference for primary care specialties. The participants preferred internal medicine most, with 28% ranking it first and 35.2% of WCM-Q graduates entering the field. As shown in Table 1, the number of WCM-Q graduates entering internal medicine careers increased from 2019 to 2021 while those entering paediatric careers decreased. This could be attributed to a growth in internal medicine positions resulting from the COVID-19 pandemic, but regardless, the upshot is that WCM-Q students both prefer primary care specialties and enter primary care careers at roughly equal rates. This finding contrasts with other studies of medical students in the Middle East, which report a stronger preference for general surgery [27–29].

Besides internal medicine, participants preferred other primary care specialties like paediatrics and family medicine. Their preference for primary care specialties contrasts with trends in the United States, where medical students often aim for higher-paying specialties [30]. We attribute this difference to international mobility. Most WCM-Q students seek postgraduate training in the United States, competing for placements left unfilled by domestic American students. WCM-Q is an international branch campus, and its graduates are considered international medical graduates (IMGs) for matching into American residency programmes. A study investigating IMG participation in American residency programmes found that more than half of IMGs who successfully matched in the United States entered primary care specialties to fill positions left vacant by domestic American graduates [31]. This could explain the discrepancy between the percentage of participants who preferred surgery (14%) and those who successfully entered surgical specialties (5.5%). Medical students in Qatar prefer primary specialties because they intend to compete for positions in American residency programmes as IMGs, and primary care enhances their odds of matching.

We found that the local Qatari context influences how medical students value specialties. The career values Prestige, Social Orientation, and Role Model explained variation in specialty preference, echoing earlier studies from the Middle East. For instance, Khader et al. identified 'intellectual content of the specialty' as the most important factor for Jordanian medical students, but specialty reputation and expected income also featured prominently, especially for men [19]. Male participants in our study valued specialty reputation and expected income more than female participants, reflecting social norms and gender roles. Another similar study noted that medical students in Kuwait value prestige and feel socially responsible for filling gaps in the national physician workforce [27]. The participants in our study also recognised local demands for primary care specialists, and their sense of social responsibility and the stronger odds for matching in an American residency programme led them to prefer specialties like internal medicine, paediatrics, and family medicine. The participants preferred specialties in which they had a significant role model, underscoring the importance of human relationships [1–4,32].

The model in Figure 1 illustrates the relationships between learning approach, career values, and specialty preference and contributes to a growing body of research using SEM

to explore medical education [14,21]. The model explains how career values mediate the relationships between learning approach and specialty preferences, supporting studies arguing that medical students adapt their choices to suit individual needs, personalities, and career expectations [33–37]. However, these needs and expectations vary by local context. Our model illustrates variance between specialty choices and shows how learning approach correlates to career values. Participants who prefer a surface learning approach choose specialties that offer prestige, develop their interests through relationships with role models, and value a varied scope of practice. This suggests that medical students who prefer specialties because of prestige, personal relationships, or varied scope of practice use medicine to attain social goals. These motives correlate with surface learning strategies in medical school (e.g., memorising information to pass examinations). Participants who preferred a deep learning approach chose hospital specialties that provide opportunities for greater specialisation, exposure to rare cases, and research. Medical students interested in academic and research careers, which are associated with teaching hospitals, have more intrinsic curiosity about medical knowledge and practice.

These findings raise several important points. Students strategically employ surface or deep learning approaches based on their subjective perceptions of specific contexts. Learning approach is not an essential attribute; students are not surface or deep learners but prefer surface or deep learning approaches to fit their goals and expectations. Thus, medical educators can help to foster deeper learning approaches in students by (1) influencing their aims for pursuing a medical career and (2) shaping their perceptions of different medical specialties. Influencing students' aims entails more consistent mentorship to emphasise medicine's intrinsic value and humanitarian aims [38–40]. Medical educators could guide students motivated by prestige or high salary towards developing intrinsic interest in a particular specialty. Medical educators might also support students in clarifying aims and developing a stronger sense of purpose. They should provide students with opportunities to reflect on how becoming a doctor is about more than attaining personal goals but also about caring for patients [41]. Medical educators could shape student perceptions of medical specialties by providing greater exposure to medical specialties early on in medical school. Students should receive scaffolded clinical exposure from the first year to develop a more holistic understanding of each specialty's qualities and identify the qualities that interest them [42–46].

Although deep learning approaches correlate more with interest in specialised careers, such students should not be dissuaded from generalist and community-based careers. Indeed, medical educators should encourage students who show such inclinations because healthcare systems need thoughtful, committed doctors in every specialty and setting. Medical schools attract students with deep learning approaches, and medical educators should foster these qualities by stimulating curiosity about a range of specialties [9]. Involvement in research can enhance deep learning approaches, so medical educators should aim to promote undergraduate research participation in different specialties [47]. Likewise, students should learn research methodologies as doctors because they need to apply current evidence to support their clinical decisions, regardless of specialty. Research trains students to ask tough questions and take logical steps to find solutions. A curricular focus on teaching research skills to undergraduate medical students has been shown to improve research self-efficacy and confidence in using research [48,49].

Our study examined a single institution, providing a snapshot of a particular timeframe. As a transnational medical school in the Middle East, WCM-Q is a unique case that offers interesting insights into how medical students choose their career paths. However, this also reduces the generalisability of some findings. We have argued that WCM-Q students often aim to pursue a residency in the United States, which influences their specialty preferences. This local contextual factor does not apply to settings where graduates seek residency opportunities locally. We could not estimate our model's causality effect because our data came from a cross-sectional study. Finally, while our sample size is small, our findings approximate historical matriculation data, as shown in Table 1. Individual model-

focused approaches entail associations between parameter precision and power when determining the sample size requirements for SEM analyses [50,51]. This gives greater confidence in the overall results, but future studies should involve longitudinal analyses to further investigate the identified causal effects.

5. Conclusions

In this study, we used structural equation modelling to show the relationship between learning approach, career values, and specialty choice for medical students at a transnational medical school in the State of Qatar. While most students choose primary care specialties, they vary in lower-ranked choices according to national origin and gender. More importantly, learning approach and career values helped to account for variation in their specialty choices. Medical schools attract students with deep learning approaches, but students adapt their approaches to suit the needs of specific learning contexts. We found that students who more often prefer surface learning approaches prioritise external values like specialty prestige and personal relationships, while those who more often prefer deep learning approaches emphasise intrinsic values like a varied scope of practice and research opportunities. Although some students are more likely to employ deep learning approaches than others, their learning context influences their tendencies. Medical programmes that offer meaningful mentorship and career guidance, early exposure to clinical settings, and significant training in research can encourage deeper learning approaches in students.

A growing body of research has sought to explore the relationship between learning approach and specialty choices in medical education, but the specific causal model we presented requires further investigation. Existing studies have examined various aspects of this relationship, but a comprehensive, directly comparable causal model is not yet well-established in the literature [4,52]. More targeted research is needed to fully validate and expand upon the proposed connections between learning approach, career values, and specialty choice.

Understanding how students choose specialties and how different factors interact to influence student preferences can help medical schools guide and counsel students through this challenging process while ensuring the future of the physician workforce. Our findings from an American branch campus in Qatar contribute to earlier research on how medical students choose specialties by offering a novel SEM model for conceptualising the relationships between learning approach, career values, and specialty choice. We hope these findings will prove useful for medical schools from similar contexts that need to adapt curriculum to meet local needs and guide medical students transitioning from medical school to postgraduate training.

Author Contributions: The initial idea for the study and instruments for research came from S.S.Q., and after discussions with the Medical Education Department, an arrangement was made to collaborate with V.R.V. and A.H.L. All authors made substantial contribution to the design of the study. Statistical analysis was carried out by V.R.V. as well as methods and results contribution in the first draft of the manuscript. A.H.L. and S.S.Q. wrote the introduction, and V.R.V. and A.H.L. contributed to the introduction, wrote the methods and discussion sections, and completed the final draft. All authors contributed to the revisions, read the drafts, and approved the final manuscript. All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data and materials are available upon request.

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