

RESEARCH ARTICLE

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Risky business: medical students' feedback-seeking behaviours: a mixed methods study

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ABSTRACT

There are differing views on how learners' feedback-seeking behaviours (FSB) develop during training. With globalisation has come medical student migration and programme internationalisation. Western-derived educational practices may prove challenging for diverse learner populations. Exploring undergraduate activity using a model of FSB may give insight into how FSB evolves and the influence of situational factors, such as nationality and site of study. Our findings seek to inform medical school processes that support feedback literacy. Using a mixed methods approach, we collected questionnaire and interview data from final-year medical students in Ireland, Bahrain, and Malaysia. A validated questionnaire investigated relationships with FSB and goal orientation, leadership style preference, and perceived costs and benefits. Interviews with the same student population explored their FSB experiences in clinical practice, qualitatively, enriching this data. The data were integrated using the 'following the thread' technique. Three hundred and twenty-five of a total of 514 completed questionnaires and 57 interviews were analysed. Learning goal orientation (LGO), instrumental leadership and supportive leadership related positively to perceived feedback benefits (0.23, 0.2, and 0.31, respectively, $p < 0.05$). Perceived feedback benefits are related positively to feedback monitoring and inquiry (0.13 and 0.38, respectively, $p < 0.05$). The personal cost of feedback is unsupported in quantitative data, but was a strong theme in interviews, as was feedback avoidance, peer feedback, and unsupportive learning environment. No differences were observed across sub-groups based on gender, study site, or student nationality. Integrated analysis describes FSB: avoiding 'unsafe' feedback (*first, do no harm*) and overcoming barriers (*beat the system*) and goal-centred curation (*shop around*) to optimise benefits. Diverse medical students across three continents undertake FSB with careful navigation, as a valued but risky business, that is highly contextualised. Promoting a constructive FSB is complex. Overcoming outdated theory and practices on the wards remains a challenge to psychologically safe, learner-centred feedback.

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Feedback-seeking; feedback; mixed methods; undergraduate feedback; feedback literacy

Introduction

Originally considered as rater-transmitted information, contemporary work reframes feedback as bi-directional developmental planning, reliant on an educational alliance with the learner as active participant [1,2]. The proactive effort made by learners to engage with feedback is defined as feedback-seeking behaviour (FSB), a central focus of the present study. The feedback literate learner actively seeks and engages with feedback to enhance in-the-moment learning and learning strategies. Evidence from practice indicates that such proactive behaviours are variable and dependent on a number of factors. A FSB model applied in postgraduate obstetric and surgical trainees showed some commonalities and differences between FSB and individual (e.g., learner motivation) and situational (e.g., supervisor or learning environ-

ment factors) variables [3,4]. There are also differing opinions on how learners' interactions with feedback evolve through training. Senior learners may be more active in feedback-seeking [5] while junior residents may not have the mental or emotional space to proactively seek feedback [6].

The problem remains that learners do not predictably engage constructively in feedback-seeking behaviours. The gap we sought to explore was how existing models of FSB relate to undergraduate learner experience and to uncover additional factors which influence FSB, with the aim of informing curricula to support student feedback literacy. While the model itself has so far only been applied in postgraduate contexts, the constructs included derive from studies in both undergraduate and postgraduate environments [7–10].

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Building on the concept of feedback as a ‘social act’ [11] we next consider the impact of national context on FSB. Learner and supervisor behaviour may be influenced by the environment in which they occur [12]. Feedback-seeking may be influenced by the learner’s national culture. Cross-cultural research often refers to the ‘individualism-collectivism’ framework. Individualist societies are proposed to prioritise the needs of the individual over the group and thus are characterised by valuing autonomy and independence. Collectivist societies, conversely, value deep interconnection between community and social groups, above the needs of the individual [13]. Learners within an individualist culture are more likely to engage in direct inquiry, while in collectivist societies, monitoring, i.e., indirectly obtaining feedback information by observing people’s behaviours [14], will dominate [15]. Triandis’ [16] description of cultural syndromes has been applied to response to feedback: Norton described uncertainty reduction as a key incentive in feedback-seeking and Sully De Luque and Sommer [15], refer to uncertainty tolerance; which varies dramatically (high in US, UK, India; low in Mexico, Middle East). Societies with high uncertainty intolerance “maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. In these cultures, there is an emotional need for rules. A learner influenced by this background may be challenged in accepting feedback that requires behavioural changes and/or re-conceptualisation of study and performance strategies. Opportunities for feedback-seeking within an organisation may be affected by embedded systems related to national culture [17]. These cultural considerations are of particular relevance given that medical student migration patterns and dissemination of western curricula to sister sites are features of modern medical education [18,19]. It has been established that cultural differences can present challenges if local contexts are not considered [20], but it remains unknown how national and organisational contexts specifically influence FSB. Therefore, when considering factors that influence FSB, we compared student experiences in the pre-existing model and in our qualitative analysis, across site of study and nationality.

We chose to study final-year students because we are interested in FSB in clinical learning environments similar to previous studies, but with important distinctions – student rotations are relatively short, with frequent movement and multiple supervisors. Final-year students put greater value on feedback to earlier undergraduates [5]. Our study seeks to explore how final-year medical students engage in feedback-seeking, to provide insight on factors that motivate or obstruct FSB. Additionally, we aim to explore how situational factors such as nationality and site of study influence feedback-seeking behaviours.

Methods and materials

Methodology

This study uses mixed-methods design to better understand the influences on how medical students seek feedback. Quantitative and qualitative data were collected in parallel, analysed, and integrated.

Theoretical framework

The model of feedback seeking behaviour derived from existing research described above is based on the following outcome, mediating, and predictor variables.

An outcome variable is the measurable factor that is the focus of the study, i.e., types of feedback-seeking behaviours are the outcome variable in this study.

A mediating variable is a variable that helps explain the mechanism by which a predictor variable affects an outcome variable. In this model, mediating variables are perceived costs and benefits of FSB.

A predictor variable is a variable believed to affect or predict changes in an outcome variable. In this model, predictor variables are learner goal orientation and leadership style preferences. Figure 1 demonstrates the hypothesised relationships investigated in this study.

Outcome variables

Research suggests that learners seek feedback via *monitoring* (observing situational cues, observing how others respond to them to generate feedback) and *inquiry* (actively asking for feedback) [7].

Mediating variables

Building on prior work [4,8], we hypothesize the following mediating relationships:

H1a: Students who perceive feedback benefits engage in FSB through monitoring.

H1b: Students who perceive feedback benefits engage in FSB through inquiry

H2a: Students who perceive high feedback costs engage in monitoring

H2b: Students who perceive high feedback costs do not inquire for feedback

H3: Students who perceive high feedback benefits do not see high costs

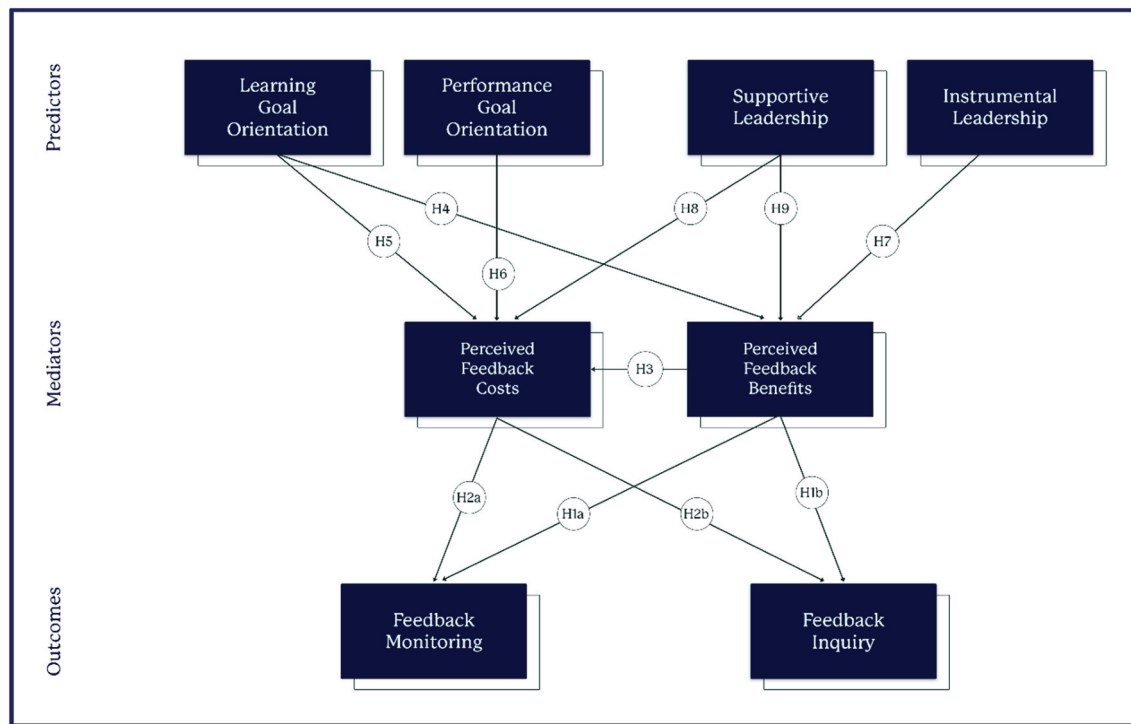


Figure 1. A model of medical student feedback-seeking behaviour, modified from Teunissen and colleagues' model of trainee feedback-seeking behaviour [4]. Arrows indicate hypothesised relationships between predictors, mediators, and outcomes, as follows: hypothesis (H) 1a: feedback benefits are positively associated with feedback monitoring. H1b: feedback benefits are positively associated with feedback inquiry. H2a: feedback costs are negatively associated with feedback monitoring. H2b: feedback costs are negatively associated with feedback inquiry. H3: feedback costs and benefits are negatively associated. H4: learning goal orientation is positively associated with feedback benefits. H5: learning goal orientation is negatively associated with feedback costs. H6: performance goal orientation is positively associated with feedback costs. H7: instrumental supervision is positively associated with feedback benefits. H8: supportive supervision is negatively associated with feedback costs. H9: a positive relationship exists between a more supportive leadership style and perceived feedback benefits.

Predictor variables

Individual variables

Goal orientation influences FSB [21]: learners with learning goal orientation (LGO) are motivated by mastery, while those with performance goal orientation (PGO) seek favourable judgment of their ability [22]. In accordance with this, we hypothesise the following:

H4: Students with higher LGO perceive high benefits to feedback

H5: Students with higher LGO perceive low costs to feedback

H6: Students with higher PGO perceive high costs to feedback

Situational variables

The theoretical framework includes two commonly described supervision styles: supportive (approachable and considerate of trainees) and instrumental (focus on explicit instruction and clear goals) [23].

With regard to these, we hypothesise:

H7: There is a positive relationship between higher instrumental leadership style and perceived feedback benefits of FSB (H7),

H8: There is a negative relationship between supportive leadership style and perceived feedback benefits of FSB (H7),

H9: There is a positive relationship between a more supportive leadership style and perceived feedback benefits

To assess the above relationships, the model uses 8 constructs and scales with 55 items measuring learning goal orientation (5) performance goal orientation(8), perceived feedback benefits(6), perceived feedback costs(8), instrumental leadership preference (7), supportive leadership preference(9), frequency of feedback inquiry(6) and frequency of feedback monitoring(6). Responses to all of these items were on a 6-point Likert scale, where 1 = strongly disagree and 6 = strongly agree, with the exception of the supervisory scales which were on a seven-point scale from 1 = never to 7 = always. [Appendix 1](#) includes sample items for each scale.

Research orientation

This study seeks to complex issues from multiple perspectives. Some assert that mixed methods are not possible due to the incompatibility of the paradigms underlying them (e.g., Guba & Lincoln [24]. Others have delineated several potential viewpoints; an apara-digmatic stance, which disregards paradigms; a multi paradigm stance which advocates for mixing alternative paradigms even when ostensibly incompatible; and a single paradigm approach which proposes that qualitative and quantitative work can be accommodated under one paradigm [25]. In this study, the aims draw on different types of knowledge creation. To reconcile this, we applied a pragmatic paradigm which focusses on the research questions and the utility of the work in practice, thus enabling a pluralistic approach [26].

Setting

In terms of contextual reflexivity, our institution has three campuses in Ireland, Bahrain, and Malaysia, with the Irish campus student population comprising 101 nationalities (Reference in non-anonymised version). The students in Ireland enter via direct or graduate entry, then come together for the final two years of studies. Students in Bahrain and Malaysia are all enrolled in the traditional direct-entry programme. The programme is delivered in English at all sites. Feedback in the clinical environment is primarily verbal. Mandatory written end-of-rotation appraisals must be elicited; these are available to students for their portfolio, but not provided to external bodies, e.g., intern or residency programmes. There are two common supervisors at each site who give feedback on the wards: consultants (attendings) and clinical lecturers (doctors at residency level employed by the medical school to teach and assess on the wards. In order to understand potential differences in FSB across sites, it was important to reflect on these differing contexts and how they may uniquely shape students' FSB.

Sample and procedures

The seven-scale questionnaire [4] was distributed to final-year medical students at each campus at an educational session, in September 2019. As many students have lived across several countries and are of mixed ethnic and/or national background, demographic questions included nationality and requested a response to what 'Place I Call Home' (PICH) to capture this complex data meaningfully in student-centred terms. Medical students were asked to base their responses on feedback experiences on the wards.

Data management and analysis

All questionnaire data was double-entered manually and analysed using Stata [27].

Cronbach's alpha was used to assess the internal consistency of our measures. Descriptive statistics and Pearson correlation coefficients were used to screen the data and assess the relationships between pairs of variables. There was a small amount of missing data (<1%) and the maximum likelihood with missing values option in Stata was used. The complexity of the hypothetical model, with multiple mediators and outcome variables, led us to use structural equation modelling (SEM) to test the significance of the hypothesised relationships between variables and the fit of the overall model. Subgroup analysis was conducted, by gender (male/female), entry level (Direct Entry Medicine (DEM), Graduate Entry Medicine (GEM)) location (Dublin, Bahrain, Kuala Lumpur) and Place I Call Home (South Asia, Arab States and USA/Canada and Europe). Regression weights were deemed significant at an alpha level of 0.05.

Interviews

Interviews were undertaken to develop a more in-depth understanding of relationships uncovered in the quantitative data and to explore additional factors which influence students' FSB.

Sample and procedures

Qualitative data were collected from September 2019 to July 2020 (The pandemic delayed access). JL (Ireland), MS (Bahrain), and MHJ (Malaysia) conducted individual semi-structured interviews with a total of 57 participants. Recruitment was via announcements in lectures, emails, virtual learning environment posts, and snowballing. We aimed for maximum diversity sampling to ensure a mix of students in terms of gender, site of study, PICH, and entry route. Participants were provided with an information leaflet and presentation prior to agreeing to participate. An interview guide was created by MS to explore feedback-seeking experiences. This was fine-tuned based on initial quantitative data. Preliminary quantitative data identified several non-hypothesised relationships (Figure 2), which prompted adding to the questions on FSB motivation (Appendix 2, 3a, 6). The questionnaire results indicated no relationship between feedback costs and either the predictor variables or FSB, so additional questions related to costs (Appendix 2, 3c, and d) were added to the interview guide. A pilot interview was performed in Dublin by JL, leading to a refined interview guide (MS, JL, TP) (Appendix 2). Interviews explored factors influencing FSB on the wards. The majority were in person, 10% were telephone interviews. All interviews were recorded and transcribed using Otter transcription

software (Otter.ai, 2023) then verified for accuracy from the recording, and anonymised. Original recordings were subsequently destroyed, after participants were given an opportunity to review transcripts, as per ethics requirements. Analysis was undertaken iteratively; with sample size was guided by the principles of information power. With a broad aim with cross-case comparison required a wide sample, therefore coding continued until it was felt that no additional information was being added that addressed the research aims [28].

Data management and analysis

Template analysis was chosen as a systematic approach, as it is useful when managing large data sets and allows for *a priori* codes from previous studies to be considered [29]. We followed the six-stage process [30] of familiarisation, preliminary coding, clustering, producing an initial template, applying and developing the template,

and template evolution and final interpretation. Details of the steps are outlined in Table 2.

Data integration

The integration technique of ‘following the thread’ was employed after the initial analysis of quantitative and qualitative data [31]. This technique allowed us to identify key themes from the quantitative data to pick up and explore in the qualitative data, and vice versa. In effect to develop a more multi-faceted perspective. Themes were chosen as having findings which related to the research questions, and which demonstrated relationships across the datasets. We assessed the two datasets for confirmation (findings reinforcing each other), expansions (findings in one set which expanded on insights from the other) and discordance (contradictory findings) [32]. A diagram of this process is presented in Figure 3.

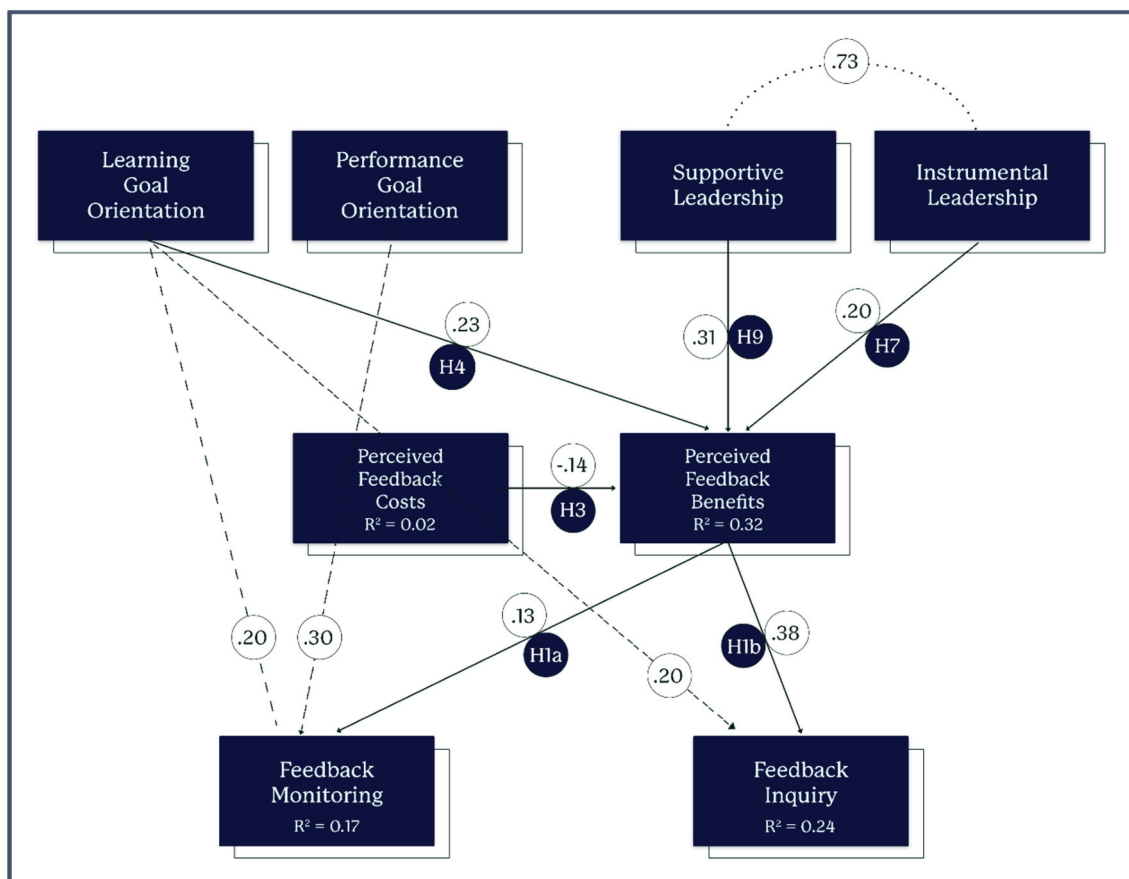


Figure 2. Model explaining final-year medical students' feedback-seeking behaviours. Reported path values are standardized regression weights. Standardized regression weights < 0.20 are significant at the $P < 0.05$ level; regression weights ≥ 0.20 are significant at the $P < 0.001$ level. R^2 is the percentage of variance explained for that specific variable. To assess different aspects of the overall model fit, we used several indices including the chi-square index divided by degrees of freedom, which should be less than 3 for a good model fit. The root mean square error of approximation (RMSEA) should be less than or equal to 0.05 and PCLOSE is the corresponding p value that tests the null hypothesis that the RMSEA is no greater than 0.05. The comparative fit index (CFI) compares the covariance matrix of our empirical model to the observed covariance matrix. A CFI close to 1 indicates a very good fit. The fit indices for this model were: chi-square/df = 1.6, RMSEA = 0.043, PCLOSE = 0.54, and CFI = 0.99. The CFI indicates that 99% of the covariance in the data is accounted for by this model. The resulting model explains 2% of the variance on the perceived feedback costs variable, 32% of the variance on perceived feedback benefits, 17% of the variance on feedback monitoring, and 23% of the variance on feedback inquiry.

Researcher reflexivity and rigour

Interviewers did not have any educational relationship with interviewees (JL-Dublin, MS- Bahrain, MHJ- Malaysia). MS and TP are both clinicians with a special interest in feedback, while the rest of the team are outsiders to this research context. All interviewers are experienced qualitative researchers, who undertook group orientation and pilot review to ensure consistent approaches. Interviewers were not known to the participants and were not involved in

their teaching or assessment, in an attempt to limit inter-personal power distance. We strengthened the trustworthiness of our interpretation by undertaking mixed methods, thus seeking evidence from more than one source [33,34].

Our diverse research team were based in England, Ireland, and Malaysia, and brought differing perspectives to the analysis, to challenge preconceived ideas. MS kept a reflexive diary to recognise opinions and emotions as part of the research. We used rich description in creating templates, and multi-vocality to

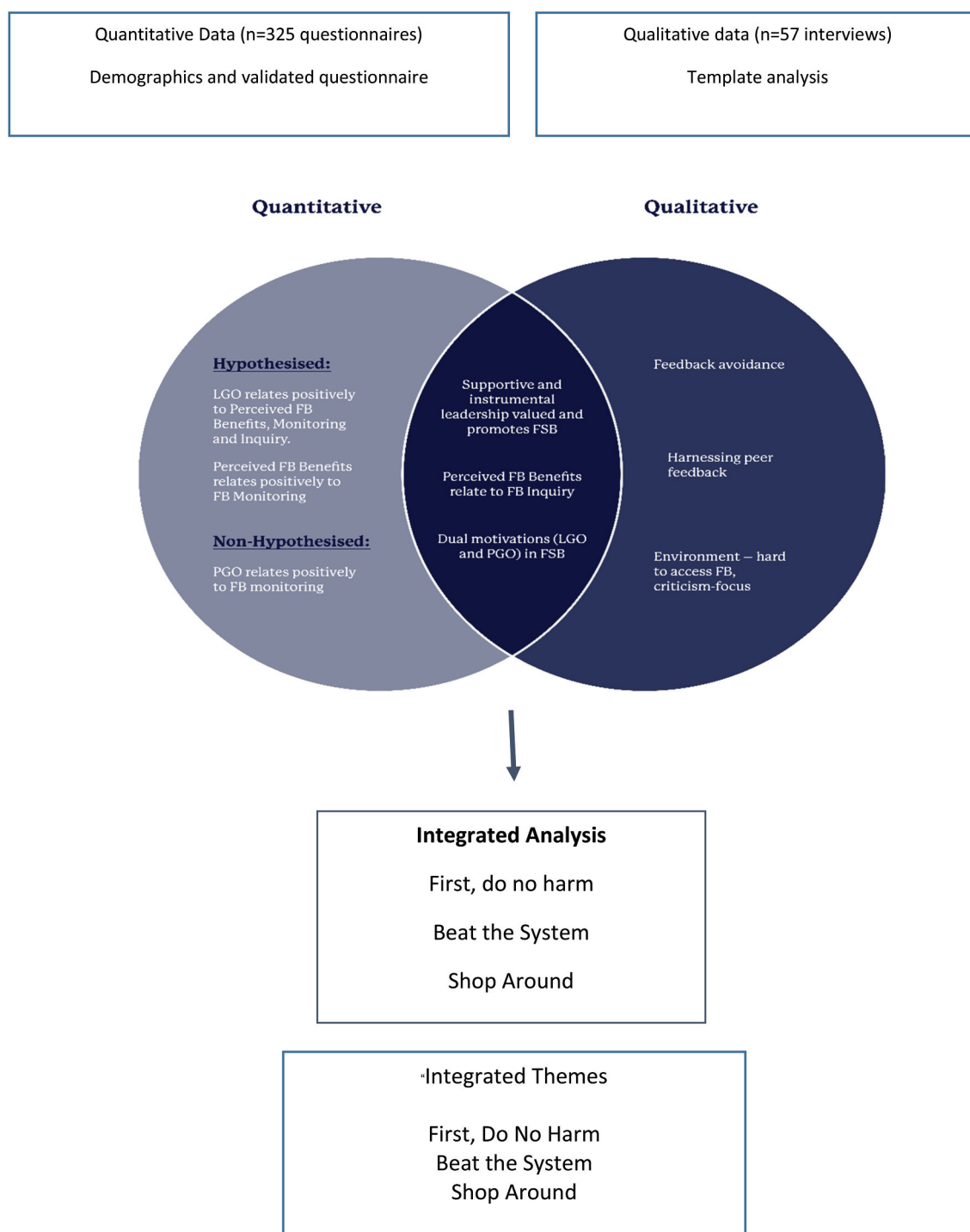


Figure 3. Diagram of the process used to integrate the data from the mixed methods in this study exploring feedback-seeking behaviours in undergraduate medical students at three transcontinental campuses. FB = feedback. FSB = feedback-seeking behaviours.

Table 1. Participant profile for interviews. Fifty-seven students participated, with their details in terms of gender, entry route (direct entry versus graduate entry), site of study included, with total population numbers for each group also indicated.

Average age of participants	25.1 (21–33)				
Gender	Male	Female			
Participants	26 (46%)	31(54%)			
Full Class	269 (52%)	245(48%)			
Entry route	Direct Entry	Graduate Entry			
Participants	47 (82%)	10 (18%)			
Full class	449(87%)	65 (13%)			
Site of Study	Dublin	Manama	Kuala Lumpur		
Participants	41 (72%)	8 (14%)	8 (14%)		
Full Class	323	151	40		
Place I Call Home*	Europe	Arab States	U.S. and Canada	South East Asia	Other
Participants	8 (14.0%)	20 (35%)	14(25%)	9 (16%)	6 (11%)
Full class	87(17%)	227 (44%)	100(20%)	69(13%)	31(6%)

progress raw data to iterative analysis. Participants were invited to review interview analysis and their contribution allowed for further refinement of themes.

Ethical considerations

We received ethical approval (01557) for this study from each international site. Informed consent was obtained with each participant. Students were assured there were no implications arising from this study for their academic progression and that they could withdraw at any point. MS performed respondent validation [35].

Results

Descriptive results

The questionnaire response rate was 63% (325 completed of 514 students). Almost half of students (157, 48%) identified as female, 157 (48%) as male and 11 (3%) as non-binary or 'other'. Of the respondents, 182 (56%) were based in Ireland, 104 (32%) in Bahrain and 40 (12%) in Malaysia. Table 2 presents statistical analysis including correlations among variables in the hypothetical model tested.

We interviewed 57 students, 31 (54%) who identified as female, 26 as male (46%). This represented 41 (72%) from the Irish campus, and 8 (14%) from each of the Bahraini and Malaysian campuses. For Place I Call Home (PICH), 8 (14%) of students nominated Europe, 20 (35%) Arab states, 14 (25%) U.S. and Canada, 9 (16%) South East Asia. Six (10%) students were classified as 'other' as they represented specific countries outside of the previously mentioned regions which would identify them. Detailed demographics are represented in Table 1. Interviews ranged from 17 to 66 minutes.

Structural equation model

Table 2 presents the means, standard deviations, Cronbach alphas, and correlations among variables in the hypothetical model. We tested the hypothetical model (Figure 1) using SEM methods. To assess different aspects of the overall

model fit, we used several indices (chi-square index, the root mean square error of approximation (RMSEA), and comparative fit index (CFI)). The fit indices for the original model were poor: chi-square/df = 7.8, RMSEA = 0.15, PCLOSE < 0.01, and CFI = 0.77. Results in Table 2 indicated a positive correlation between Learning Goal Orientation LGO, and feedback inquiry and monitoring, between PGO and FB monitoring, and between instrumental and supportive leadership. We adjusted the model to account for these potential relationships (Figure 2). The fit indices for this model were much better: chi-square/df = 1.6, RMSEA = 0.043, PCLOSE = 0.54, and CFI = 0.99. The CFI indicates that 99% of the covariance in the data is accounted for by this model.

Model results

Figure 2 displays questionnaire data analysis. Hypotheses 1A, 1B, 3, 4, 7, and 9 (predictors and outcomes related to feedback benefits) were supported, while hypotheses 2A, 2B, 5, 6, and 8 (predictors and outcomes related to feedback costs) were not, as summarised below.

Confirmed hypothesised relationships

Learning goal orientation (0.23, $p < 0.01$), instrumental leadership (0.20, $p < 0.01$), and supportive leadership (0.31, $p < 0.01$) related positively to perceived feedback benefits. Eighty-four percent of the respondents showed LGO dominance in the questionnaire. Perceived feedback benefits related positively with Feedback Monitoring (0.13, $p = 0.01$) and Inquiry (0.38 $p < 0.01$). Perceived feedback benefits are negatively related to perceived feedback costs (-0.14 , $p = 0.03$).

Non-confirmed hypothesised relationships

Besides the inverse relationship with feedback benefits, there was no significant relationship identified between feedback costs and any other variable.

Table 2. Means, standard deviations, Cronbach alphas, and correlations among variables in the hypothetical model.

	Mean (SD)	Cronbach alpha	Correlations							
			Learning goal	Performance goal	Supportive leadership	Instrumental leadership	Perceived costs	Perceived benefits/value	Feedback monitoring	Feedback inquiry
1. Learning goal	4.82 (0.69)	0.78	1							
2. Performance goal	3.73 (0.89)	0.81	0.0076	1						
3. Supportive leadership	4.68 (1.06)	0.92	0.1325	0.1188	1					
4. Instrumental leadership	4.88 (1.06)	0.92	0.131	0.1202	0.7245	1				
5. Perceived costs	4.91 (0.64)	0.73	0.0316	0.0764	−0.0493	−0.0236	1			
6. Perceived benefits/value	3.03 (0.62)	0.71	0.2975	0.0887	0.4954	0.4655	−0.1069	1		
7. Feedback monitoring	4.62 (0.81)	0.79	0.2471	0.3124	0.0682	0.0595	0.0183	0.2218	1	
8. Feedback inquiry	3.63 (1.06)	0.88	0.3148	−0.0329	0.2204	0.2904	0.0131	0.4268	0.0899	1

Significant non-hypothesised relationships

As mentioned above, non-hypothesised relationships were accounted for in the model. There was evidence of a relationship between both LGO (0.20, $p < 0.01$) and PGO (0.30, $p < 0.01$) with FB Monitoring, and between LGO (0.20, $p < 0.01$) and FB Inquiry. We also found a relationship between Instrumental leadership and supportive leadership (0.73, $p < 0.01$).

Sub-group analysis

Sub-group analysis for all hypotheses mirrored the above, with exceptions as follows:

- Instrumental leadership was associated with perceived FB benefits for all groups except graduate entry students, students who identified Place I call home (PICH) as South East Asia and students at the Malaysian campus.
- PGO and perceived feedback costs showed a positive relationship in male students, students who identified PICH as the Middle East and students at the Bahraini campus.

However, sample sizes for the subgroup analysis were smaller and the model fit indices were poor with significant chi-squared statistics and RSMEA > 0.05 . Thus, results should be interpreted with caution, and further research is required in relation to subgroups.

Interview analysis

Participants articulated the strategies they used to decide feedback-seeking behaviours. They consider personal goals while weighing up costs and benefits in each individual context. Findings from our interviews did not support any FSB specific to sub-groups based on gender, site of study, route of entry or PICH. A small number of participants described being more likely to engage with supervisors with the same nationality or ethnicity.

I think people find comfort when they find similarities between each other. You know, so they kind of like gravitate towards each other (S52). (Student at Bahrain site, identifies as Indian)

Some participants described that feedback was more comfortable with someone with whom they felt they shared characteristics. Most indicated that neither their own national nor ethnic background, nor that of the supervisor affected FSB:

No, I don't think so. Like I wouldn't go look for feedback from them because we are the same ethnicity, I don't think I would go seeking feedback from them. Unless I just happened to be on their rotation or something like that. Yeah, I wouldn't go out of my way. (S8) (Student at Dublin site, identifies as Canadian, Indian, and Chinese)

Interviewer: Do you think the cultural background has any effect on who you approach?

Probably not, I've never, it would never come into an active thought process (S37) (Student at Dublin site, identifies as Irish)

Interviewer: Does the cultural background of the doctors affect how you approach them?

No, definitely. I'm trying to think No, I've never done this (*chosen to ask for feedback based on cultural background*) even before. So I don't think I would do that. I have tutors from different nationalities, I always kept asking for feedback (S21) (Student at Dublin site, identifies as Kuwaiti)

Interviewer: Would you consider the cultural background of the teacher's background?

You mean, like in terms of like, maybe they from UK, or they're from Malaysia? Or India? No, like it depends on the knowledge base they have, the experience they have, of course, the more experience you

have, the more likely we are going to listen to you (S47) (Student at Malaysian campus, identifies as Malaysian)>

However, we identified two additional themes related to FSB: Environment, Feedback Avoidance, and Peer Feedback. These are summarised in Table 3. Our integrated analysis led to three overarching themes: First, Do No Harm; Beat the System, and Shop Around.

Integrated analysis

First, do no harm

Students conceptualised feedback seeking as a risky business. While quantitative results showed no relationship between FSB, the predictor variables (goal orientation, leadership styles) and perceived feedback costs, this was not borne out in qualitative findings. Participants did not spontaneously describe 'costs', but discussed losing face (self-presentation costs) and lowered self-esteem (ego costs). They actively avoid feedback because 'I'm afraid of knowing my performance' (S48). They forfeit feedback if it entails potential trauma. This could be situational, e.g., performing in front of their whole class/team, or performing a new skill

"I am in fifth med and it's my whole class, and I've known everybody for five years, like, you just tend to feel embarrassed because you're like, 'Oh, these people know me and are gonna be told how bad I am, this is not good' (S15).

FSB often related to leadership style, in line with confirmed hypotheses 7 and 9 (Figure 2) – instrumental leadership and supportive leadership relate positively to perceived feedback benefits. (0.2 and 0.31, respectively, $p < 0.05$). As seen by the relation between instrumental and supportive leadership in the questionnaire, they seek feedback from supervisors perceived as supportive but also direct.

"You can be direct, but not rude...and say, 'This is not a good job. You can do better. This is how you should do it' and that's fine. Just don't go like 'Oh, you're a terrible student' (S10)

They target supervisors who 'really seem like they're interested in teaching us and helping us succeed' (S3). Likewise, they actively avoid unsupportive leaders

"If what they say is insulting, not really needed trying to make you correct but insulting you, and making you feel down, I'll avoid it. Yeah, definitely avoid. (S9)

Avoidance was not a construct in the original theoretical model on which the questionnaire was developed.

Beat the system

Interviewees indicated that they had to find ways around an environment with poor access to feedback. They describe their attempts to 'beat the system', i.e.,

surmount the obstacles in their FSB. They take several approaches to this. When feedback is not embedded in learning activities, they sometimes proactively ask for it:

'You have to actively seek it' (S5)

'I actively seek out feedback pretty frequently because actively seeking out feedback tends to be the only way to actually get any? Because there's, there's nothing sort of built into the program.' (S3)

This is challenging and oftentimes unsuccessful, because they describe busy supervisors who imply feedback is burdensome

'I went to his clinic, and he didn't even look at me. And he was super busy. So I would never be like, "Oh, my God, look at me". I just left it. Yeah. So I kind of tried to feel it out, by I guess their body language. If someone looks at me then I could be like, "Oh, they notice me. Okay". If he just did his stuff and walks away? No way am I gonna be like, "talk to me".'(S15)

Both questionnaire and interview data indicate students' value instrumental leadership with clear expectations, but feedback was often vague or critical, and un-actionable. Seeking useful feedback was sometimes onerous and discouraged. While hypothesis 2A – perceived costs positively relate to monitoring – was not proven, interviews revealed feedback inquiry came at the cost of reprimand, so students describe resorting to monitoring

'you just kind of you do something and you're kind of just gauging based on someone's reaction ... a lot of times you can kind of tell with the examiner, whether you're on the right track'. (S37)

This often meant struggling to interpret tacit observations and turning to peers to make sense of feedback

"... other times you didn't do well. And you know, you didn't do well. And so if you just need to sort of bounce ideas around with people, like if there's something that you need help understanding, then other students are good people for that (S34).

Shop around

Qualitative data suggested that students' motivation in seeking feedback was complex and could not be easily categorised in to either performance or mastery orientation. Students appear to have dual goals in FSB.

'For two reasons. I always ask for feedback. The first reason is to aim high in scores. Definitely. That's the first thing and I would be lying if I didn't say that true. The second reason is that I'm imagining myself graduating in a few years as a doctor ... I'm aiming to become even higher than average. Like I have a lot of exemplary doctors I have seen in my life. I want to be like them' (S14).

Table 3. Qualitative themes that describe situational factors relating to feedback-seeking behaviours in medical students.

Theme	Sub-theme	Description	Illustrative quote
Environment	Programme level barriers to accessing feedback	Learners describe that feedback opportunities are not embedded in the programme.	There's nothing sort of built into the program. That I mean, nothing might be strong, but there's very little built into the program where you actually get feedback. I think we got feedback on like a short case, in second year, one time. (S3)
		Learners described having to navigate bureaucratic processes to access feedback.	You sort of can't, well officially you can ... but it's really hard. So I never do, because there's sort of no point, it's too much of a headache (S19)
		Learners perceived supervisors to be very busy and that providing feedback to them was onerous and should not be expected.	I think I don't want to bother people ... when you're in a hospital, and the people that are teaching, you have other issues at stake, they have to look after patients, and they are in a professional role ... when it comes to teaching us, that's probably lower on the list of priorities. So I just think it's not something that I would think is that important to take up their time really to have to consider me and feedback towards me (S5)
		Learners describe being admonished for requesting feedback, both directly from supervisors, and advised by administrative staff that the policy was not to provide feedback	I feel like ... the consultants are less approachable here, when it comes to asking for feedback, I don't think I have ever asked for feedback here, just because I just don't feel like it would be taken well.(S11) Sometimes they tell us, you're not supposed to make contact, for feedback, because if you're gonna get feedback, then everyone else is gonna want feedback (S23)
	Generic feedback common	Students will ask for feedback if it is likely to be specific to their performance: if they expect generic responses, they don't.	I really like, specific points ... please do X, Y, and Z. So anything that is the opposite of that, in terms of vagueness ... just sort of providing critique, because it's expected ... (<i>I leave a</i>) feedback session being like, why did I even bother showing up? (S8) I feel like there's just either zero feedback, or the feedback that we get is just like, 'oh, you need to study more in this. study more of that'. It's not. It's not specific. (S11)
	Longitudinal feedback not often possible	students were more likely to seek feedback following repeated observation	I would ask someone, if I feel like, they've been seeing me enough to be able to have something to say (S34) So, the more knowledgeable a person is of my behaviours and (has)spent time with me, then I would (<i>seek feedback</i>) ... be like, yeah, they actually know ... they have, they've noticed the repetitive kind of patterns (S31)
			Sometimes I'll be with a reg (<i>registrar</i>) for like, two hours in clinic, you know, in that case, I might not ask because they wouldn't have a whole lot to go on (S34) But it's sort of hard to seek out. I think most of our lecturers don't know us that well. Yeah, that well, so it's kind of like, if you just email someone out of the blue, I feel like a lot of the time, they won't even remember who you are by name (S39)
FB Avoidance	Snapshot feedback common	Students sometimes actively avoid feedback when it is on a 'snapshot' of performance that they feel unrepresentative of their ability	If I feel like the person is just straight up being malicious ... I'm not going to accept the feedback or even seek it. (S1) As I say like, there are some of the seniors doctors are like are really tough. Yeah. And then when they select you have present to them, I try to avoid them (S41)
	Unsupportive leadership	Students actively avoid feedback which they perceive to be purposefully hurtful or have excessively high standards	Do you ever give or seek feedback from other students? Yeah, definitely, all the time. And what does that look like? Really casual, friendly positive. It's mostly around friends, rather than just random students. But like, there have been instances where you're just randomly put with a student who is not your friend, and if they're nice enough to help each other, like "Oh, no, you should do that better. And oh, no, we should do that better" It's actually really positive, I tend to really like it.(S19) <i>other times you didn't do well. And you know, you didn't do well. And so if you just need to sort of bounce ideas around with people, like if there's something that you need to help understanding, then other students are good people for that (S34).</i>
Peers	Students turn to peers for feedback when it is not easy to access or is unhelpful	Students value asking peers for feedback to make sense of feedback and develop learning plans.	

So in any specific situation, they consider potential benefits of feedback and shop around for different needs: role models are targeted for mastery goals, they seek feedback from faculty who set exams for performance goals. This ties in with quantitative data which showed relationships for LGO with both inquiry and monitoring, and PGO with monitoring. Interviewees strategically avoid ‘stern’ consultants who they consider unsupportive, despite quantitative data finding no relationship between perceived personal costs and FSB

“there are a lot of students who, get feedback that is sort of like personally insulting or degrading, and then take it personally and then just like, decide that they’re not going to seek feedback again, which I think is a really reasonable decision on their part.” (S3).

They are conscientious consumers, who pick and choose what suits their aims while side-stepping interactions they cannot afford, and then compile the accumulated ‘nuggets’ of personal feedback for their dual goals of mastery and achievement.

Strengths and limitations

This is a multi-site study of diverse students, many at a site other than their home country, at campuses on three continents, with feedback experiences on the wards in three different healthcare systems in ostensibly different cultures. The different sizes and response rates at each site may influence the representation of particular behaviours; however, the varying background and context of these students increases likelihood that these findings have wider relevance. Engagement with the quantitative questionnaire was good, and our qualitative analysis achieved a depth of exploration with the sizeable rich data attained in maximum variation sampling across sites. There were no relationships identified with predictor variables, FSB, and personal costs in the questionnaire but by using mixed methods, we were able to explore in more depth how learners perceived costs. This was illuminating as it indicated learners experienced hostile feedback encounters regularly but felt this was inherent in the learning culture. This may mean these questionnaire items do not constitute a good fit for undergraduates. Inevitably, some sample sizes are small for the other subgroups, and relations for them should be considered exploratory and those results interpreted accordingly. There were fewer questionnaire items for learning goal orientation and instrumental leadership preference than the other scales which may have limited their interpretation. Particular insights were gained from mixed methods integration. While some quantitative results were confirmed and expanded by the qualitative data, others were discordant with qualitative findings for the personal costs of feedback. Taken as

a whole, this study offers generalizable results and a deep exploration of individual experiences to provide an integrated analysis with a conceptual model on which future research can be built.

Discussion

Our study sought to explore how final-year medical students engage in feedback-seeking, to provide insight on how their particular needs may be supported. Additionally, we aimed to explore how situational factors such as nationality and site of study influence FSB. Medical students value feedback but contend with complex considerations deciding to inquire, monitor, or avoid. These are highly contextualised and dynamically re-evaluated for each scenario. Our findings are striking for almost identical patterns across sites, entry route, nationality and PICH, i.e., national and ethnic identity and site of study did not influence FSB. Previous work has indicated such cultural factors can potentially influence FSB. Healthcare workplaces have diverse staff, which may mean students habituate to inter-cultural learning interactions at an early stage. As ‘digital natives’, generation Z’s sense of self has been curated online and is characterised by identity fluidity [36]. These learners have grown up with digital connectedness that means routine exposure to a diversity of representations of nationality, culture, and community. It is likely that restricted concepts of identity such as nationality do not resonate with these learners and therefore do not impact their FSB. Educators must recognise this evolution. Broad concepts that support feedback literacy- respect, constructive agenda, and developmental planning- should combine with appreciation of the individual context in any feedback encounter if it is to support learning.

There were two sub-group exceptions to overall questionnaire results. Instrumental leadership was associated with perceived FB benefits for all groups except graduate entry students, students who identified PICH as South East Asia, and students at the Malaysian campus. Instrumental leadership is characterised by explicit instructions and an expectation of following specific guidelines. The individualism-collectivism cultural framework identifies South East Asian culture as collectivist, which favour behaviour in harmony with the group. Knowledge is shared and discussed, with a focus on group decision-making. They may therefore value collaboration over direct instruction [15]. It is possible that GEM students, having previous workplace experience, may prefer styles associated with positive workplace behaviours, such as transformational leadership [37,38].

Performance goal orientation and perceived feedback costs showed a positive relationship in male students. There is well-established research suggesting that

performance goal orientation is more common in males [39,40]. In keeping with previous work [10], high performance goal orientation in this group showed a relationship with more perceived feedback costs. Learners motivated by external validation will feel they have more to lose if feedback is unfavourable.

Although our quantitative findings align with postgraduate studies indicating supportive, instrumental leadership promote FSB, we found that unsupportive leadership is common, and frequently causes avoidance. Personal Costs were a strong theme in interviews, though students did not name them as such. This is particularly interesting given the unmediated positive relationship between PGO and LGO and inquiry, suggesting students are inherently motivated towards FSB, irrespective of potential costs. The questionnaire did not uncover any relationships with feedback costs, with the model explaining only 2% of the variance on perceived feedback costs. Students may not have recognised personal costs in the questionnaire. Taking these three findings together, students may normalise personal costs to some extent. If they accept them as an ever-present unavoidable phenomenon within their learning environment, it could explain why they do not mediate FSB. This aligns with undergraduate experience being reported as hierarchical, criticism-focussed [41], with students adapting to mistreatment practices [42,43]. This may also contribute to under-reported costs if there is an element of social desirability bias to reply according to this culture's expectations [44]. In the same model, few relationships to costs were noted among surgical trainees [3], where hierarchical culture is widely acknowledged [45]. An alternative interpretation is that because feedback on the wards was not implemented in a continuous assessment programme, it held less risk for our students. However, interviewees did perceive costs and when they felt psychologically unsafe, resorted to monitoring tacit messages or harnessing peer feedback. Future research should consider therefore the amount, quality, and accuracy in interpretation of feedback occurring 'off the books'.

Supportive, instrumental leadership was key in promoting inquiry; when unsupportive students avoid feedback. Educators should be wary that short clerkships may mean less invested supervisors, where flippant comments negatively affect subsequent FSB. Longitudinal relationships are widely acknowledged to support feedback [2,46] but integrated clerkships are practically challenging. Feedback models centred on coaching for in-the-moment feedback in brief clinical encounters show promise in postgraduate education [47]; further research is needed to explore how this would translate in undergraduate contexts.

Our work indicates that dividing learners in to LGO or PGO may be reductive; learners' motivations are complex and their FSB is dynamic, acknowledging the

limitations from any one interaction. They pick and choose to curate what they need, while simultaneously side-stepping what they fear. Engaging in meaningful bidirectional dialogue will proactively engage the learner in acknowledging these goals, while co-constructing a developmental plan aligned to them will make the most of each encounter [48], while presumption of binary goal orientation risks increasing the need to shop around to fulfil feedback needs.

Conclusion

Our findings concerning feedback-seeking behaviour indicate that, as with postgraduates, FSB in medical students hinges on supportive relationships in a positive learning context. Acknowledging dual goal orientation enables comprehensive developmental planning. While FSB is highly contextualised, our findings indicate that site of study, entry route and nationality have minimal impact for medical students. Cultural context in terms of nationality and ethnicity does not appear to contribute to FSB; we suggest investment in feedback literacy should focus on cultivating a positive learning culture around feedback. If students avoid explicit feedback-seeking and use alternative sources, educators cannot identify that there is an unmet need. This work indicates embedding it as a routine activity in learning activities that both supervisors and students expect is key to potentiate feedback-seeking which supports learning.

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Author contributions

MS conceptualised the study. MS, FB, and TP contributed to the study design. MS and TP performed the data collection. FB and MS performed statistical analysis. MS and TP undertook integrated data analysis. MS produced the first draft of the paper; all authors contributed to and refined this draft. All authors approved the final manuscript for submission.

Availability of data and materials

The datasets analysed in the study are available from the corresponding author on reasonable request.

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Appendix 1

Examples of Items for Each of the Eight Measures Used to Study Final-Year Medical Students' Feedback-Seeking Behaviours

Measure (number of items)	Sample item (Answered on a 6-point Likert scale, where 1 = strongly disagree and 6 = strongly agree)
Measure (number of items) Sample item	I enjoy challenging and difficult tasks at work where I'll learn new skills.
Learning goal orientation (5)	
Performance goal orientation (8)	I'm concerned about taking on a task at work if my performance would reveal that I had low ability.
Perceived feedback benefits (6)	Feedback on my performance helps me to improve my work.
Perceived feedback costs (8)	It is not a good idea to ask your clinical lecturers/supervisors for feedback; they might think you are incompetent
Supportive leadership (9)	My clinical lecturer/supervisor is friendly and approachable.
Instrumental leadership (7)	My clinical lecturer/supervisor asks that students follow standard rules and regulations.
Measure (number of items)	Sample item (Answered on a 7-point Likert scale, where 1 = never and 6 = always)
Frequency of feedback inquiry (6)	How often do you ask your clinical supervisor for feedback on your performance?
Frequency of feedback monitoring (6)	How often do you try to read the behaviour of your clinical lecturer/supervisor?

Appendix 2

Guiding Questions for Interviews

Prior to commencing the interview prompts related specifically to FSB, each participant was asked to discuss their cultural background, specifically:

- How they identified in terms of nationality, resident status, places where they have lived and where they considered home

Cultural influences at home- national and ethnic-related practices that influenced their home life, e.g. languages spoken, culinary

These questions relate to your preferences for feedback while on clinical rotations, with consultant or lecturer supervisors.

- (1) Tell me what you consider to be feedback
 - a. Talk to me about what feedback looked like growing up (at home, in school)
 - b. Talk to me about your feedback experiences in medical school
- (2) Do you seek feedback? Tell me about this.
- (3) What motivates you to seek feedback?
 - a. What are your goals when seeking feedback?
 - a. How do grades influence your feedback seeking?
 - b. How does achieving competence in a skill influence feedback-seeking
 - c. How do you try to fulfil different goals in your feedback-seeking
 - b. What would stop you from seeking feedback?
 - c. If you did badly, what would you do?
 - d. If you disagreed with the feedback, what would you do?
- (4) How do you decide on who to ask for feedback or to discuss feedback with?
 - a. What characteristics in a supervisor makes you want to ask them for feedback?
 - (i) Does their national or ethnic background affect who you approach?
 - (ii) Does their gender affect who you approach?
- (5) Do you ever actively avoid feedback?
 - a. Why do you avoid feedback?
 - b. When/what context?
 - c. What characteristics in a supervisor makes you want to avoid asking them for feedback?
 - (i) Does their national or ethnic background affect who you potentially avoid?
 - (ii) Does their gender affect who you potentially avoid?
- (6) What would it take for you to seek out feedback?
- (7) Do you think your life experience affects your attitude to feedback?
 - a. Do you think where you grow up affect your attitude to feedback? In what ways?
 - b. Do you think your ethnic or national background affect your attitude to feedback? In what ways?

Interview questions are based on [8,20,14,20,21,20,49]