Research

Lecture attendance among university paramedic students: A sequential mixed methods study

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Abstract

Background
Lecture absenteeism is a widespread issue and has been reported for a large range of university disciplines. The aim of this study was to describe face-to-face lecture attendance within a Bachelor of Paramedicine cohort at a large Australian university and explore associated factors.

Methods
A sequential mixed method study was undertaken using lecture attendance counts, a cross-sectional questionnaire and semi-structured interviews. Attendance was recorded at four time points throughout one semester. The Lecture Attendance Scale, a standardised 34-item questionnaire with a 7-point Likert rating scale, was used to examine reasons behind students' choice to attend lectures or not, followed by further exploration via semi-structured interviews.

Results
Lecture attendance ranged from 30% to 76%, with a mean of 49.2%. On analysis of the questionnaire, eight factors were identified, and these were largely supported by the interview data.

Conclusion
High levels of lecture attendance were not observed. This study suggests that the decision to attend a lecture can be complex and is influenced by a range of student and organisation-related factors. Understanding and utilising this information to modify and improve healthcare curricula delivery is vital, especially where there may be an association between attendance and the development of clinical skills, and professional attitudes and qualities. This is especially important in healthcare education in the post-COVID-19 pandemic era where the value of in-person education will continue to be examined.

Keywords:
lecture attendance; paramedicine; students, health occupations; university education

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Introduction

In the context of university-based education, the lecture has typically been the most common method of the communication of information from academic to a student; and has served as an integral part of the tertiary student experience (1). It has traditionally been seen as an effective way to communicate content to large numbers of students at once, as well as efficient use of academic staff (2). However, questions have been raised as to whether the face-to-face lecture is the best way to impart knowledge at universities in the 21st century (3).

A component of this discourse is the issue of lecture absenteeism, which is a widespread issue and has been reported for a wide range of disciplines (4). Reports regarding this issue started to appear in the literature around the early 1990s (5,6). Nonetheless, there is some ongoing concern that attendance is especially declining in recent times, and that this may be associated with the development and widespread use of technology, primarily due to access to online lectures (7). However, the studies in this area have shown inconsistent results (8-11).

The literature generally concurs that there is an association between higher attendance and greater academic achievement. This is supported by a meta-analysis that concluded that class attendance in college is a better predictor of performance than any other known variable (12). Conversely, others suggest a weak (13) or nil positive impact (14), suggesting further empirical examination is required. Absenteeism may also be associated with an increased level of course withdrawal (15), loss of income for the university (16), and decreased levels of enthusiasm of the academic staff (17).

Non-attendance to lectures has many potential causes and is likely to be multi-factorial. Associated factors tend to be either student-related such as tiredness, illness, studying for other subjects, or commitments such as a part-time job (18); or university-related, such as teaching issues, lecture timetabling or compulsory attendance policies (19). These all have direct implications for university-based paramedicine education and comes at an important time for many countries with established and emerging university paramedicine programs as they consider and integrate curriculum design and pedagogical theory changes. Some of these changes include flipped classroom (20), team-based learning (21), case-based learning (22), near-peer teaching (23), distance education (24), and social constructivism (23). However, despite these changes and to the best of our knowledge, there are no studies that have examined the phenomenon of lecture attendance within paramedicine.

It is important to note that the data for the present study was collected before the development of the COVID-19 pandemic, which necessitated the rapid transition to online learning within tertiary educational settings (25). After COVID-19 strategies such as social distancing and isolation have ended, it is likely that educational institutions will be involved in pedagogical decisions regarding the ongoing utility of online learning. Discourse regarding maintaining a fully online course where it has been shown to be achievable, compared with reverting to traditional face-to-face offerings, or a well-considered combination of the two is probable within tertiary education planning.

The primary aim of this study is to describe attendance over one semester in 2019 and explore the factors associated with attendance/non-attendance at lectures within an undergraduate paramedicine cohort. Student views on face-to-face versus online learning will be explored. This pre-COVID-19 information may be used to inform future curricula development and delivery, especially in the post-COVID-19 era, to optimise student engagement and learning.

Methods

Study design
A sequential mixed method study was undertaken. Student attendance at pre-determined lectures over one semester was recorded, as well as using a cross-sectional questionnaire and semi-structured interviews, which provided data about the reasons for lecture attendance/non-attendance. This type of methodology was chosen to enable the integration of findings from both quantitative and qualitative data to generate a thorough understanding of the associated factors (26).

Participants and procedures
The study participants were recruited from a Bachelor of Paramedicine course at a large Australian university which had 401 enrolled undergraduate students. To enable an overview of lecture attendance across the semester, attendance was measured in weeks 1, 4, 8 and 12 of a 12-week semester in 2019 and was inclusive of all three-year levels within the course. The seven subjects within which attendance was recorded were the subjects that utilised traditional weekly face-to-face lectures. Other subjects that incorporated online lectures or that were simulation/practical skill-based were not included. Lecture attendance was taken individually by two staff members standing at the back of the lecture theatre 10 minutes after lecture commencement to enable the inclusion of late-arriving students. It was then confirmed that the individual counts were identical; if not, counts were repeated until consensus was achieved. This method was chosen over student self-report as the latter method has a propensity for inflation of attendance figures (27).

Instrumentation
Data concerning the reasons for attendance/non-attendance were collected using the Lecture Attendance Scale (18), a standardised 34-item questionnaire with a 7-point Likert rating scale (1 = strongly disagree, 7 = strongly agree). Responses that attained higher scores indicated a positive outlook towards attendance to lectures. Twenty of the 34 items are reverse scored; thus, scores were allocated oppositely. This questionnaire had been previously used in a Turkish cohort

of medicine, pharmacy, dentistry and nursing students (18). Although the authors reported a five-factor solution with an overall Cronbach's α of .85, there was no report of the internal consistency of individual factors.

All students enrolled in the undergraduate paramedic course were informed of the opportunity to participate in a one-on-one semi-structured interview with a research assistant who was not a lecturer to any of the students. If they were interested, they could supply their name and contact details for subsequent emailing to arrange an interview. Participants were recruited and interviewed until data saturation had been achieved (28). These interviews were based on an interview guide that explored their views and attitudes on this topic as well as reasons and motivations underpinning their decisions to attend lectures. The interviews were audio-recorded and subsequently transcribed by an external third-party transcribing company.

Data analysis

Quantitative data are presented as mean (SD) and frequencies where appropriate. Data storage and generation of statistics were achieved with the use of IMB SPSS Statistics (v. 25). The questionnaire also underwent exploratory factor analysis using Principal Axis Factoring (PAF) followed by orthogonal Varimax rotation (29). Interview transcripts were organised with NVivo v12 (30), and thematic analysis (31) was utilised to assess the interview data. Two authors (BB and BW) individually analysed the data and conflicts were resolved by discussion. Individual interviewees were identified by pseudonyms.

Ethics

Ethical approval for this study was gained from the Monash University Human Research Ethics Committee (approval number 19644-30281). Students were informed that participation in the study was voluntary, there was no obligation to participate, and there would be no adverse implications from non-participation or if they withdrew from the research. The explanatory statement advised that answering the questionnaire would imply consent to that portion of the study, and that completion of a written consent form would be required for participation in an interview. They were also assured that their data was confidential and would be kept in secure, password-protected storage which would only be accessible to the researchers of the paper.

Results

Lecture attendance

Data were drawn from attendance levels at lectures for seven subjects in the paramedic program: three from first year, three from second year and one from third year. In the first-year cohort, attendance ranged from 30% to 76% (M=52.7, SD=13.7); the second-year group demonstrated 33% to 60% attendance (M=46.3, SD=8.7); and the third-year group 36% to 52% attendance (M=47.3, SD=7.5). Overall, for the four time points across the three undergraduate years, lecture attendance ranged from 30% to 76% (M=49.2%, SD=11.5%) (Figure 1).

Most of the academic units demonstrated a general decline in student attendance over the semester, with four of the seven subjects having the highest attendance in the first week of lectures. This observation is supported by the following quote:

"I went to the first three or four lectures, but I just lost interest in it. So, I would go home and then just do study for other subjects and stuff like that." (female, first year)

However, it was noted three subject units (Advanced Life Support, Cardiac Conditions, and Emergency Management) had an increase in attendance in the final week (week 12) of the semester.
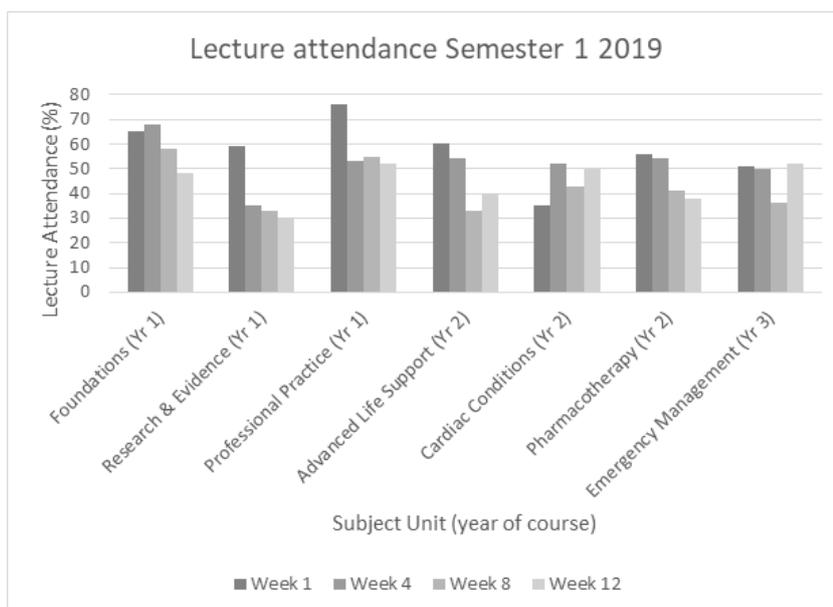

Figure 1. Lecture attendance at four time-points in one semester

Interviews

Sixteen students (10 female, six male) took part in one-on-one semi-structured interviews which averaged 33 minutes and 23 seconds in duration. This group included nine first year, one second year, and six third year students. The data from the interviews were used to discuss and illustrate the factors identified from the Lecture Attendance Scale.

Questionnaire

The Lecture Attendance Scale was completed by 310 students (47% first year, 35% second year, 19% third year), which was a response rate of 77.3% (310/401). The largest proportion were less than 21 years of age (56%), followed by 21–25 years (36%), 26–30 years (4%), 31–35 years (2%) and more than 35 years (2%). Females made up 63% of the sample.

The 34-item questionnaire was subjected to exploratory factor analysis using PAF followed by orthogonal Varimax rotation (Table 1). Utilising an eigenvalue of >1, eight factors were identified which explained a cumulative variance of 62.93%. Five items did not load on any of the identified factors and so were deemed redundant and removed from further analysis. Data were considered appropriate for data analysis: the Kaiser-Meyer-Olkin measure confirmed the sampling adequacy (.848) and Bartlett's test of sphericity $x2(561) = 3731.32$, p<.000 adequate sample size-to-variable ratio, and inspection of the correlation matrix for loadings >.30. This process identified eight factors from the questionnaire.

Cronbach's α coefficient was used to evaluate the internal consistency of each of the factors identified from the PAF (Table 1). Factors 1, 3 and 7 demonstrated acceptable reliability, with Cronbach's α values of .89, .70 and .74 respectively. Factors 2, 4 and 6 showed questionable reliability (.67, .60, .67), and factors 5 and 8 demonstrated poor reliability (.54 and .57) (32).

Of the eight factors, six can be categorised as student-related and two as organisational /university-related. Seven of the eight factors that were identified from responses to the questionnaire, were supported with interview data.

Factor 1. Lectures facilitate understanding

Many of our interviewees felt that they needed to be present at lectures to learn effectively. They felt that being there in-person made them more focussed, less likely to be distracted, and allowed them to ask questions about any points that required clarification.

> "I think with [me] not being able to sit still, being in the lecture helps me a lot to learn." (female, third year)

Factor 2. Lectures are unnecessary for success

In contrast, other students felt that they were able to learn all that was required without attending many, or any, lectures. These students would generally catch up on the lecture information by watching the recorded lecture at home or read the written information that had been presented in the live lecture.

> "And it's those sorts of [rapidly delivered] lectures that I very quickly think it's pointless me going there because if I listen to it online, I can stop, go back, go was that important and take my notes." (male, first year)

Factor 3. Other priorities

Both the questionnaire and the interviews revealed that students generally had many activities and priorities which may influence their decision to attend a lecture. Such matters as timetabling of lectures, tiredness, studying for other subjects/assignments, as well as the preference not to attend if their friends chose not to attend, were acknowledged, and are illustrated by the following:

> "I missed about three lectures this semester. Just in the final week and a half because we had about four assignments due in two weeks." (male, first year)
> "…one day I was feeling really tired and I was like, I'm not going to take anything in so there's no point coming. I should probably sleep." (female, first year)
> "I think just knowing that friends go to lectures also helps motivate you and encourage you to go to them as well." (female, third year)

Factor 4. Negative external factors

This factor included items such as disliking other students in the class, negative effects of medication, meeting with their girl/boyfriend and bad weather. However, the interviews that were undertaken provided no supporting evidence for this factor.

Factor 5. Competing commitments

Events or activities competing for the students' time, such as medical appointments, other university activities, or part-time employment were identified as influencing attendance:

> "I have not attended any of [those] lectures because they clashed with my work… I've missed [one] other lecture though… because I had a dentist appointment." (female, first year)

Factor 6. Transport issues

The reason identified for non-attendance at lectures for some students was as a result of difficulties with transport to and from the university campus. To place these views in context, it should be noted that the campus involved is located in an outer suburb of Melbourne (Victoria) and has limited public transport options. Some students mentioned that although there is a university bus service, the timetable meant that sometimes there would be no bus available shortly after their last lecture finished. In this case, it was highly unlikely that they would choose to attend this lecture every week.

> "There wasn't a bus available for me to get home immediately afterward. It impacted my ability to stay." (female, first year)

Also affecting students attending lectures was the issue of the cost of car transport, both in petrol costs and highway tolls, as illustrated by the following comment:

> "I would easily pay $100 a week in tolls and fuel. It does

Table 1. Correlation matrix (principal components analysis with varimax rotation)

Questionnaire items	Factor loadings									
	1	2	3	4	5	6	7	8	h²	rit
Lectures are very instructive (item 5)	.823								.704	.860
Important topics are emphasised in lectures (item 6)	.807								.747	.860
The lecturers help me to understand (item 9)	.760								.654	.866
Activities during lectures are beneficial and help me to understand (item 12)	.710								.733	.859
I enjoy attending lectures (item 4)	.698								.725	.860
The lecturers are very keen and enthusiastic in lectures (item 10)	.659								.481	.861
I am able to ask questions in lectures (item 7)	.635								.637	.862
It is important for me to attend lectures to maintain a high level of achievement (item 2)	.624	.422							.621	.874
Attendance at lectures is essential (item 1)	.613	.422							.584	.861
The lectures are very easy, I could learn by myself (item 20R)		.713							.573	.862
Attendance at lectures does not affect academic achievement (item 19R)		.699							.769	.876
Even if I don't attend, the lecture notes are enough (item 18R)		.675							.789	.861
Lecture times don't suit me (too early/too late) (item 21R)			.606						.557	.868
I have to study for exams in other subjects (item 25R)			.592		.414				.640	.869
I hadn't had enough sleep (item 30R)			.522						.655	.865
My friends don't attend either (item 24R)			.519						.640	.862
I don't like the other students in my class (item 28R)				.703					.591	.862
My medication has a negative effect on me (item 33R)				.637					.641	.863
Because I met up with my girlfriend/boyfriend outside (item 34R)				.591					.575	.862
The weather was very bad (item 29R)				.574					.623	.863
I had something else important to do at that time (dental appointment, illness in the family or of someone close, and so on) (item 27R)					.721				.616	.861
There was another university activity that I had to take part in at the same time (item 26R)					.668				.598	.866
I have to work (item 15R)					.525				.596	.866
I have a transport problem (item 31R)						.826			.527	.860
I can't afford the fares to get to the university (item 32R)						.775			.506	.861
The lectures are boring (item 16R)							.786		.717	.866
The lecturers are boring (item 17R)							.778		.670	.865
The physical conditions in the lecture hall are unsuitable (too hot/cold/small/stuffy) (item 23R)								.756	.617	.865
Overcrowded lectures hinder my understanding (item 22R)								.731	.465	.845
Eigenvalues	7.55	2.55	1.72	1.49	1.45	1.25	1.18	1.07		
Explained variance	26.05	8.82	5.93	5.15	5.00	4.33	4.08	3.54		
Cronbach alpha	.898	.678	.705	.600	.540	.676	.746	.576		

h² = communality; rit = corrected item-total correlations; R=reverse scored

impact a little bit, because [classes are] spread over the four days, and so… if you've just got the one tutorial… [compared to at home] study, you might prioritise [at home study] more than a tutorial." (male, first year)

While another student mentioned other transport costs may affect their decision to attend university:

"And then if you miss the bus from the train station to here you had to either pay a $10 Uber or walk 15 minutes." (female, third year)

Factor 7. Boring content/delivery

The effect of student perception of "boring" lecture content or a "boring" style of lecturing was quite apparent from the interviews:

"…if you get someone that reads straight off the PowerPoints you're going 'I wish I hadn't have come' and then I'm more likely to miss the next week… Whereas if [the lecturer is] interactive and questions and involve you, then I'd be more likely to keep coming." (male, third year)

Factor 8. Lecture room environment

In the interviews, some students spoke of finding it difficult to concentrate or that they feel their learning is affected in lecture theatres with large groups of students. These issues are illustrated by the following comment:

"I just don't learn that well in [lecture halls] because I'm worried 'am I taking note of the things I'm supposed to be taking note of?' Everyone's busy tapping away and I find that sometimes if I'm too busy taking notes I miss what's being said..." (male, first year)

Discussion

This study examined the reasons that undergraduate paramedic students enrolled at an Australian university chose to attend or not attend face-to-face lectures. Overall, attendance to lectures over the semester ranged from 30% to 76%, with average attendance from all year levels of approximately 50%. Although issues with lecture attendance have been widely reported, the proportion of students attending health-related lectures appear to vary considerably in the literature (13,33,34). Possible reasons for variable results in studies include specific foci on one academic unit or discipline, utilisation of online teaching modalities, possible inaccuracies of paper-based or self-reported attendance monitoring, and that attendance may vary over the week (9,35,36).

Most of the subject units in the present study had a general decrease in student numbers attending as the semester progressed, with four of the seven subject units having the highest attendance in the first week of lectures. Although the majority of the literature report on either cross-sectional or average attendance figures, this temporal attendance decrease has been previously noted (36). However, as can be seen in Figure 1, the subjects of Advanced Life Support, Cardiac Conditions, and Emergency Management all had increased attendance in the last week of the semester (week 12). Anecdotally, the last lecture in the semester for a subject is often when lecturers indicate or explain what to expect in the upcoming examination, which may hold high appeal for many students. This increased attendance may also indicate the importance the students ascribed to being personally present for certain types of lectures, a phenomenon that has been previously described (37). These three subjects are arguably the most 'clinical' in nature, in which some students anecdotally indicate an increased perceived value. Further research would be valuable to identify if clinical practice subjects such as these are also the ones most valued by the majority of the student cohort from a clinical healthcare degree.

The factors identified via questionnaire responses regarding non-attendance at lectures were primarily student centred. They related to the students' perceptions of how they best learn, what areas they found interesting or valuable, and other priorities/commitments in their life.

The first two factors ('lectures facilitate understanding' and 'lectures are unnecessary for success') appear as opposing viewpoints, which is likely to be a function of learner diversity. Students mentioned that as people possess various learning preferences and approaches, some get more educational benefit out of attending a lecture, and some from learning in a smaller class environment with more hands-on experiences. Often, the latter group of students was inclined not to attend many lectures. Students commented that other priorities or commitments which may underpin their decision to be absent for a lecture. A decrease in lecture attendance when there are assignments or assessments due for other subjects was commonly mentioned and this has been noted by previous research (38). Other issues such as missing lectures to attend part-time employment or medical appointments, as well as transportation difficulties have also been noted in the literature (27,39).

It was apparent that for many, the decision to not attend a lecture was based on the perception that the class was boring or low quality, or that they could adequately learn the content in their own time by accessing the online resources provided. This viewpoint is supported by previous research which indicates that the lecturer and their methods of imparting information are viewed by students as vital for a high-quality lecture (40). In addition, it has previously been reported that 30% of students feel that most or all of their lectures are boring (41) and that this perception increases the likelihood that students will not attend lectures (18).

While student absenteeism is a widespread problem, it may hold more significance in clinical healthcare programs where knowledge and professional clinical practice will be required to support public health and safety (42). In addition to a potential for gaps in knowledge and clinical skills, it has been contended that attending lectures and other learning opportunities is vital

for the development of professional qualities essential for their future careers (43). The development of such attributes as self-discipline, courtesy, effective communication and interpersonal skills are considered to be part of the 'hidden curriculum' (44). That is, implicit aspects of an academic program that convey expectations, values and behaviours, and assist with professional development and thus assist in the professional socialisation process of students (17,45). So, it is feasible that non-attendance at lectures may not only result in gaps in clinical knowledge and skill proficiency but also hinder the development of professional practice.

The traditional didactic lecture format is undergoing continuing scrutinisation (46). It is being queried if past methods of tertiary teaching are still relevant, effective and engaging for adults that have grown up in a digital age. To encourage a higher level of student engagement there have been suggestions that healthcare curricula should move from the traditional lecturer-led approach to become more student-centred (47), including such techniques as the flipped classroom (48) and peer teaching (47). Although attendance to the smaller, more student-centred sessions in the paramedic course such as tutorials or practical skills were not measured, data from our interviews indicate that students may be more likely to attend these forms of education compared with lectures. This may be related to these classes having an 80% attendance requirement, but also that students feel that this is where their paramedic clinical skills are acquired and practised. This is supported by studies in medicine where attendance to problem-based learning and clinical skills sessions are higher compared with lectures (34). Also, it has been reported that lectures foster lower student engagement when compared with problem-based and team learning (49).

The issues identified which determine whether a student will attend lectures indicate that this is a matter with a potentially complex aetiology. The factors identified were predominantly related to student issues such as perceptions of lecture interest and value, individual learning preferences, and competing priorities or commitments which affected their choices regarding lecture attendance. It appears prudent for higher learning institutions to encourage the utilisation of more student-centred learning modalities, and to present educational content in a range of formats to support the diversity of the student cohort and their learning preferences.

During the COVID-19 pandemic, face-to-face lectures were reduced or cancelled worldwide to decrease spread of the virus (50). This resulted in vast educational transformation to online, socially distant learning. As post-COVID-19 higher education returns, institutions may consider continuing their distance learning in preference to reverting to face-to-face offerings. However, the results of the present study suggest that there is value in returning to in-person lectures as appropriate, especially for healthcare students.

Limitations and recommendations for future research

A limitation of this study is that the students who attend lectures least may not have participated, resulting in non-response bias (51). We endeavoured to recruit such individuals by making the study information available at practical sessions which were known to have high attendance rates, as well as ensuring that students were aware that their answers were confidential and there would be no adverse effects as a result of their participation. Also, self-report data has a possibility of response bias, including social desirability bias (52). As the paramedic student cohort was drawn from one Australian university, the results need to be interpreted with caution for other cohorts or settings. A further limitation is that lecturers are not identical in their teaching styles and use of lecture structure, and this may need consideration for future studies. The lack of support for the factor 'negative external factors' from student interviews suggests that there may be some incongruence between the identified factors and the relevance to this particular cohort. In addition, the internal consistency of some of the individual questionnaire factors was suboptimal. Both of these issues indicate that more psychometric work should be completed in this space. To increase generalisability, further research should include a larger paramedic cohort drawn from multiple universities or large cohorts from a range of healthcare disciplines. Issues that could be examined in future studies to gain further understanding in this area include: similarities and inconsistencies of the reasons underpinning lecture non-attendance between distinct healthcare courses, differences between students of various year levels within a course of study, the effect of a first as opposed to a subsequent university course undertaken, motivational theories, individual study behaviours and distractibility, social connectedness, and examination of the views of academic educators. Furthermore, closer examination of educator competencies and their alignment with program outcomes and pedagogical theories is another area of further research.

Conclusion

This study builds on previous research in this space which has examined undergraduate healthcare students. High levels of face-to-face lecture attendance were not observed in the paramedic cohort but were comparable to data reported in previous studies of student groups from a range of professions. This study has identified and explored the previously undetermined reasons underpinning the decision not to attend lectures in this undergraduate healthcare cohort. The results suggest that the decision to be absent for a lecture can be complex and influenced by a multitude of student-related and organisational-related factors. The importance of understanding these issues is especially vital in healthcare education where there may be an association between attendance and the

development of professional attitudes and qualities. This is an especially important consideration as curricula evolves in the post-COVID-19 educational environment. Also, due to the range of student learning preferences, it is reasonable to present academic information via multiple approaches and formats to promote student engagement in the education process and facilitate individual student learning. It is envisioned that this study will be expanded to include other student healthcare cohorts and the results utilised to inform future curricula delivery modes and formats.

Acknowledgements

Competing interests

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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