Abstract

Introduction

The University Clinical Aptitude Test (UCAT) has been used since 2006 by a consortium of UK medical and dental schools to assist in undergraduate selection. In 2019 UCAT was used by 30 Universities (14 dental schools).

Aim

To report how UCAT use has changed in undergraduate student selection in the UK.

Methods

UCAT use was categorised and trends identified from annual telephone interviews with dental school admission tutors; this process started in 2011.

Results

Dental schools using UCAT rose from 8 (2006) to 14 (2020). The most significant use of the test to select applicants for interview was as a weighted factor; at offer stage UCAT was most used to discriminate between applicants at borderlines. A growing number of dental schools are using the Situational Judgement Test (SJT) in selection (2019, n=6). In 2019, eight schools adjusted selection processes for widening access applicants. Multiple Mini Interviews are now used by the majority (n=10) of dental schools.

Conclusions

UCAT represents a significant factor in selection to UK undergraduate dental programmes and is used by all but two dental schools. In most schools, UCAT contributes in a substantial way to selection outcomes and strength in test use has grown over time.

Introduction

Selection to the health professions remains a contentious issue internationally. The updated Ottawa consensus statement on selection and recruitment to the healthcare professions [1] reported a growing evidence based approach to selection, it also noted conflicting drivers around diversity, differential attainment, retention and institutional aspirations. Similar conflicts have been reported in dental student selection.[2]

In the UK there is a growing evidence base around medical student selection, but few papers examine dental selection closely. [3,4] Existing literature suggests that conflict might exist during dental student selection when aspirations to widen access to the profession are enacted by using admission tests. [3] Evidence to support the predictive validity of dental selection tools is limited but there is tentative evidence of a small but significant relationship between the UCAT and assessment outcome [2,5] and although weak, there is a relationship between UCAT scores and medical school assessments. [3]

The selection of students for entry to UK dental schools has traditionally followed a consistent process: an initial assessment of academic qualifications, the assessment of qualities obtained from the Universities and Colleges Admissions Service (UCAS) application form (personal statements and references) and an interview. Once this process is completed, dental schools then make offer

decisions. While selection processes remain at the discretion of individual Universities, this approach remains similar across all dental schools in the UK. [4]

In 2005, a collaboration between 23 medical schools and eight dental schools led to the development of the United Kingdom Clinical Aptitude Test (UKCAT) (www.ucat.ac.uk). International collaboration in 2019 led to the test being used in Australia and New Zealand and following this expansion UKCAT changed its name to University Clinical Aptitude Test (UCAT). In the UK 30 medical schools and 14 dental schools now use the UCAT as part of their selection processes for undergraduate programmes.

Candidates take the UCAT in the year they make their university application (UCAS) with the test being available between July and early October. Candidates meet the costs of the test although the UCAT Consortium offers full fee bursaries to candidates from low-income families. The test is delivered at test centres in the UK and internationally. In 2020, due to the COVID-19 pandemic there was an opportunity for candidates to take the test at home using on-line proctoring. Candidates receive their test scores immediately after testing and in advance of the UCAS deadline and allows candidates to use their score to inform their University choices.

The original UCAT comprised four cognitive subtests (verbal reasoning, quantitative reasoning, abstract reasoning and decision analysis), providing identifiable subtest scores (each with a scale score range of 300-900) which when totalled produced an overall score for each candidate. In 2013, the UCAT Situational Judgement Test (SJT) component of the test was introduced with candidates' performance allocated to one of four bands; band 1 being allocated to the highest performing candidates. The Decision Analysis subtest was replaced by a Decision Making subtest in 2017 and reflected a desire by the Consortium to test a broader range of decision making traits within the test. The UCAT cognitive test scores have, since inception, provided a standardised tool that dental schools could use in student selection.[5]

As highlighted above, the Consortium formed from UCAT members has enabled participating schools to develop and determine how best to use the test; the consortium being informed annually regarding test content, scoring and statistical performance of the test.[7]

This paper describes changes and trends in the use of UCAT scores in dental selection by UK dental schools from 2011 to 2019. It follows a similar but not identical approach to a recent review of the use of UCAT scores in medicine. [8]

Materials and Methods

Like studies relating to medical school selection [8,9] annual retrospective telephone interviews have been conducted with every UCAT Consortium dental school since 2011 with a pre-circulated questionnaire being used to assist this process (appendix 1). The data collected includes some basic admissions data (number of applications, interviews and offers) and descriptive information regarding admission processes.

Interviews were conducted (by RG) at a mutually agreeable time. Interviews generally took place in the summer term by which time admission cycles were largely complete. Interviewees were either admission tutors or administrators familiar with their local selection processes. Structured interviews focused on the selection procedures for each school's standard programmes, in most cases, a five-year undergraduate course. Interviewees were provided with the responses relevant to their dental school from the previous year, in advance of a telephone interview. Key points during each interview were noted along with any changes from the previous years data. After each

interview, a written summary was forwarded to each interviewee allowing for corrections and agreement on the accuracy of data collected. Whilst minor amendments to the questionnaire took place between years the core content remained unchanged.

It is noted that some schools also provide other dentistry courses such as six-year undergraduate programmes gateway, accelerated and graduate entry programmes however results relating to these programmes are not reported here.

Selection processes could usually be split across three stages: pre-screening, selection for interview and selection for offer. Collated data from each interview questionnaire was extracted and uploaded to a database (Excel ᵀᴹ).

Categorisation of Use of the UCAT in Selection

For the purpose of analysis (and to inform the reader), use of the UCAT in selection has previously been categorised as borderline, factor, threshold and rescue [5] (Table 1). This categorisation has been utilised by other researchers [6, 7] to describe trends in the use of the UCAT.

Table 1 Categorising Use of the UCAT in Selection

Method	Description
Borderline	UCAT used as an objective measure to discriminate between applicants lying at a decision borderline for either interview or offer.
Factor method	Selection criteria are scored and weighted to create a comparable overall score for applicants. Criteria used to identify applicants for interview include academic scoring, UCAT scoring, personal statement scoring and specific University questionnaires.
	This approach is used most frequently to determine an invite for interview and on occasion to make offers.
Threshold method	Applicants are required to achieve a minimum UCAT score to progress to the next stage of a selection process with 2 methods applied:
	i. pre-determined 'Actual' thresholds which definitively determine outcome and ii. 'Convenience' thresholds which rank applicants by test score with schools then choosing a cut off score which provides the number of applicants required for interview.
Rescue method	High UCAT scores used to 'compensate' for a lower score in another part of the selection process and 'rescuing' applicants who might otherwise have been rejected.

Results

In 2011, 10 of the 14 UK dental schools used in the test in student selection (University of Aberdeen, Queen Mary University of London, Cardiff University, University of Dundee, University of Glasgow, Kings College London, University of Manchester, University of Newcastle, University of Sheffield, Queens University, Belfast). In 2013, Plymouth University joined the UCAT Consortium with the Universities of Birmingham and Liverpool joining in 2016 and the University of Bristol in 2017.

Figure 1 reports the main use of the UCAT to select applicants for interview since 2011. Some
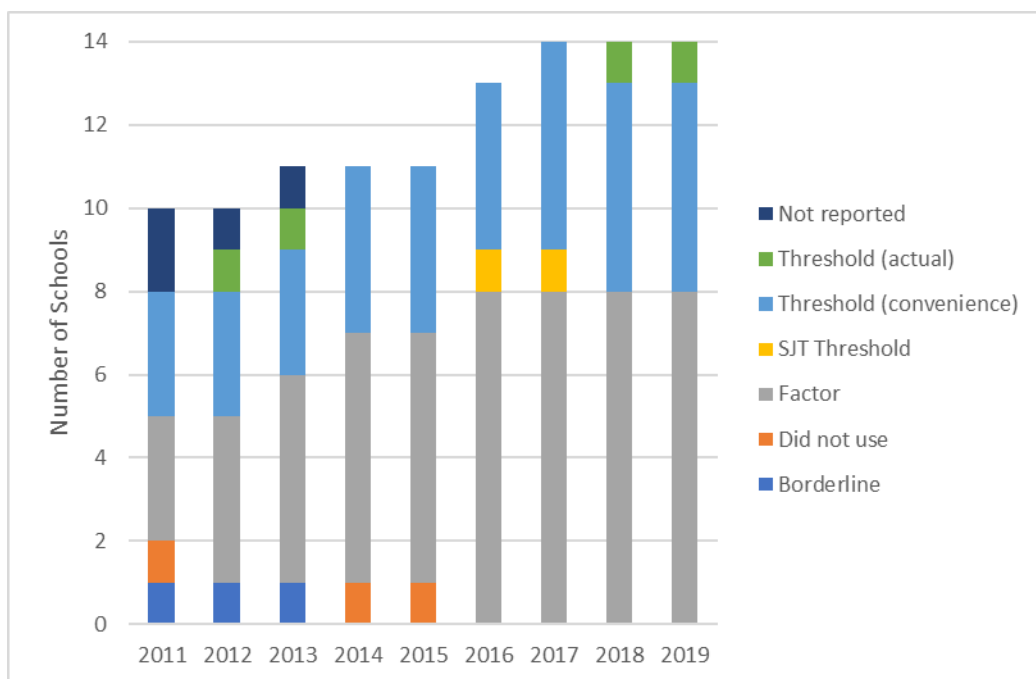
Figure 1 Use of the UCAT: Invitation for Interview

schools used the test in more than one way at this stage and this is described further in Table 3. As viewed there have been changes over the years and whilst the number of schools using the test has grown, the balance in main use across factor and threshold methods has not changed significantly.

Use of UCAT in assisting making an invitation for interview.

Borderline Use/ Borderline Method

Initially, some schools included the borderline method in their selection 'toolkit' but did not always use it at this stage with outcomes at other selection stages determining selection.

Factor Use / Factor Method

The most popular application of the test in 2019 is factor use (n=8)

Table 2 presents results from schools using a factor approach to select applicants for interview and

Table 2 Factor Use of the UCAT (Selection for Interview): Number of schools and weighting

	Factor							
	Academic Score		**Personal Statements**		**UCAT (Cognitive)**		**UCAT (SJT)**	
	Schools	Factor Weighting	Schools	Factor Weighting	Schools	Factor Weighting	Schools	Factor Weighting
	N	%	N	%	N	%	N	%
2011 (N=3)	1	45%	1	36%	1	19%		
2012 (N=4)	3	59%	2	31%	3	20%		
2013 (N=5)	4	65%	2	33%	4	19%		
2014 (N=6)	5	66%	1	25%	5	29%		

2015 (N=6)	5	69%			5	31%		
2016 (N=7)	5	67%			5	31%	1	9%
2017 (N=8)	6	61%	1	50%	7	27%	1	11%
2018 (N=8)	6	61%	1	50%	7	27%	1	11%
2019 (N=8)	6	61%	1	50%	7	30%	1	11%

the mean average weighting applied for each factor in each year. In some years, some schools did not report the factor weightings in sufficient detail to report here. Where percentage weightings were not provided by schools, these could not be included in the mean averages.

The use of academic scores remains the highest weighted factor used to select applicants for interview. Weighting of academic scores has increased over time but has been relatively consistent since 2013. A maximum of two schools used personal statements as a factor in selection during this time. The mean average factor use of the UCAT increased from 20% to 30%. The range of UCAT factor weighting was relatively small (19% - 31%). Over this period three Universities shifted their weighted use of the UCAT upwards whilst in the remaining four schools there has been little change.

Threshold Use / Threshold method
In 2019 one school used a pre-defined 'actual threshold' as a pre-screening tool prior to using academic scores to select applicants for interview.

A further five schools used a 'convenience threshold'. It should be noted here that convenience thresholds applied by individual schools varied over time because decisions made each year by schools relate to the number and quality of applicants in any application cycle. A University will identify the desirable number of interviews based on previous experience and conversion rates (rates of acceptances to offers) in particular.

Convenience thresholds 'scores' used by schools since 2011 have not varied greatly with the mean average ranging from 2407 to 2545 (mean 2465, SD 53). Apart from one year (2013), the mean is below the mean average candidate score; schools are essentially screening out lower performing applicants.

Rescue Use / Rescue method
During 2011, 2012 and 2013 one school used the test in this manner to consider "borderline" applicants. Since 2011 there have been to the best of the researcher's knowledge and belief no reported instances of any other dental schools in the UK using the UCAT rescue method.

Use of the UCAT in assisting/making an offer.
A small number of schools used the UCAT at offer making stage (Figure 2). In 2011, five out of ten
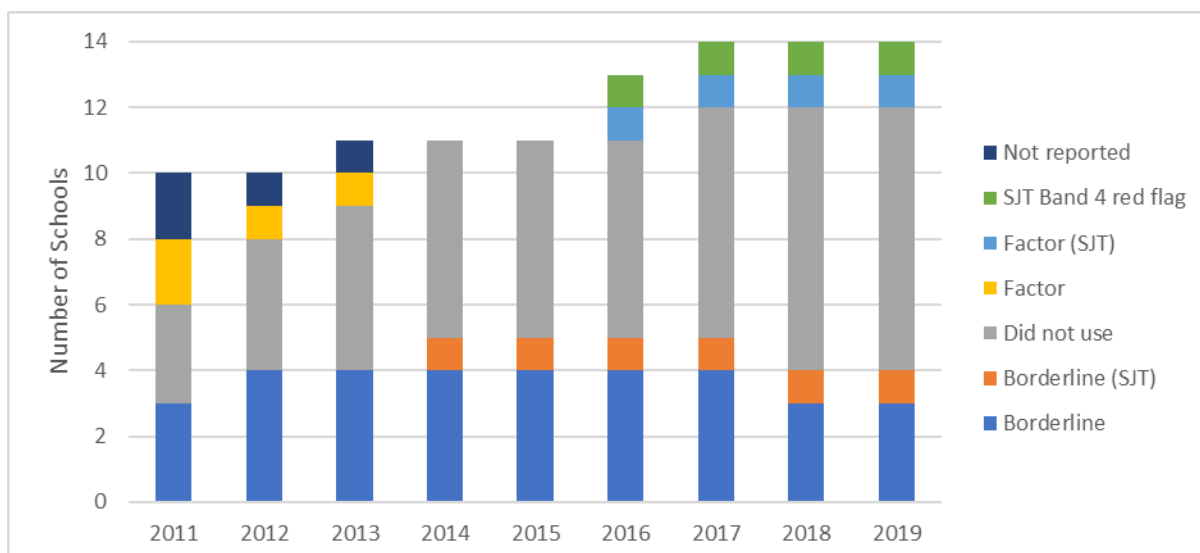
Figure 2 Use of the UCAT: Making an offer

schools used UCAT at this stage with three schools using the test to discriminate between borderline applicants and two schools using the overall test score as a determining factor. In 2019, five (out of 14) schools used the test at this stage; four for 'borderline' applicants and one using SJT scores.

Increased Use of the Situational Judgment Test in Selection

The UCAT SJT was introduced operationally in 2013. Dental Schools have been cautious in the use of this subtest during selection and use of the SJT remains relatively light touch. In 2019, five schools used the SJT at some point in their selection processes. Two schools utilised an SJT threshold (rejecting SJT Band 4 applicants), one school applied a factor weighting to select applicants for interview. In two schools, SJT results contributed to interview outcomes.

Multiple use of UCAT scores

Since 2011 some Universities have used the test in more than one way during their selection processes and this is illustrated for 2019 in Table3. During this cycle, five Universities (D, E, I, M, N) used the test at only one point in their selection processes; 7 Universities (A, B, C, F, G, H, K) used the test at two points; 2 Universities (J, L) used the test at three points.

Table 3 Use of the Test by Universities (anonymised), 2019

| School | Use for Selection for Interview | | | | | | UCAT Use for Offer | | |
	UCAT Threshold (Actual)	UCAT Factor	UCAT Threshold (Convenience)	SJT Factor	SJT Threshold	UCAT Borderline	SJT Factor	UCAT Borderline	SJT Borderline
A	✔	✔		✔				✔	
B			✔		✔				
C		✔						✔	
D			✔						
E		✔							

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F		✔			✔			
G	✔	✔				✔		
H	✔			✔				
I		✔						
J			✔				✔	
K		✔						
L			✔					✔
M		✔						
N			✔					

Other relevant findings from the interviews

a. Widening Access

In the first few years of testing very little information was reported by schools regarding adjustments to processes for widening access applicants. In 2019, nine of the 14 dental schools referred to a specific aspect of their selection processes which had been adjusted for widening access applicants. Five Universities adjusted required UCAT scores for widening access applicants (alongside, in some cases, adjustments for A-level or equivalent qualifications).

b. Types of Interview

There has been a gradual shift towards greater use of Multiple Mini Interviews (MMIs) across Universities with 10 out of 14 Universities using MMIs in 2019.

Discussion

The realisation that individual University admissions teams found it increasingly difficult to objectively separate and stratify their high-quality medicine and dentistry applications led to the development and introduction of the UCAT and the establishment of the UCAT consortium. It was believed that cognitive ability as well as academic potential should be evaluated if doctors and dentists with traits felt desirable to the profession were to be recruited. The UCAT is now firmly embedded as an admission tool and now represents a significant factor in assisting selection to dentistry programmes in the UK and is used by all but two Universities for entry to undergraduate dental training. The two non-UCAT schools are Leeds (who use the Biomedical Admissions Test (BMAT) in selection) and UCLAN (who do not utilise an admissions tests for entry to their graduate entry programme).

In most medical and dental schools, the UCAT contributes in a substantial way to selection outcomes. Even in cases where the UCAT factor is relatively low, UCAT scores are likely to have an impact given the ceiling effect of high academic grades required by Universities.

In the early years of the UCAT Consortium there was some reluctance on the part of dental schools to use the test too strongly and a cautious watchful approach was applied. Since 2011, there has been a shift to use the test more robustly in dental student selection, most notably as a factor method to identify those suitable for interview. In 2019, eight schools used the test in this way; on average UCAT was weighted to contribute a value of around 30% in selection decisions.

The selection landscape for dentistry remains relatively stable. It is interesting to note that during the period of the research there has been significant change in medical school student selection where there have been drivers for change particularly around a shift away from the use of personal statements due to the lack of a credible evidence base.[10,11,12] Very few dental schools used personal statements as a significant element of selection over this period.

A key driver in medical student selection has been in relation to widening access. Such strong drivers have not significantly influenced dental student selection, possibly because competition has been traditionally lower than for medicine. In addition, political attention around widening access though purportedly relating to all the professions has tended to focus on medicine. Whilst dentistry (anecdotally) can claim to have greater ethnic diversity in applications, widening access in terms of socio economic status remains a challenge.[13] In the event of there being a greater focus in the future on widening access in dental selection this might lead to further changes in selection processes. Whilst the test may be less sensitive to some measures of socio-economics than school leaver qualifications [14], there is no evidence to date of it reducing disadvantage in medical selection. [15] This is perhaps acknowledged by those schools adjusting UCAT requirements (usually alongside school leaver requirements) for these applicants.

It was notable that since the Selection for Excellence Report [16] which advised medical schools to move towards processes combining academic attainment with performance in aptitude tests and multiple mini interviews (MMIs) these measures have increased in use amongst the dental schools surveyed

Strengths and Limitations

A unique data set that focusses on the UK UCAT Consortium members has been used in this study. Its completion rate was excellent and is an undisputed strength. Unfortunately, there is no information for the two schools that use or have used alternative admission tests or no admission test. There is some missing data in relation to weightings used by schools using the factor method.

The reader should note that this study reports findings that relate to the main dental programme of UCAT consortium dental schools (the standard 5-year course). It should be noted that findings in relation to the other courses offered e.g., widening access and graduate entry have not been reported and these could vary to that reported here.

Implications for the Future

This paper provides a unique overview of dental selection in the UK and we hope provides a backdrop for further exploration of factors influencing selection decisions. There is a pressing need to explore how different selection tools predict performance in dental undergraduate and postgraduate education. The level of detail included in the paper should help researchers planning such studies understand the complexity involved.

The UCAT SJT has provided selectors with a measure of non-cognitive traits prior to interview and there is a growing. Its tentative use in selection suggests perhaps that dental schools require additional assurances regarding the predictive validity of this tool.

Conclusions

UCAT is a core element of selection to undergraduate dental training in the UK, with more dental schools now using the test with its use having grown and strengthened since 2011. More research into undergraduate dental selection is required.

Author Contributions

RG contributed to the study design. RG conducted the interviews, undertook primary analysis of the data, and wrote the first draft of the paper. RM contributed to the interpretation of results and critical revisions of the paper. Both authors approved the final manuscript.

Ethics approval

The Faculty of Medicine & Health Sciences Research Ethics Committee (University of Nottingham) has confirmed that the nature of this research and its methodology falls under the category of service evaluation/systematic review and as such does not require formal research ethics approval.

The Faculty of Medicine & Health Sciences Research Ethics Committee (University of Nottingham) has confirmed that implied consent by those individuals taking part in the annual interviews is sufficient on the basis that this is information routinely collected to inform the evaluation of the UKCAT.

Declaration of interests

RG is the (paid) Chief Operating Officer of the UCAT Consortium. RM is an unpaid member of the Board of the UCAT Consortium. UCAT supports the cost of RG's PhD which this paper forms part of.

Acknowledgements

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Survey of Dental Schools' use of the UCAT (INSERT YEAR)

Dental School	
Name of respondent	
Role of respondent	
Telephone number	
Email	
Date and time of interview	
Interview duration	
Draft document sent for checking	
Final document received	

Basic statistics	Response in Year X	Response in Year Y
Number of places (home)		
Number of places (overseas)		
Number of applications		
Number of interviews		
Number of offers		
Standard offer		

	Question	Response in Year X	Response in Year Y
1	Please describe your selection process this year. It may be useful to use the following headings:		
	Receipt of form		
	Screening academic credentials		
	Reading PS and Ref		
	Scoring		
	Invitation for interview		
	Format of interview		
	Outcome of interview		
	Recommendation for offer		

	Question	Response in Year X	Response in Year Y
	Making of offer		
	Offer level		
2	How did you use the UCAT result in your selection process?		
2a	Was this used in pre-selection?		
	Was this used in selection for interview?		
	Was this used after interview?		
2b	Did you use it for assessment or selection of any specific subgroups? (eg borderline, WP, mature or disabled). Please specify and describe.		
3	Did you make any other changes to your selection process this year?		
4a	Do you think using the UCAT has affected the profile of the candidates you have selected this year, compared with previous years? If so, how?		
4b	Do you have any evidence to support this?		
5a	Have you analysed the effect of using the UCAT on the profile of your selected candidates? If so, how?		
5b	Do you intend to analyse effect of using the UCAT on the profile of your selected candidates? If so, how?		
6	Are you anticipating any significant changes to your admission processes next year including the use of the UCAT? Please comment on whether you will be using the SJT results within your admission processes this year.		