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### What's in a name?

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## What's in a name: Word inflation, punctuation, abbreviation and cloud formation

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### Abstract

The title of a journal paper offers a crucial portal into any scientific field. It determines whether interested readers locate the paper and whether others have enough interest sparked to lead them to read the abstract. This article looks at authored journal paper titles in *Medical Education* over its first 50 years (n=6357) of publication and *Medical Teacher* over its first 35 years of publication, revealing both trends in areas of interest and how those interests are worded. Word clouds per decade showed a shift from teaching to learning and examination to assessment, and new foci on learning, patient, research and feedback in both journals. The average length of title in *Medical Education* peaked in the 2000s, dropping to 70 in the 2010s, with no titles being larger than 140 characters (the length of a tweet) in this last decade. Abbreviations were used sparingly. The use of humorous titles, although not common, has increased in recent years. The use of the colon showed a marked increase in the 80s, dropping a little in the 2000s but resurging in the 2010s. Titles posed as a question increased steadily, appearing to plateau in the 2000s at 11%. The use of humour and questions suggests that these journal article authors are considering papers to be selected by the human rather than just the virtual eye. We also hypothesise the use of humour may indicate a maturation of medical education as a subject.

### Introduction

As Kevin Eva points out in *Enough rope to hang yourself: word limits in Medical Education*, "if the title doesn't capture attention, the abstract won't be read"<sup>1(p432)</sup>. As a result, the titles of articles written in published papers offer an interesting and accessible window into how the field has changed over time. In this paper we look at some trends in paper titles in *Medical Education* and *Medical Teacher*, and what they might reveal about trends in medical education itself.

### Method

We downloaded all *Medical Education* journal references from volumes 1 (1966) to 49(8), including supplements, into Excel via Endnote (n=6575). Introductions, duplicates and papers without author

names were removed, leaving n=6357. The number of characters and words per title and punctuation use were calculated within Excel. The titles were read through to identify potential areas of interest. Analysis and visualisation of specific word and word-stem counts were performed in the R statistical environment<sup>2</sup> using the text mining package tm<sup>3</sup>, and word clouds produced using the Wordcloud package<sup>4</sup>. ‘Medical’ overwhelmed all the word clouds, so was excluded and the package rerun. Plurals were singularised (e.g. grouping ‘students’ and ‘student’ together as ‘student’). All *Medical Teacher* references from its first volume in 1979 to November 2015 were downloaded from PubMed and word clouds were then processed by decade in the same manner from 1980 onwards (1979 was ignored, the data set being too small to make a meaningful word cloud).

## Results and discussion

### Length of title

For titles in *Medical Education*, the average character length steadily increased up to the 2000s, dropping back again in the 2010s (Table 1). At the time of writing, no title was longer than 140 characters in the 2010s, compared with 3% in the previous two decades. The authors speculated this may be due to the rise in popularity of Twitter to share article titles<sup>5</sup>. However, the majority of journals now use online submission with character-restricted boxes, and *Medical Education*’s current system limits to 90 characters which will of course have had an impact. It is not known how this limit was decided upon.

Decade	Total	Characters including spaces					Words				
	Number of titles	Mean	Min	Max	>140	%	Mean	Min	Max	>12	%
60s	183	52.4	10	165	1	1%	7.3	1	24	14	8%
70s	586	65.8	10	183	10	2%	9.3	1	27	119	20%
80s	711	72.4	13	211	6	1%	9.9	2	27	162	23%
90s	959	74.2	9	241	29	3%	10.1	1	33	233	24%
2000s	2548	76.6	8	224	76	3%	10.4	1	31	777	30%
2010s	1371	70.5	12	138	0	0%	9.4	2	21	192	14%
Overall	6357	72.8	8	241	122	2%	9.9	1	33	1497	24%

Table 1: Title length

### Number of words

Titles ranged from 1 word (e.g. *Cheating*<sup>6</sup>) to 33 (*The performance of foreign medical graduates on the National Board of Medical Examiners (NBME) standardized patient examination prototype: a collaborative study of the NBME and the Educational Commission for Foreign Medical Graduates*

(ECFMG)<sup>7</sup>). The average number of words in a title increased up to the 2000s, dropping back in the 2010s (Table 1). This indicates an increase in characters per word (7.1 in the '60s and '70s to 7.35 in the '80s to '00s to 7.5 in the '10s), perhaps indicating professionalisation of the subject. However analysis of titles from *Medical Teacher* did not show a clear increasing trend, so this may be journal-specific. Jamali & Nikzad<sup>8</sup> found within biological sciences that journal papers with longer titles are downloaded slightly less often than those with shorter titles. Bem<sup>9</sup> considered the ideal length to be between 10 and 12 words, and APA<sup>10</sup> recommended 12 maximum. We found the numbers of titles exceeding 12 words declined noticeably in the 2010s.

### Trends in abbreviations

Hartley<sup>11</sup> warns against using acronyms in the title without spelling them out, so those used alone generally reveal acronyms that reside in a community's or society's commonly understood lexicon (e.g. MD and DVD). Abbreviations not spelled out in the title were used in 3% of *Medical Education* papers, with no noticeable shift in pattern. Use of some acronyms changed over time. For example, OSCE was first published in 1979 with its full name spelled out and appeared many times in subsequent years, but was first used in a title in its abbreviated form in 1991. That said, many authors continued to use non-abbreviated forms even after the first appearance of the shortened form (e.g. Objective Structured Clinical Examination was still used in full in 2014<sup>12</sup>). AIDS made its first appearance, unexpanded from the start, in 1988 and HIV 1991, an example of medical education responding to health trends. The term AIDS, however, first appeared in the medical literature 1982, the first clinical cases having been identified in 1981<sup>13</sup>. We leave it to the reader to decide whether the seven-year lag was a reasonable time for the topic to become of sufficient interest to medical educators, and to future researchers to investigate the link between health demands and topics published.

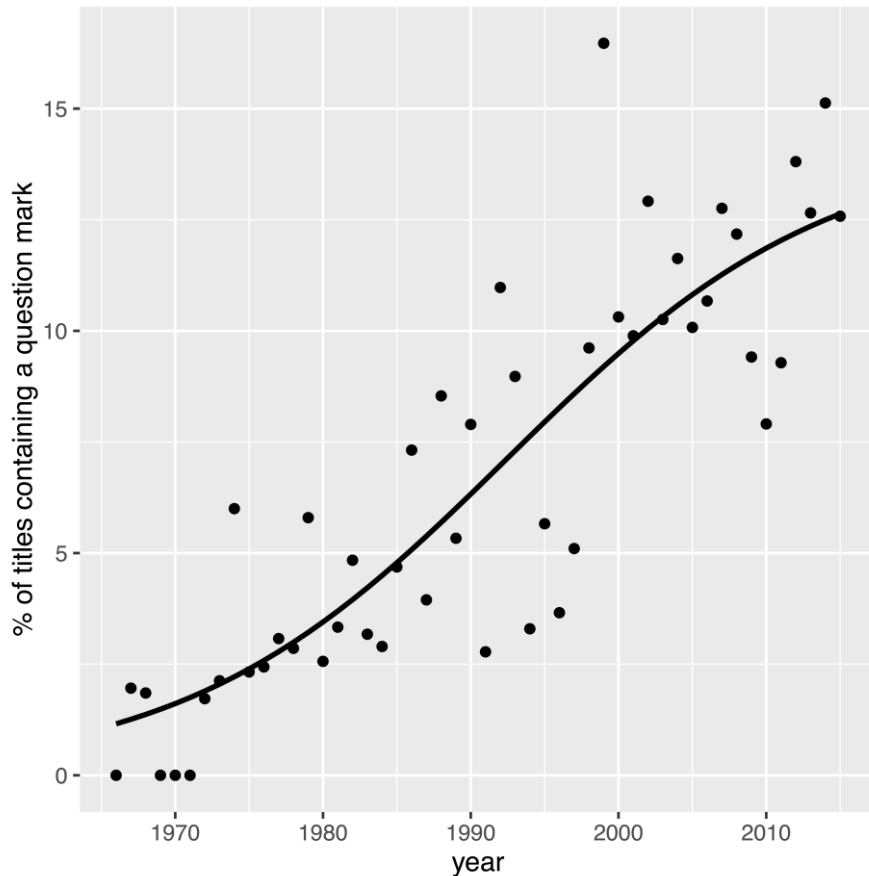


Figure 1: Growth in use of the question mark with solid line showing fitted logistic growth curve

### Trends in punctuation

The use of the colon grew linearly from 0 in 1966, peaking in 1993 (53%), dropping back to 34% in 2000, then climbing again (49% in 2015) (Table 2). Colons are used to add supplementary information to the title but can make titles long and cumbersome<sup>14</sup>. Titles with question marks have grown from 0 in 1966 to 13% in 2015, with a fitted logistic growth model predicting use will saturate around 15% (figure 1). The exclamation mark did not appear till 2000 with the title *“If you want the surgery done well, get a woman to do it!”*<sup>15</sup>, perhaps recognising its provocative nature. They have since been sporadic, and are not used extensively. Emoticons had not appeared at time of writing.

Decade	Number	:	%	?	%	!	%
60s	183	20	11%	2	1.1%	0	0.0%
70s	586	105	18%	16	2.7%	0	0.0%
80s	711	204	29%	34	4.8%	0	0.0%
90s	959	421	44%	79	8.2%	0	0.0%
2000s	2548	975	38%	280	11.0%	14	0.5%
2010s	1371	589	43%	162	11.8%	4	0.3%
Overall	6357	2314	36%	573	9.0%	18	0.3%

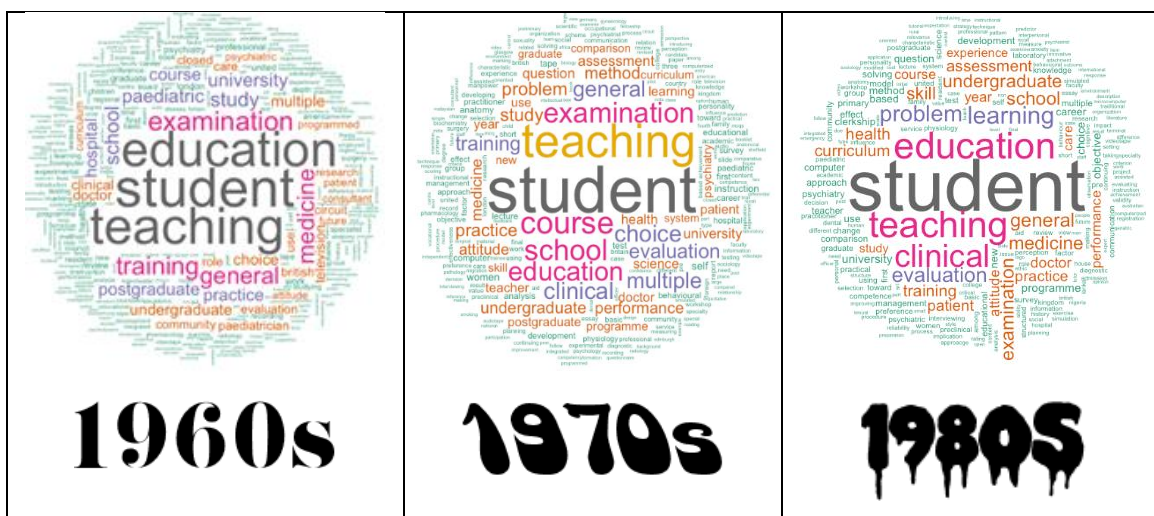
Table 2: use of punctuation

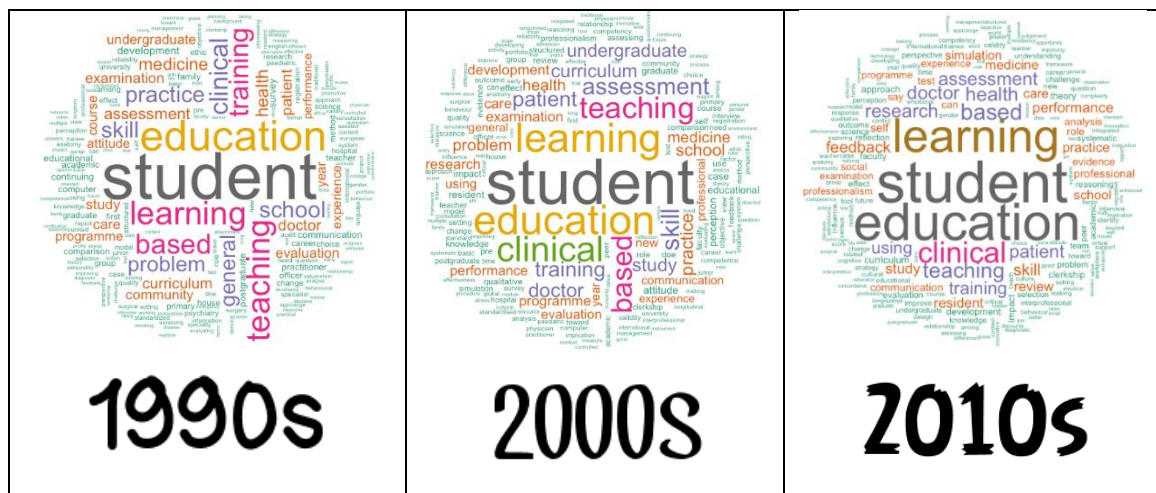
## Trends in words

Of particular interest is the shift in the use of certain words across time and the stability of others, visually demonstrated by the word clouds for each decade (Figure 2). 'Student' has been reassuringly predominant throughout. Other interesting trends were further explored in R. Titles with the stem 'teach' averaged above 20% in the 60s and 70s and have steadily dropped to around 7% whereas titles with the stem 'learn' have grown steadily from 0 (1966) to around 20% more recently. The stem 'exam' (dropping from 10-15% to 2%) and 'assessment' (rising from 0%, peaking at 15% in 2000 and currently 8%). The stem 'based' first appeared 1975, peaked at 12% in the early 2000s, and has now fallen to 5%. 'Evidence' appeared once in 1979 then not at all till 1999 since when it has averaged around 3%. 'Impact', 'simulation' and 'feedback' have all shown a steady increase in use since 2000. The stem 'professional' averaged 2% in the early 90s and has increased steadily to approximately 8%. 'University' has dropped steadily, from 12% to virtually none. 'Research' has shown a steady increase from about 1% mid 90s to about 6% currently.

Analysis of the journal *Medical Teacher* revealed similar trends (visualised in Figure 2), in particular the shift from 'teaching' to 'learning'. However, there are some striking differences. Whereas 'student' was the most frequent word in *Medical Education* titles throughout, it appeared less than 'education' and 'teaching' in the 80s and 'teaching' in the 90s in *Medical Teacher*. All word clouds for both journals showed much more use of the term 'teaching' than 'training'.

Figure 2: Word clouds showing trends in *Medical Education* titles per decade





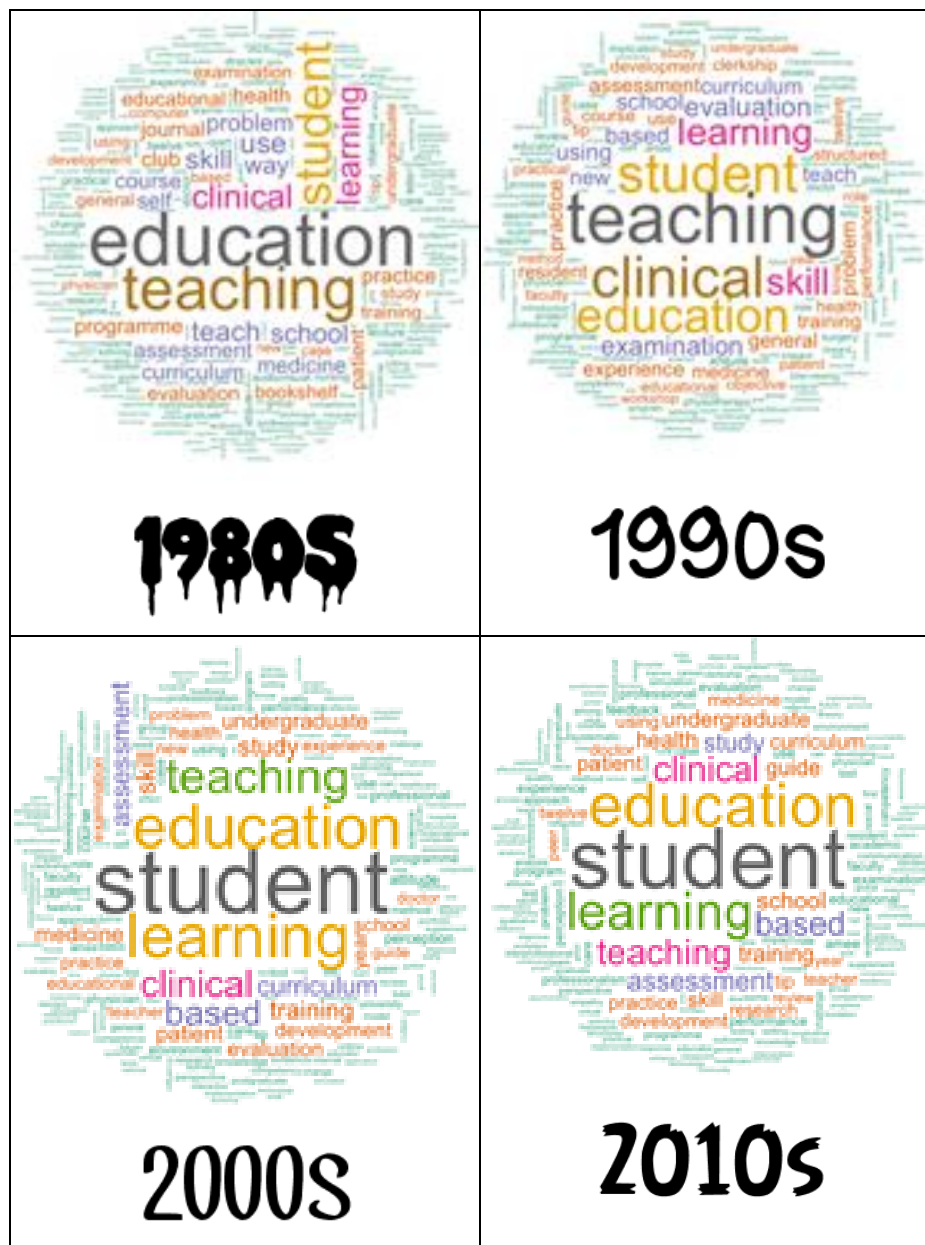
\* fonts generated at <http://www.dafont.com/>

### ‘The humorous title

Humour is subjective, so classification here is prone to personal bias. The first title we classified as humorous was in 1967 *“An Experiment in Beer-tasting”*<sup>16</sup>. However, Hartley<sup>11</sup> highlights several problems with humour: it is cultural, can be difficult for non-native speakers, and may reduce search results, such as in the example above which gives no clear pointers to the topic of the paper.

Another example *“This thorough, tedious, expensive and disappointing study...”*<sup>17</sup> again caused a smile, but the subject matter may not be obvious in an online search. Altogether we classified 115 titles as humorous, the majority occurring in the last decade. Although a risky strategy for search engines, this rise may reflect increased sharing of titles via social networking sites such as Twitter, catching the human rather than the virtual eye. We suggest also this indicates authors’ increasing confidence in medical education being taken seriously as a subject, with humour being used here to build a relationship with the audience<sup>18</sup>.

Figure 3: Word clouds showing trends in Medical Teacher titles per decade



### Limitations and Conclusions

This paper did not look at the impact of any of the trends observed on metrics of the titles' effectiveness (e.g., conversion rates from reading the abstract to reading the paper). Nor were we able to examine editorial guideline changes, thereby preventing us from determining which trends were driven by journal policies and which were driven by changes in the culture of the field. Nonetheless, we were able to observe and illustrate intriguing and shifting trends in medical education title-writing over the last 50 years. There has been a clear move from emphasis on teaching to learning, indicating a shift from teacher- to learner-centred education. The arrival of



online searching and Twitter may be a driver of change in style. The use of humour, particularly coupled with changes in how readers select papers warrants further study, as does the movement in individual words being used.

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