Intercalating in Medical Education; is it more valuable than other Intercalated Degrees?

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Abstract

Aim: This study aimed to identify whether an intercalated BSc (iBSc) in Medical Education offers long-term career benefits beyond that of traditional iBScs by exploring candidates’ retrospective perceptions.

Method: A small-scale study was conducted with doctors who had completed an iBSc at Barts and the London SMD. A mixed methods approach was adopted using a questionnaire (21), and semi-structured interviews (4) to further explore respondent’s perceptions.

Results: All iBScs highlight similar curriculum outcomes in terms of research skill development and offer additional points at foundation- and specialty training applications. Medical Education respondents reported additional parallel benefits such as teaching alongside research activity, with a greater numbers of outputs e.g. presentations, publications. Understanding educational theory, developing teaching skills and portfolio creation were identified by the Medical Education group as particularly valuable to career progression. Additionally, Medical Educational iBSc candidates felt the course would offer ubiquitous value in the core medical curriculum, with those completing traditional ‘lab based’ iBScs feeling that no aspect of their intercalation had such generic value, and should remain a separate, optional educational intervention.

Conclusion: Considering the increasing emphasis on education and teaching in medicine, this study suggests Medical Education offers greater benefit to candidates in the long-term. It follows that incorporation of this in the core medical curriculum would offer value to all candidates.

Keywords: intercalation; medical education; postgraduate progression

Introduction

The medical school curriculum in the United Kingdom aims at producing well-rounded doctors with transferable
skillsets in line with the General Medical Council's (GMC) 'Good Medical Practice' domains that would enable them to pursue successful careers in the medical field. Alongside domains identifying the role of the doctor as a clinician and scholar are the emerging roles of the doctor as a teacher.

The medical school curriculum is becoming saturated as a result of the increasing focus on communication- and practical skills and a broader system of competencies expected from doctors. Alongside this saturation, medical students are offered to undertake an intercalated degree during their medical studies to expand on specific interests and develop desirable qualities and skills. An intercalated BSc (iBSc) offers medical students the opportunity to broaden their knowledge and skill base beyond that of the core medical curriculum. An intercalated degree is a one-year course taken after second, third or fourth year of medicine in the UK. Many medical schools in the UK encourage students to undertake an iBSc, whilst others have made this compulsory. Approximately a third of medical students in the U.K. choose to undertake one of the 230 intercalated degree courses on offer (British Medical Association Medical Students’ Committee, 2004; Hull York Medical School, n.d.).

There are several benefits that intercalation offers students simply by undertaking the extra year. Perhaps the most apparent is the rewarding of up to 4 extra points at the point of application for Foundation Year training (UK Foundation Programme Office, 2015). At the point of specialty training applications, an extra degree such as the iBSc awards significant additional points and furthermore has been shown to give applicant's research experience and additional achievements to speak about at interviews (Iqbal, 2001), useful personal contacts (Park et al., 2010), and employment references (Leung, 2001). Candidates feel that the aforementioned explicitly sets them apart from others (Stubbs et al., 2013). Thus, an iBSc makes the applicant significantly more competitive and arguably a more desirable candidate for specialty training posts, which are already incredibly competitive in their nature (Mahesan et al., 2011; Stubbs et al., 2013).

Intercalation not only offers benefits at the postgraduate level, but has also been shown to improve academic performance in final year exams among medical students (Agha & Howell, 2005; Cleland et al., 2009; Mahesan et al., 2011). Further research has also demonstrated that the extra year of study and experience enhances students’ maturity, which directly influences exam outcomes (Wilkinson et al., 2004). It is unknown whether intercalation acts as a staging post for high achievers, and therefore creates a self-selecting component to this outcome.

Traditionally, intercalated courses were aimed at fostering research mindedness and critical appraisal among medical students through a final project and dissertation in a lab-based capacity beyond the realm of medicine (Agha & Singh, 2003; Greenhalgh & Wong, 2003). As a result, iBScs offered are based around biochemistry, physiology and natural sciences. More recently, intercalated degrees that focus more on social sciences, such as Global Public Health, Management in Medicine, and Medical Education, are increasingly offered and are increasing in popularity.

The Walport Report of 2005 recommends making more opportunities available for students to "explore both the theory and practice of education in the undergraduate curricula through appropriate programmes, study modules/student selected components and intercalated degrees" (Academic Careers Sub-committee of Modernising Medical Careers and the UK Clinical Research Collaboration, 2005). In response to the increasing emphasis on doctors as teachers and teaching as an integral part of professionalism by both the British Medical Association (BMA) and the General Medical Council (2013), Barts and The London SMD introduced an intercalated BSc in Medical Education in 2007. In addition to research, this course focuses on teaching the theory behind education and learning, as well as exposing students to a range of teaching techniques and opportunities, portfolio creation and reflective practice (Barts and The London SMD, 2015).

Where research has shown the benefits of intercalation in general, there has been little work done looking at the specific benefits of individual courses, despite being very different in the skills they aim to develop and the material
they cover. Considering the inevitability of doctors being teachers alongside their clinical duties, the question arises whether doctors who have a greater understanding of teaching itself, ultimately make better doctors on the whole. Furthermore, the question arises of which specific skills promoted by intercalation, besides research, may be useful to integrate into the regular medical curriculum to produce the most well rounded practitioners. Considering the duties of the doctor stipulated in Good Medical Practice and its insistence on reflecting on one's own medical practice as part of maintaining and improving standards of care, this is an avenue that is beneficial to explore in terms of determining valuable educational interventions for future healthcare professionals.

There are a number of perceived and confirmed benefits of intercalation to students both at an undergraduate and postgraduate level. It follows that there are likely to be both similarities and differences between potential benefits offered by educational and more traditional iBScs. It would be advantageous to identify whether students who intercalate in education perceive less, similar or even enhanced benefits from their course at both an undergraduate and postgraduate level. This study assesses where these degrees offer benefits beyond the scope of other iBScs for students in their short and longer-term careers.

Method

A retrospective, mixed methods study was done to ascertain a comprehensive, in-depth understanding of the perceptions of graduates. Data was collected through an electronic questionnaire and a series of semi-structured one-to-one interviews conducted by the primary author. The questionnaire consisted of 13 items allowing free text, multiple choice, and Likert scale responses. The questionnaire and interview questions were piloted among a small group of students in order to improve clarity of the questions and changes were made accordingly. The two methods of data collection were done in parallel.

Graduates who had obtained an intercalated BSc from a large UK medical school (Barts and The London SMD) were invited to participate in this study between December 2015 and May 2016. A list of graduates of the Medical Education iBSc from 2007-2014 was obtained (n=90). The secondary researcher sent out an email questionnaire to a number of alumni in their already established network in order to recruit participants who had done ‘Other’ iBScs. Using the snowballing technique, questionnaire responses were obtained from this group. Those who filled in the questionnaire were invited to an interview by the primary researcher. To be included in the study the respondent had to have completed an iBSc at Barts and The London and respondents were to be Bart's alumni at the time of participation. There were no age, gender or training level related exclusion criteria.

Data was analysed using the NVivo coding software. A coding framework for all data was devised from the codes created by both the primary and secondary researcher separately to minimise researcher bias.

The interviews were anonymised and a letter-number combination was assigned to each transcript. Each questionnaire response was anonymised and answers were confidential. The questionnaire and interview were optional and completion was taken as consent to participate. There were no ethical concerns expressed by the university ethical committee.

Results

A total of 21 questionnaire responses and 4 interviews (2 Medical Education and 2 ‘Other’) were collected, giving a response rate for the Medical Education group of 11%. It is not possible to comment on the response rate of the
other group due to the chosen method of recruitment through snowballing. The distribution of iBScs undertaken by participants is shown in Table 1. The respondents had undertaken their iBSc between 2006 and 2013, with the median being 2010. The respondents were at different points in their training in a range of specialties, demonstrated in Table 2. 7 of the respondents were in their foundation years and had thus not started their specialty training at the time of data collection. Table 3 is a summary of responses to the remaining closed questions regarding participant achievements and teaching activity completed up to the time of data collection.

**Table 1 - Distribution of iBScs undertaken by Participants**

<table>
<thead>
<tr>
<th>iBSc</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Engineering and Clinical Methods</td>
<td>1</td>
</tr>
<tr>
<td>Experimental Pathology</td>
<td>1</td>
</tr>
<tr>
<td>Infectious Disease and Epidemiology</td>
<td>2</td>
</tr>
<tr>
<td>Medical Education</td>
<td>10</td>
</tr>
<tr>
<td>Molecular Medicine</td>
<td>2</td>
</tr>
<tr>
<td>Molecular Therapeutics</td>
<td>2</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>1</td>
</tr>
<tr>
<td>Sports and Exercise Medicine</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 2 - Participant Specialty and Training Level**

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY1</td>
<td>2</td>
</tr>
<tr>
<td>FY2</td>
<td>3</td>
</tr>
<tr>
<td>FY3</td>
<td>2</td>
</tr>
<tr>
<td>GP</td>
<td>4</td>
</tr>
<tr>
<td>Emergency</td>
<td>1</td>
</tr>
<tr>
<td>Obstetrics and Gynaecology</td>
<td>1</td>
</tr>
<tr>
<td>Core Medicine CT2</td>
<td>2</td>
</tr>
<tr>
<td>Anaesthetics CT2</td>
<td>1</td>
</tr>
<tr>
<td>Specialty</td>
<td>Count</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Intensive Care Medicine</td>
<td>1</td>
</tr>
<tr>
<td>Trauma and Orthopaedics</td>
<td>1</td>
</tr>
<tr>
<td>ACCS EM</td>
<td>1</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 3 - Participant Achievement and Teaching Activity Summary

<table>
<thead>
<tr>
<th></th>
<th>Medical Education (Total 10)</th>
<th>Other iBSc (Total 11)</th>
<th>Combined iBScs (Total 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Followed an Academic Path</td>
<td>4 (40%)</td>
<td>0</td>
<td>4 (19%)</td>
</tr>
<tr>
<td>Currently doing Teaching</td>
<td>10 (100%)</td>
<td>7 (64%)</td>
<td>17 (81%)</td>
</tr>
<tr>
<td>Currently doing Research</td>
<td>3 (30%)</td>
<td>1 (9%)</td>
<td>4 (19%)</td>
</tr>
<tr>
<td>Published</td>
<td>5 (50%)</td>
<td>3 (27%)</td>
<td>8 (38%)</td>
</tr>
<tr>
<td>Won Prizes</td>
<td>4 (40%)</td>
<td>6 (55%)</td>
<td>10 (48%)</td>
</tr>
<tr>
<td>Undertake an iBSc again?</td>
<td>10 (100%)</td>
<td>10 (91%)</td>
<td>20 (95%)</td>
</tr>
</tbody>
</table>

Impact of undertaking an iBSc on uptake of Academic Medicine and Teaching

Nineteen percent (n=4) of respondents had followed an academic training path since graduating. From those following a postgraduate academic training path, all had done the Medical Education iBSc during their time at medical school. Those that had completed the Medical Education iBSc regarded the course as having heightened their interest in Medical Education and further increased their passion for teaching. They reported that having the specific iBSc in education not only helped in their application for the academic job, but also “spawned their interest in teaching and further training in the field”.

Eighty-one percent (n=17) of respondents reported that they engaged in teaching activities, this primarily being informal ward-based teaching. All Medical Education iBSc participants and 64% (n=7) of those completing ‘Other’ iBScs reported to be actively involved in teaching. One third (n=6) of respondents felt that their iBSc impacted their teaching levels. Out of these, all held the iBSc degree in Medical Education. Those who completed an iBSc in Medical Education felt especially encouraged to actively seek out teaching opportunities throughout their foundation years. They also expressed feeling more prepared to take on formal teaching roles in a hospital setting and felt that their degree acted as a springboard to further their career in education:

“I was more willing to engage with medical students on the firms whereas other junior doctors would have just sort of felt ‘no I don’t want to get involved in that or I don’t want to do extra session’, so it increased my confidence and I was happy to do that extra.”

Gaining skills in teaching and understanding the theory underpinning education, which are key aims of the iBSc in Medical Education, were seen as significant advantages over doing more traditional iBScs.
Impact of iBSc on Job Application

The iBSc offered significant value in securing first choice foundation year jobs due to the additional points in the FPAS application:

"If it weren't for my intercalation, I almost certainly would not have gotten my foundation training in London”.

This was attributed to the extra year of study rather than the nature of the degree itself. Many had received prizes and done presentations based on their iBSc, gaining further additional points. Beyond the foundation years, the intercalated year was perceived to have helped attain specialty jobs, where many were specifically asked about their iBSc in their interviews and allowed them to express an interest beyond mere clinical medicine.

The opportunities in publishing and research related to the iBSc as well as understanding the processes involved were found to help in applications as well. Furthermore, respondents reported that they were able to establish networks, which opened doors for them later on in their careers. These were benefits reported by all respondents regardless of the completed iBSc.

Impact of iBSc on Professional Development and Research

One fifth (n=4) of respondents reported to undertaking research at the point of completion of the questionnaire. Of these, 30% (n=3) of the Medical Education cohort and 9% (n=1) of the ‘Other’ cohort was undertaking research. Fifty-five percent (n=6) of those that did ‘Other’ iBScs had won prizes and done presentations, compared to 40% (n=4) of those that had done Medical Education. From those that had won prizes and done presentations, 80% (n=8) had done so based on work they had done or skills they had gained during their intercalation. Over half of those that reported having been published had published their iBSc project or related work. More participants who had done Medical Education (50%, n=5) had published than those doing other iBScs (27%, n=3).

Confidence with portfolio creation and upkeep was mentioned as a skill that was predominantly developed in the Medical Education iBSc. Whereas for Medical Education graduates the confidence stemmed largely from understanding the reasoning and structuring behind portfolios, those who had done ‘Other’ iBScs reported that it gave them valuable material to include in their portfolios and thus heightened their confidence in the portfolio itself. One ‘Other’ iBSc participant reported becoming a more self-motivated learner throughout his iBSc and therefore felt more prepared to keep a portfolio throughout his career.

Understanding research methodologies, critical analysis and gaining basic research skills were reported to be important and transferable aspects of intercalation in general. Respondents felt that these were important regardless of whether one was going to follow an academic career path and that, once equipped with the skills to do, would be more likely to undertake research.

Skills gained through iBSc to be included in the core medical curriculum

Both groups felt that ‘Research Methodology and Skill’ should be emphasised more in the core medical curriculum.
Overall, the latter as well as 'Educational Theories and Philosophies' were reported to be of value if added to the core medical curriculum.

Among the Medical Education iBSc graduates, it was noted that many felt aspects specific to Medical Education should be included in the core medical curriculum, such as Educational Theories and Philosophies (40%), Teaching Skills (27%), Portfolio/Reflection (13%), and Feedback (7%). The Medical Education degree gave respondents a newfound appreciation of aspects relevant to the medical profession in general:

"For the rest of my career it made me appreciate things like reflection and portfolio and that sort of thing, because a portfolio, throughout specialty training, has a big weighting."

Respondents stressed the importance of the doctor's duty to teach and recommended an integrated Medical Education course into the core medical curriculum. Although some mentioned that they got some experience in teaching in their final year of medical school, the overriding agreement appeared to be that this did not suffice.

Among the ‘Other’ iBSc graduates, the most common response (34%) was that no aspect of their degree should be incorporated into the normal curriculum for the following reason as they considered the year one for purely research:

"It is a research year for those interested in research. It is completely irrelevant if you already know you want to be a purely clinical speciality such as GP, A&E or acute medicine."

Figures 1 and 2 demonstrate the difference in what the two groups felt should be included in the core medical curriculum.

*Figure 1 - Summary of Medical Education iBSc respondents' responses regarding what should be incorporated into the core medical school curriculum*
Figure 2 - Summary of 'Other' iBSc respondents' responses regarding what should be incorporated into the core medical school curriculum
**Discussion**

This study was one of the first studies to identify whether there is a difference between the perceived value attributed to intercalation in education and other, more traditional courses. There are some known benefits of intercalation in general in terms of academic performance and points for foundation year training. The impact of intercalation beyond that has been a point of dispute, with some claiming the degree holds no further value after undergraduate qualification (Park et al., 2010). In this study, although some perceive their intercalation as being predominantly valuable at an undergraduate level, it is suggested that intercalation offers extra benefits beyond the additional points in foundation year applications. Some of these benefits are shared by all iBScs, such as research competencies and experience to take on to specialty training, thereby improving candidates’ competitiveness.

There appears to be a low focus on education and the underpinning theories and Public Health in the medical school curriculum (Barts and The London SMD, 2010). Due to the high number of clinical science-based intercalated degrees and the general clinically scientific focus of the medical school curriculum, perhaps students are not made aware of the opportunities available for those otherwise inclined. Following the recommendations in the 2005 Walport Report, it is the responsibility of the universities to provide opportunities to introduce and encourage the exploration of education early on, at the undergraduate level, through intercalation for example.

This study suggests that experience in teaching and understanding the theories underpinning Medical Education
influence doctors’ confidence and readiness to teach at a postgraduate level. Several teaching courses have been set up at Barts and The London SMD (Cook et al., 2010) as well as at the University of British Columbia. The students rated the course as excellent and reported increased confidence and understanding of teaching in medicine (Craig & Page, 1987). Further development and extension of such a programme focusing on teaching in medicine would deem advantageous. However, the already saturated medical curriculum and financial strain must be taken into account. It also remains unclear whether these perceived benefits would be achieved to the same degree through a short course or student selected component as opposed to a year-long degree explicitly focused on teaching. It must also be noted that this study explored the perceived effect of intercalating on teaching, and increased confidence does not irrefutably equate to better quality of teaching.

Similar to courses in education, research courses have been trialled at medical schools in Germany (Fritsche et al., 2002), the United States (Jacobs and Cross, 1995), Croatia (Kolčić et al., 2005), Canada (Smith et al., 2001) and Finland (Remes et al., 2000). Although these share properties with the research encouraged through iBScs, to date it is unclear whether these offer the same benefits as intercalation. Indeed, research competencies is an aspect that may need to be further emphasised in the medical curriculum, despite student selected components offering these research opportunities on a smaller scale.

In a curriculum reform, one university in Australia introduced a mandatory iBSc with a focus on medical research. They found that although this ensured that most students gained significant research skills, intercalation demanded a certain level of maturity, autonomy and preparedness that was not uniformly present in all those that did take part in the mandatory programme (Collins et al., 2010). This suggests that, to a certain extent, those who intercalate are a self-selecting group, who may already have a fostered interest in research to begin with. The study recommended fostering research-mindedness (with regards to evidence-based medicine) among all medical students through the regular medical curriculum, which is supported by our study.

Those with an iBSc raise substantially more research grants from the Medical Research Council, have a better publication record over 10 years, and are cited more often than those who do not (Evered et al., 1987; Agha & Howell, 2005). This suggests that publication, further research, academic posts, presentations at conferences, and further postgraduate qualification are perceived as outcome measures suggestive of benefit from intercalation in general. In our study, more respondents who had done the Medical Education iBSc had been published than those who did ‘Other’ iBScs. Some respondents mentioned that guidance on how to approach research publications was a skill they learned from their project supervisors during their intercalated year and encouraged them to seek these opportunities later on in their career, as the threshold to doing so had been lowered.

Our study further found that those who had done more traditional iBScs had won more prizes than those who had done Medical Education. Whilst awareness of opportunities available may play a role, it may also be a question of availability of prizes versus presentations in the respective fields. It must be considered that Medical Education is a relatively new field, and thus the number, in addition to the awareness, of the available prizes may be limited. Student-supervisor relationships, student characteristics and medical school focus are aspects beyond the scope of this project, however they may be an area for further research and could offer an explanation for the disparities found in this study.

Those who completed the more traditional degrees were more inclined to say that no aspects of the intercalated degree should be included in the core medical curriculum, arguing that it is not relevant to those not interested in pursuing a career in research. Despite this, gaining skills in research is perceived to be one of the main transferable benefits of intercalation in this study. Intercalation has traditionally been thought to be a gateway to a career in research, as the core medical curriculum has proven not to encourage this. Considering the duties of a Doctor
outlined in 'Good Medical Practice' (General Medical Council, 2013) and the GMC's 'Tomorrow's Doctors' (2015), we argue that these attributes should not be optional to medical professionals, and should be encouraged in the medical curriculum.

This study considered whether a degree in education would encourage pursuing an academic pathway, as research has suggested this (McManus et al., 1999). Only 16% of respondents in the study reported to having followed an academic path. These were all respondents who had completed the iBSc in Medical Education. In a paper outlining the need for revitalising academic medicine, Professor Desmond Sheridan (2006) demanded recognition of its role in teaching and research within the clinical context. Professor Sheridan claimed it is imperative that teaching and research are critical outcomes to include in healthcare reforms. Interestingly, the data in this study suggests that those with a degree in teaching are more likely to follow an academic career path, which is promising considering the recent decline.

The intercalated year has been described as one in which students learn to think and question things for themselves, enhancing personal development as well as professional. No one, according to Smith, seems to dispute the value of these degrees (1986). This study confirms this, as 96% would recommend intercalating.

**Limitations**

The small scale of this study affects the power and generalizability of the results, subjecting the data collected to a degree of sample bias.

As a comparative study, it was assumed that all ‘Other’ iBScs were homogenous, and collectively significantly different in terms of their characteristics and outcomes, from Medical Education.

The time between having completed the iBSc and participating in this study varied from 2 to 9 years, with most respondents having qualified relatively recently. This suggests we may not have captured the full impact of intercalation for some participants, as many had not yet chosen which specialty they wanted to go into. Moreover, achievements such as publications and prize applications are often lengthy processes which may still have been ongoing for some participants at the time of research.

**Recommendations**

We recommend studying the perceptions of iBScs in education and other fields on a larger and more longitudinal scale, as the course in Medical Education is relatively new (2007). It would be advantageous to trial a course or module in education and research, which can be integrated into the core medical curriculum, considering the general decline in academic interests and the increasing importance of teaching. Despite the size of the study, the implications are applicable to other institutions in the UK that offer similar intercalated degrees. A larger, more powered study is required to confirm the accuracy of our findings.

**Conclusion**

This study shows that both ‘Traditional’ and Medical Education iBScs offer some generalizable benefits to students in
terms of research skill development, employability and points at the foundation- and specialty training application.

This study further suggests that intercalating in Medical Education confers additional transferable benefits to the well-established transferable skills of intercalation. The iBSc in Medical Education appears to offer more skills relevant to continuing professional development in the long-term as demonstrated by greater numbers of outcome markers e.g. publications, presentations, teaching and research. The areas of most benefit identified by those doing Medical Education were: portfolio creation and maintenance, acquiring teaching skills, and gaining a better understanding of theories behind teaching. These benefits are valuable in the current medical setting where education and teaching is increasingly being prioritised.

Whereas many students intercalate under the premise of conducting laboratory based research, and thus may not be interested in a degree in education, it is undisputable that skills acquired through intercalation in education are ubiquitously of value to being a doctor. As such it would follow that there may be a place for encouraging these generic skills in the core medical curriculum given their long-term value.

**Take Home Messages**

1. All iBScs offer similar opportunities in terms of research skills and competencies.
2. Medical Education respondents report greater teaching activity alongside research, with a greater number of outputs.
3. Those completing traditional iBScs feel that intercalation should remain a separate, optional educational intervention with a focus on specific research.
4. Educational theories and philosophies, teaching skills and portfolio creation are particularly identified by the Medical Education group as valuable to long-term career progression.
5. We recommend inclusion of a Teaching and Research Methodologies course in the core medical curriculum.

**Notes On Contributors**

Marjolein van Winsen is a medical student at Barts and The London School of Medicine and Dentistry, London, United Kingdom. She completed an intercalated degree in Medical Education at Barts and The London SMD in 2016.

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Professor Sandra Nicholson is the Centre Lead for Medical Education at Barts and The London SMD, London, United Kingdom.

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Appendices

Declarations

The author has declared that there are no conflicts of interest.

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