Understanding the impact of academic difficulties among medical students: a scoping review

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Understanding the impact of academic difficulties among medical students: a scoping review

*Medical Education*, in press

**note:** this is the accepted manuscript; the published version may differ

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**ABSTRACT**

**Background:** Many medical students may encounter a range of academic and personal challenges during their course of study, but very is little is known about their experiences. Our aim was to review the literature to inform future scholarship and to inform policy change.

**Methods:** A scoping review was conducted searching PubMed, MEDLINE, EMBASE, PsycInfo, British Education Index, Web of Science and ERIC for English language primary research with no date limits. This retrieved 822 papers of which 8 met the requirements for inclusion in the review. Data were independently reviewed by two researchers and underwent thematic analysis by the research team.

**Results:** Three major themes emerged. Theme 1: ‘Identity preservation’ addressed students’ aim to preserve their sense of self in the face of academic difficulty and their tendency to seek support. This connected the apprehension many students expressed about their educational institutions to the Theme 2: ‘The dual role of the medical school’ - medical schools are required to support struggling students, but are predominantly seen as a punitive structure acting as the gatekeeper to a successful career in medicine. Students’ apprehension and attempts to protect their identities within this complex landscape often resulted in ‘maladaptive coping strategies’ (theme 3).

**Conclusion:** Understanding and exploring the academic challenges faced by medical students through their own experiences highlights the need for the development of more individualised remediation strategies. Educators may need to do more to bridge the gap between students and institutions. There is a need to build trust and to work with students to enhance their sense of self and remediate approaches to engagement with learning, rather than focusing efforts on success in assessments and progression.

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**INTRODUCTION**

On entering medical school, students have demonstrated their ability to meet demanding academic criteria. Yet many students encounter academic difficulties in which they are unable to meet the academic standards set for preclinical or clinical stages of the course. Attrition rates vary between 5-14%, and more students fail assessments but are supported to continue on the course.\(^1\)\(^-\)\(^5\)

Higher education and medical education research has focused on how best to predict academic outcomes, so as to inform admissions policies. However, it is important to explore how medical students make sense of their academic difficulties, because their beliefs about the causes of their difficulties influence how they engage with support processes and remediation programs. This scoping review synthesises the relevant literature.

Addressing academic difficulties early is important given the correlation between undergraduate underperformance and a greater risk of unprofessional behaviours, disciplinary proceedings, and fitness to practice hearings once qualified.\(^6\)\(^-\)\(^9\) Remediation practices vary across institutions, but typically provide additional support to students who have failed or are deemed to be ‘at risk’ of failure. However, they have been criticised for being generic, lacking in theoretical foundations, and having limited success.\(^10\)
This situation could be improved by utilising the broader literature on academic performance and attrition across higher education, which has highlighted the importance of situational, institutional and dispositional factors.\textsuperscript{11,12} These are described in detail in Richardson et al.’s systematic review and meta-analysis.\textsuperscript{13} They analysed the theories underpinning the complex interplay between personality traits, motivational factors, goal setting, effort regulation (ability to maintain effort in the face of challenges), self-efficacy (belief in one’s ability to complete tasks), and use of self-regulated learning (SRL) strategies to explain whether students attribute their academic performance to internal or external factors.\textsuperscript{13} Student approaches to learning (SAL) models further categorise learning strategies as ‘deep’ if they encompass critical analysis and information synthesis, in comparison to ‘surface’ strategies such as memorisation, or ‘strategic’ strategies whereby students choose which approach to take depending on how they value the task.\textsuperscript{14–16}

Within medical education literature, there has been a specific focus on the academic, psychological, and social/contextual factors outlined below.

1) Academic Factors

\textbf{Academic factors prior to medical school} have mostly been investigated from the perspective of entry criteria and admissions scoring systems. The largest UK study on this topic identified a predictive link between prior academic achievement, progress through medical school, and performance in professional exams,\textsuperscript{6} although this has not always been replicated in smaller studies.\textsuperscript{17,18} Nonetheless, using pre-university exam performance to determine academic capacity is problematic, because factors such as social class and gender are determinants of academic outcomes independent of ability.\textsuperscript{19} Furthermore, medical students who attended State schools academically outperform students who attended selective schools, despite similar results in final secondary school exams.\textsuperscript{20} Studies assessing the predictive validity of aptitude tests have been inconclusive,\textsuperscript{17,21,22} and none show how they could be used to target support for at-risk students.

Important \textit{academic factors at medical school} include the concepts of SRL and SAL,\textsuperscript{14–16,23–25} and the transition from pre-clinical learning to clinical practice. Berkhout et al. adapted the SAL model to medical education, exploring the journey from novice to experienced learners. They highlighted that experienced learners took control of their learning with more focused goals and efficient learning strategies.\textsuperscript{26} The authors of a recent review of research into the transition to learning in the clinical environment cautioned against limiting the conceptualising of “transition” as ‘a maladaptive struggle’, and drew attention to the benefits of reframing it as a positive transformative experience.\textsuperscript{27} Others have noted that academic struggles such as poor study habits or inadequate preparation for undergraduate study are more remediable than shortcomings in character, professionalism, or behavioural issues.\textsuperscript{28}

2) Psychological Factors

Studies investigating psychological factors have centred around stress, mental health and support.\textsuperscript{29,30} Research has revealed a high prevalence of distress among newly-qualified doctors, with many medical students experiencing substantial distress even prior to qualification.\textsuperscript{31} Also of concern is the finding that medical students have lower distress scores compared to non-medical students on commencing medical school, but graduate with higher levels of depression and burnout.\textsuperscript{32} This appears to be a global issue,\textsuperscript{33–37} and must not be ignored by Western medical schools attempting to diversify their student intake: evidence suggests that international medical students experience more psychological distress than home students.\textsuperscript{38} Recent initiatives to improve the diversity of representation of health professionals with physical and learning disabilities have highlighted a need to ensure that appropriate adjustments and support are available to meet their specific needs.\textsuperscript{39,40}

3) Social/contextual Factors

Attrition models show that social, academic and institutional integration are strongly linked to course completion, whereas external pressures hamper this.\textsuperscript{41–43} Several studies have focused on the
experiences of sub-groups of medical student that are under-represented in wider discussions of academic difficulties. These include mature students, students from ethnic minority backgrounds, LGBTQ+ students, and international students.44–47 Widening participation initiatives have been designed to increase the demographic breadth of medical school intakes, but this sub-group of students has higher attrition rates across university courses.48 Successful widening participation programmes may require appropriate curriculum and support systems to match student needs.49–52

The scoping review reported here explored students’ experiences of academic difficulties in relation to the various factors identified above.

**METHODS**

The scoping review was conducted following the five stages described by Levac et al.:53

1) **Research question:** What is known about borderline/failing medical students’ experience of academic struggle, learning style, teaching and remediation?

2) **Identifying relevant research:** Table 1 lists the terms used for searches of MEDLINE, EMBASE, PsycInfo, Web of Science, British Education Index and ERIC databases on 15/12/2019 and re-run on 27/08/2020.

**Table 1.** Search terms

<table>
<thead>
<tr>
<th>Database</th>
<th>Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMBASE, MEDLINE</td>
<td>Students, medical, undergraduate OR medical undergrad* Or Medical student*</td>
</tr>
<tr>
<td></td>
<td>AND</td>
</tr>
<tr>
<td></td>
<td>Student* adj12 borderline/strugg*/difficult*/distress*/fail*/adversity</td>
</tr>
<tr>
<td></td>
<td>AND</td>
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<tr>
<td></td>
<td>Student* adj9 experience/perception/sens*/feel*/impression/belief*/perspective/opinion*/narrative*/attitude*</td>
</tr>
<tr>
<td></td>
<td>AND</td>
</tr>
<tr>
<td></td>
<td>Learning style/learning technique or learning approach or learning method or</td>
</tr>
<tr>
<td></td>
<td>learning practice OR</td>
</tr>
<tr>
<td></td>
<td>Student* adj9 remediation/support OR Pastoral care/pastoral counselling OR</td>
</tr>
<tr>
<td></td>
<td>Medical adj3 curricul*/syllabus/program*/teach*</td>
</tr>
<tr>
<td>PsycInfo, ERIC</td>
<td>(Medical students or medicine students or students in medicine) OR medical</td>
</tr>
<tr>
<td></td>
<td>undergraduates</td>
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<tr>
<td></td>
<td>AND</td>
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<tr>
<td></td>
<td>Borderline student OR struggling students OR difficulties OR failing students</td>
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<td></td>
<td>OR distress OR adversity</td>
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<td></td>
<td>AND</td>
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<tr>
<td></td>
<td>(Experiences or perception or perceptions or experiences) OR (feelings or</td>
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<td></td>
<td>emotions or experiences or attitudes) OR (perspective or perception or</td>
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<td></td>
<td>opinion or experience or attitude) OR (views or opinions or perceptions or</td>
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<td></td>
<td>beliefs or attitudes or experience) OR (narrative OR sensation)</td>
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<td></td>
<td>AND</td>
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<tr>
<td></td>
<td>(learning styles and strategies) OR (learning practices OR (learning methods</td>
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<tr>
<td></td>
<td>or teaching strategies) OR learning approaches OR Medical curriculum OR</td>
</tr>
<tr>
<td></td>
<td>medical programs OR syllabus or medical teaching OR Remediation OR student</td>
</tr>
<tr>
<td></td>
<td>support OR (pastoral care or pastoral counselling)</td>
</tr>
</tbody>
</table>
3] **Study selection:** The first two authors independently screened the articles using the three criteria outlined in Box 1. The use of the first criterion (population of interest) was progressively narrowed from all students at title review, to medical students at abstract review and finally academically struggling students at full text review to ensure that no relevant papers were overlooked at an early stage. Title review led to the exclusion of 484 articles, and 200 more were excluded at abstract review, leaving 84 papers for full text review. Agreement was reached for seven papers which were included in the review. The third author reviewed four papers where agreement was not reached. Of these, one met the criteria, so eight articles were included in the review. Study quality was assessed using the Mixed Methods Appraisal Tool. There was consensus across all eight studies between reviewers DK and GW; six were deemed high quality studies,\textsuperscript{54–59} two were low quality.\textsuperscript{60,61}

Box 1  
**Screening criteria and inclusion/exclusion criteria**

<table>
<thead>
<tr>
<th>SCREENING CRITERIA</th>
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<tbody>
<tr>
<td>1. Population of interest – Academically struggling medical students</td>
<td></td>
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<tr>
<td>2. Measured student experience</td>
<td></td>
</tr>
<tr>
<td>3. About curriculum/teaching/learning/remediation/failure/support</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>INCLUSION CRITERIA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Published in English</td>
<td></td>
</tr>
<tr>
<td>• Focused on academically struggling medical students (not qualified doctors, nor students or practitioners of other health professions)</td>
<td></td>
</tr>
<tr>
<td>• Papers that focused on the medical students’ experience of failure, learning, teaching, attrition and support.</td>
<td></td>
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</table>

<table>
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<tr>
<th>EXCLUSION CRITERIA</th>
<th></th>
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<tbody>
<tr>
<td>• Articles without full text</td>
<td></td>
</tr>
<tr>
<td>• Articles published in another language</td>
<td></td>
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<tr>
<td>• Opinion pieces</td>
<td></td>
</tr>
<tr>
<td>• Systematic reviews or review articles</td>
<td></td>
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<tr>
<td>• Dissertations</td>
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</table>

4] **Data Extraction:** The first author developed a data extraction form, which included: study demographics; participant characteristics; data collection methods and analysis: definition of academic struggle; what student experiences were explored; and the identified themes, recommendations, and quality control methods. The second author reviewed the full text articles against the data extraction to check for completeness and any discrepancies. This was an iterative process refined through discussion between all authors.

5] **Collating, summarising and reporting results:** Thematic analysis was conducted using Braun and Clarke’s 6-step approach: familiarisation with data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; writing up analysis.\textsuperscript{62} The first two authors independently reviewed the articles to generate initial codes which were then discussed to produce emergent themes. These were reviewed and refined via discussion with the third author.

**RESULTS**

**Descriptive analysis**

Eight studies published between 2002 and 2016 were included in the review: four from the UK,\textsuperscript{54–56,60} and one each from Ireland,\textsuperscript{59} South Africa,\textsuperscript{61} Dominica,\textsuperscript{58} and Pakistan.\textsuperscript{57} One paper focused on first
years,\textsuperscript{58} one on resitting second years,\textsuperscript{61} and two on final year students.\textsuperscript{54,55} One paper looked across all year groups,\textsuperscript{57} one at second to fourth years,\textsuperscript{59} and two at fourth and fifth years.\textsuperscript{56,60}

Five studies used qualitative approaches;\textsuperscript{54–56,60,61} three used mixed-methods.\textsuperscript{57–59} Six studies used semi-structured interviews,\textsuperscript{54–56,58–60} of which one had an accompanying focus group,\textsuperscript{54} one had a survey,\textsuperscript{58} and one had an evaluation questionnaire.\textsuperscript{60} The quantitative studies used an open survey,\textsuperscript{61} or self-report scales.\textsuperscript{57} Academic difficulty was defined in varied ways. Two studies used scoring systems as a descriptor of academic underperformance: the distance from the year average in continuous progress tests,\textsuperscript{59} or absolute test scores.\textsuperscript{57} Other defined academic difficulty in terms of failure of summative exams in the final year,\textsuperscript{54,55} or in earlier years.\textsuperscript{56,60,61} One study focused on failure of first semester exams, which automatically triggered student participation in remediation programmes.\textsuperscript{58}

The studies focused on a broad range of student experiences, including motivation,\textsuperscript{56,60} type of curriculum,\textsuperscript{61} learning habits,\textsuperscript{55,56,60,61} assessment modalities,\textsuperscript{54,55,59,60} and support/remediation.\textsuperscript{54–56,58–60} One study focused primarily on the interaction between stress and academic outcome,\textsuperscript{57} and one focused on students’ perceptions of the influence of teachers on their learning.\textsuperscript{58}

There were diverse approaches to the topic of student experiences. Most had a narrow focus on the effect of specific issues related to student learning and academic outcomes, such as curricular change,\textsuperscript{61} remediation programs,\textsuperscript{60} the impact of progress tests,\textsuperscript{59} the role of teachers,\textsuperscript{58} or stress.\textsuperscript{57} Patel’s group took a more open and iterative approach in which the experiences explored were defined through semi-structured interviews and student narratives.\textsuperscript{54,55} Todres et al. took a similar approach, but compared high- and low-achieving students to identify differences in SAL.\textsuperscript{56}

**Thematic analysis**

**Theme 1: Identity preservation**

Academic difficulties affected students’ identities and ideas of self-worth, which in turn influenced high stress levels and impaired mental health. Failure forced some students to confront their self-perception as academically successful students, and this was associated with a fear of being seen as a failure by themselves and/or fellow students.\textsuperscript{55} In attempts to protect against this, there was a tendency to adopt maladaptive coping strategies including misattributing and trivialising failure.\textsuperscript{54}

Withdrawal from their peers was common due to fears of being marginalised and not wanting to appear ‘weak’ in an environment perceived as competitive and hostile.\textsuperscript{54,57} In addition, students wanted to avoid being ‘noticed’ by the medical school,\textsuperscript{54} and labelled as ‘bad’,\textsuperscript{55} and so would not seek early support. These became barriers to changing their learning styles and approaches to assessment.\textsuperscript{54} This inability or reluctance to self-analyse was further highlighted as a significant difference between ‘high’ and ‘low’ achieving students\textsuperscript{56}, with the latter unable to adapt their study styles, believing that effort alone would be rewarded with passing.

Interestingly, some students found that being interviewed for the studies provided an opportunity for self-reflection and behaviour change.\textsuperscript{56} Other students were resistant to self-reflection even when confronted with failure: this group provides a greater challenge to remediation as they have a greater tendency to externalise the factors responsible for underachievement. Limitations to students’ willingness or ability to self-reflect or self-regulate encompassed many of the above issues, and were reflected in the passive narrative that many struggling students used when describing their experiences.\textsuperscript{54,56}

Aspects of students’ motives for studying medicine were also linked to issues of identity: ‘high’ achievers were motivated to study to develop their skills in preparation for their future role as a doctor, whereas ‘low’ achievers tended to be assessment-oriented, and more fixed in their identity as a student.\textsuperscript{56}
Theme 2: Medical schools’ dual roles

Exploration of why students did not seek support through formal institutional processes revealed a recurring theme of distrust of the medical school and the relationship the students had with those placed to support them.

The school was often seen as both ‘judge and jury’, positioned as gatekeeper to a successful career in medicine, yet also an intended source of support for the individual student to achieve their goal of becoming a doctor. Many students felt that the approach taken by the medical school was punitive and that remediation came too late, alongside the harmful effects of failing a significant exam. Students often used phrases such as ‘frustration’, ‘bitterness’, ‘feeling let down’, ‘secondary prevention’, and ‘too little too late’.

Key attributes the students felt a good educator should possess were encouragement, motivation, honesty, and approachability, but also holding students accountable for their learning. Feedback was described as too generic to meet the needs of individual students. Feedback can be a useful tool to improve learning, however, if the delivery of feedback is poor, then it may be perceived as an unsupportive tick-box exercise that does not enhance student’s self-esteem or confidence.

Another factor highlighted was the influence on students’ study behaviours of the ‘hidden’ curriculum - the unspoken, implicit values, behaviours and norms that exist in the education setting, and the need for medical educators to have a good understanding of group study dynamics and methods.

Theme 3: Coping strategies and external pressures

The final theme related to how students cope with failure and their engagement with sources of support. Social isolation was not only a result of efforts to preserve self-identity, but also represented a lack of access to support - especially for graduate entrants, students transferring from other degree programmes, and international students.

Students found it easier to approach peers than personal tutors. However, Patel et al. cautioned against failing students working exclusively together, due to the risk of solidifying poor work practices and limiting opportunities to develop more adaptive learning styles: they called for the use of mentor schemes, alongside improving SRL, to combat this.

Availability of time for study may be affected by financial hardship (necessitating the need for paid work), bereavement, relationship breakdown, mental health difficulties and subsequent treatment. Although personal problems are not unique to failing students, the difference in the way the students responded to them was pronounced. High achievers tended to use these challenges as motivators to focus their studies and succeed, whereas low achievers attributed their failure to such challenges. To compound this, students’ belief that their medical school would not consider personal problems a legitimate reason for failure resulted in delayed help-seeking.

DISCUSSION

The causes of student academic underperformance and failure are complex, varied and individual. This is why it is important for institutions to understand how students explain and respond to academic difficulties when creating policies to support them.

Predicting which students are likely to face academic difficulty remains a struggle, especially as institutions attempt to diversify their intakes. The data presented here suggest that medical schools may need to consider evaluating students’ abilities to self-reflect and self-regulate as part of the admissions process. These are essential skills for lifelong learning, and they should be integrated much earlier in students’ educational journeys.
However, many of the influences on academic difficulties arise during students’ time at medical school: they cannot be predicted through admissions processes, and require support processes able to mitigate their effects. Institutions must act in ways that acknowledge that the ability to meet demanding academic entry requirements does not protect students from academic difficulties, and that for many students this will be their first experience of such difficulties. We have shown how this can have profound impacts on identity, and act as a barrier to accessing formal or informal support. It may help students if medical schools explicitly addressed the issue, explaining to students that such difficulties are not unusual. Sessions designed to help students develop practical and psychological skills may create an environment in which students are less fearful of being stigmatised and more open to addressing their needs.

For students who do require more support, we encourage institutions to aim for individualised remediation, but note that this may be resource-intensive.60 Finding the allocated time within the curriculum and the staff members to provide this level of support may not be feasible for many institutions. Therefore, support should be aimed at addressing the strongest modifiable correlates of tertiary academic performance: past research has identified a complex mix of self-efficacy, effort regulation, goal setting and integration.13,67

Some students felt that remediation opportunities occurred too late.59 This may be prevented via formative assessments and predictive assessment models to enable earlier identification of at-risk students.59 Further research to assess whether early identification is feasible at a multi-institutional and national scale is required. However, institutions should note that students deemed these more useful to the institution than their learning, and often interpreted them as the medical school ‘policing’ them. Additionally, there is some concern that data-driven approaches to learning risk simplifying the complex nuances of human processes and ignoring social contextual factors.69

Transparency regarding the reasons for these procedures, and better individual feedback mechanisms within this testing may help students to recognise the value of formative assessments. Research into students’ perspectives on formative assessment and actionable feedback may improve how these tests are applied and improve engagement.

For many students in the studies reviewed here, discussions with the researchers was the first opportunity to reflect on their experiences and learning, and many reported that it was therapeutic.55,56 Utilising this, institutions could integrate sessions that encourage students to reflect and challenge their current approaches to learning, facilitated by trained educators capable of teaching SRL strategies.23,68,69 This could boost self-efficacy, and thereby help students to cope better with personal problems.55,70

Finally, to address the preference of students to seek support among their peers it is worth exploring whether the benefits of near-peer teaching involving senior students teaching and mentoring more junior colleagues translates to near-peer support.71 This might appeal to failing students who are reluctant to use formal support pathways due to fears of institutional surveillance and punitive consequences. This may be of particular benefit to traditionally underrepresented students who struggle to integrate, 72 but this is an area that requires more research.

Limitations and opportunities

Although our review sampled articles across a wide range of institutions and considered differing cultural perspectives to learning and education, it did not include non-English language articles. This potentially excluded relevant studies from other countries in which struggling students may be conceptualised differently and/or where different remediation practices are employed. Additional databases could have been included, but they were unlikely to have yielded more studies given the focus on medical undergraduates and the unique demands of the course, but parallels could be drawn by examining literature in other healthcare courses. This scoping review only found a handful of studies of the experiences of academically struggling medical students: there is a clear need for more research. Struggling students were generally identified after having failed an examination, but
this may not be the only marker of academic difficulties. Future quantitative and qualitative research focused on students in the lower quartiles of exam results – but who still pass – could reveal how widespread these issues are.

Future research to determine the predictive validity of assessment of approaches to learning and formative assessments may reveal better ways to identify students who would benefit from early remediation. This may prompt personal tutors to open discussions to explore students’ experiences, and to identify areas of support that may allow for earlier remediation.

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Holmes D. Eight years’ experience of widening access to medical education. *Med Educ.*


**Figure 1** PRISMA summary flow diagram indicating the search and selection process

- **Identification**
  - Records identified through database searching (n = 1084)

- **Screening**
  - Records after duplicates removed (n = 822)

- **Eligibility**
  - Records excluded by Title and Abstract (n = 738)
    - 447 excluded as they did not involve medical students as the population of study
    - 145 excluded as not assessing the student experience
    - 146 excluded as not regarding curriculum/teaching/learning/remediation/failure/support
      (2 abstracts were for books, 1 abstract was a commentary and were thus excluded as were not primary research)

  - Records screened (n = 822)

  - Full-text articles assessed for eligibility (n = 84)

  - Full-text articles excluded, with reasons (n = 76)
    - Not about academically struggling students (n=51)
    - Not about student experience (n=9)
    - Not primary research (n=11, 3 dissertations, 1 AMEE guide, 1 letter to editor, 1 commentary, 5 systematic or review papers)
    - Abstracts with no paper published in peer reviewed journal (n=2)
    - Not in English (n=1)
    - Part of MD – not published (n=1)

- **Included**
  - Studies included in review (n = 8)