

University Materials Council (UMC) Survey Results: Open-Source Text Book

Survey results will be presented by UMC Chair Amit Misra at the
MRS Fall Virtual Meeting
Dec 7th 2021

Session Title: BI01.03:
Morning Session—Flexible Textbooks for the Materials Community II/Panel
Discussion, Needs and Best Practices

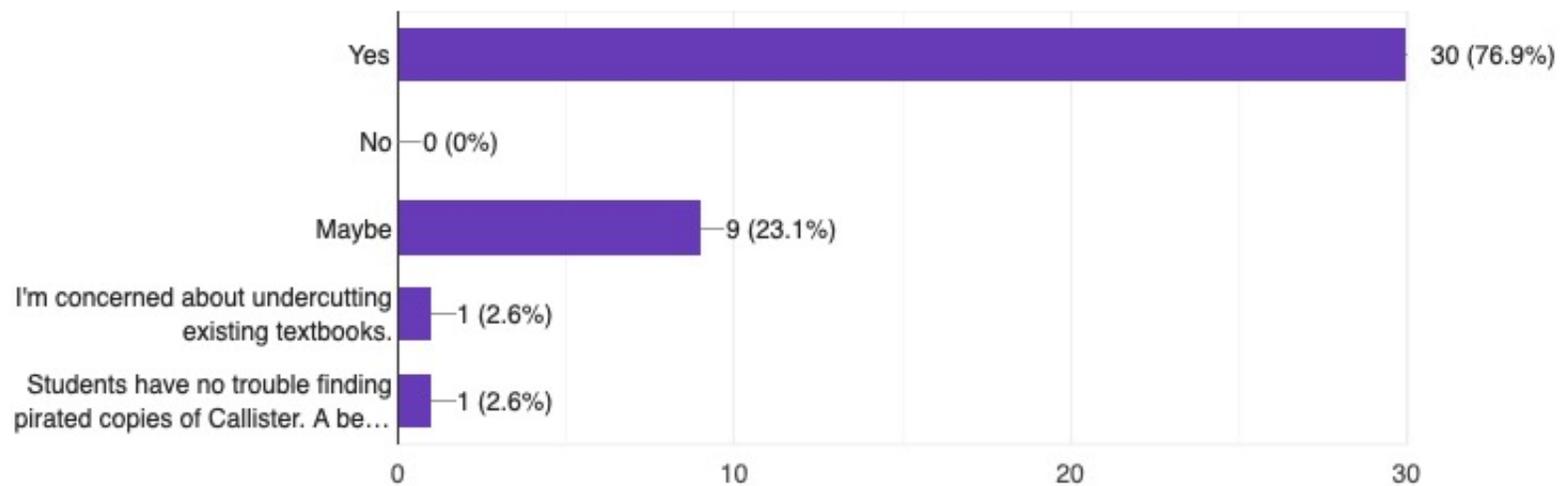
39 MSE department chairs responded to the open-source textbook survey prepared by the symposium organizers

Drexel, UT-Knoxville, Rutgers, UC-Berkeley, Johns Hopkins, Purdue, Univ. of Florida, Penn, Univ. of Pittsburgh, Northwestern, Duke, Stonybrook, Virginia Tech, Univ. of Michigan, UT-Dallas, Clemson, Boise State, Lehigh, Univ. of Wisconsin-Madison, Auburn, OK State, Georgia Tech, CMU, Univ. of Illinois-Chicago, Wright State Univ., Oregon State, Penn State, CWRU, Texas A&M, UC-Merced, Univ. of North Texas, NJIT, U-Conn, UT-Austin, UC-Santa Barbara, Columbia, Michigan State U, RPI, McGill (Canada).

Concept and Vision

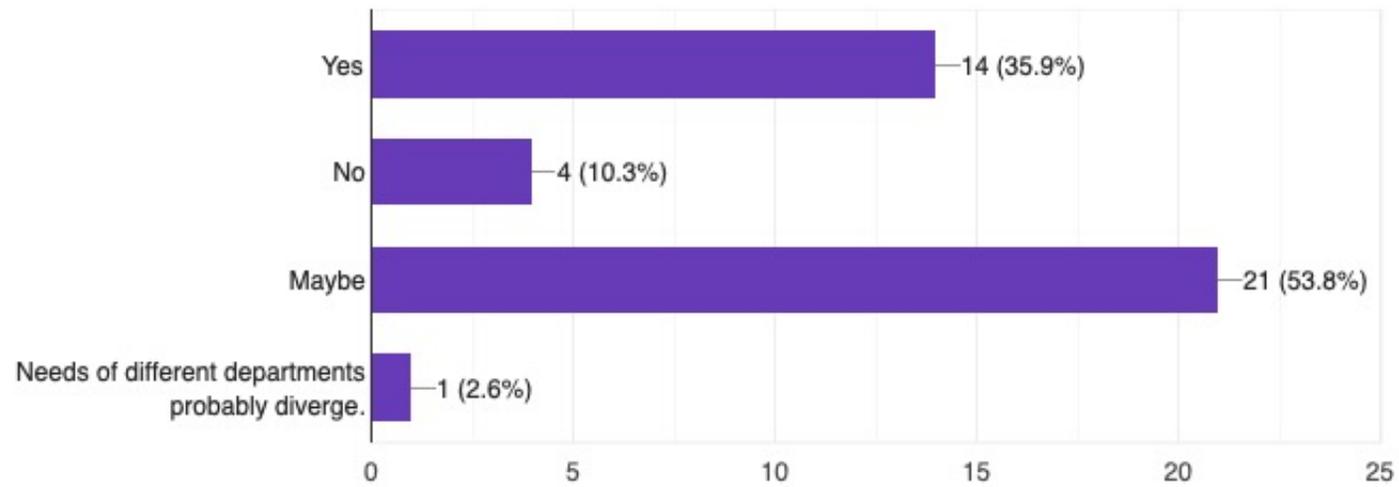
Do you see value in an open source materials text

39 responses



Do you see this as a platform for expansion beyond the sophomore level introductory text?

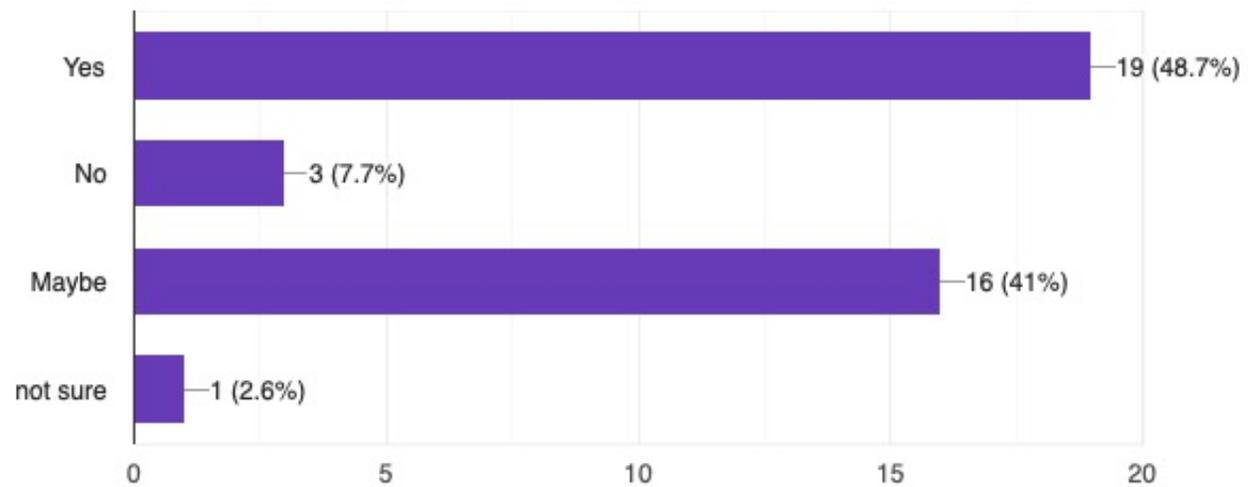
39 responses



Do you see a role for your department to contribute to this effort?



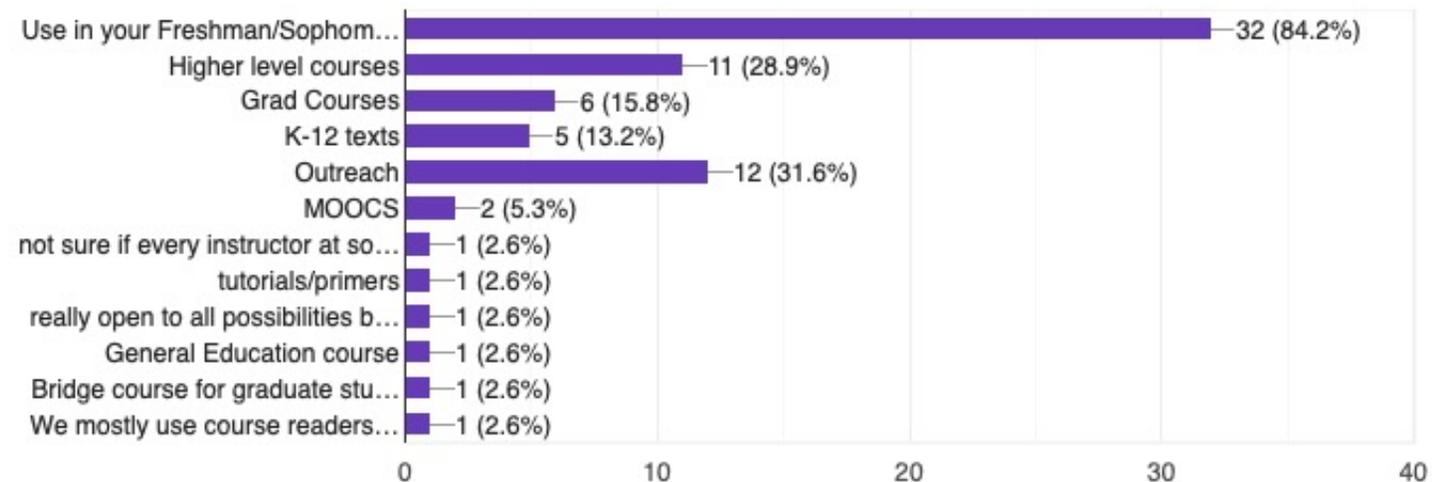
39 responses



Your Department's Needs

What are your department's needs for an open source sophomore level text?

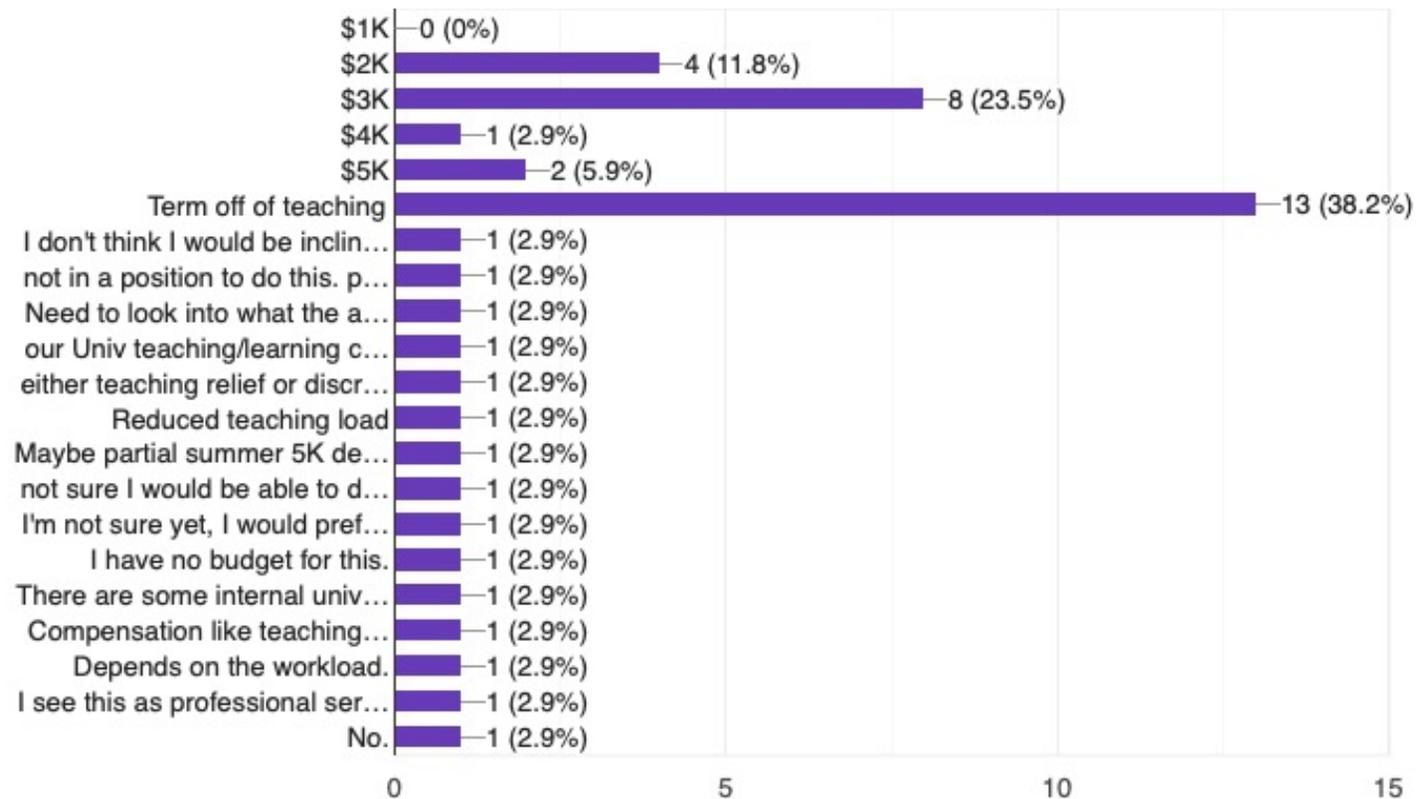
38 responses



Compensation

Would you be willing to compensate your faculty to write initial portions of the text? If so, how much would you be willing to compensate them for a chapter?

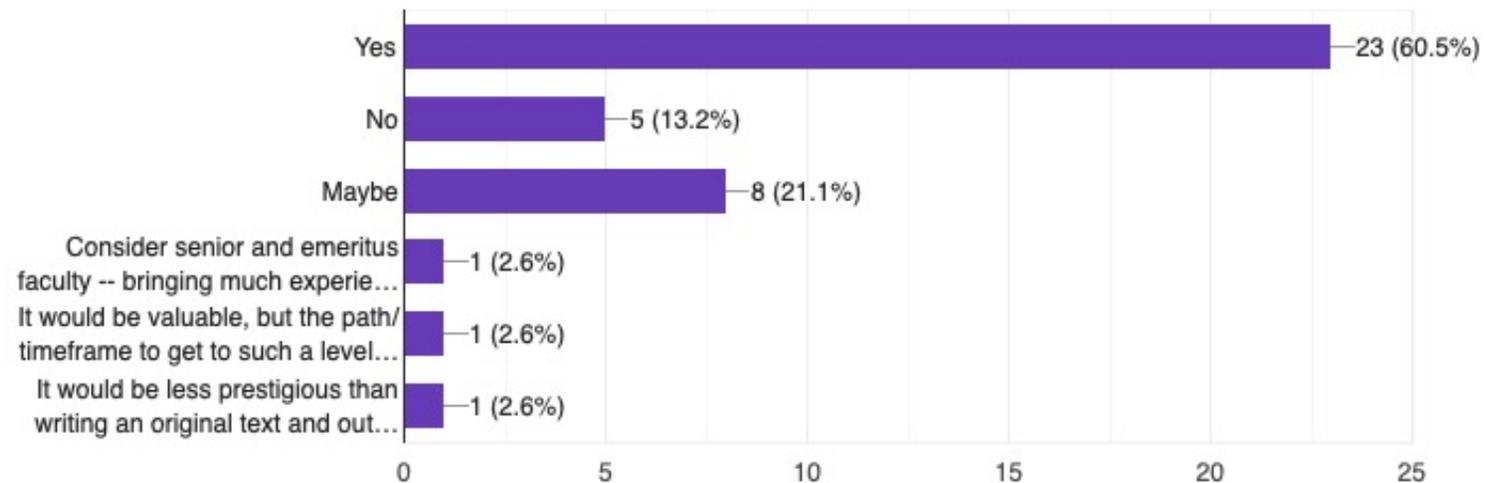
34 responses



Editorial Boards

We feel that the best group of faculty or researchers to serve on our editorial boards would be mid career people (newly tenured for example). We want the service on these boards to be considered as prestigious as that of a journal editorial position. Do you feel that this would be valuable to those in your department who would serve?

38 responses



Open comments in the UMC survey: *support*

This is a wonderful project! Look forward to learning more about it and/or having our faculty participate.

This is an excellent idea! I am particularly enthusiastic about the idea of virtual reality tools.

Happy to help in any way I can.

Thanks for the initiative.

Thank you for pushing this project along.

Great idea. Wish I had heard of it earlier. A valuable resource for students, especially those with limited resources. A curated open access site could become a long-term resource not just for materials scientists/ engineers but all engineers, or for that matter the "lay" public who may need access to some basic information.

Great concept -- this is going into the right direction! Incentives are also needed for editorial board members / reviewers. Students should participate in reviewing!!

Keen to see what we have for this - again I've been teaching an intro class for 12 years, so I'm even your target customer!

I look forward to learning more about this project at the UMC meeting.

Would be nice to have an online support platform for the textbook.

Open comments in the UMC survey : support and suggestions

Raising awareness of MSE among high school students is needed.

Help MSE departments **recruit more UG Majors**

Focus on content that will help **educate parents** and **middle/high school students** about **MSE UG major**

Ability to reach to community colleges is a strong need that this source might fit.

Would be good to develop for grad level courses as well

I've taught an introductory course for 12 years now. I have regularly used Callister for those classes. One of the things I like is the high-end figures they have. So I think maintaining an expectation of that and building in **interactive online modules** would be great. Also, **problem sets and problem databases!** Would be great to build on those.

Content details and the sharing of **problem sets**, exams and any other form of assessment.

More examples/**working problems**.

Develop a companion set of **lecture presentation** materials to go with the text

Open comments in the UMC survey : support and suggestions

I think such sources could be supplement not replacement of more structured classroom/in-person teaching.

We mostly use course readers / notes prepared by instructors at the graduate / senior level. The **MSE curriculum is not very standardized**. This seems like the best solution unless / until we all agree on what a PhD student must know.

It might be useful to **enable a unique text to be generated by a user** by selecting specific chapters/modules. It could find wider appeal by generating versions for other departments that require an introductory materials course, such as an Electrical Engineering tailored text for example. Also, I like the idea of a homework problem database. You might want to incorporate a random number generator so that a unique numerical problem can be generated for each user.

Review the open-source texts available in Chemistry discipline. What are the lessons learnt?

Open comments in the UMC survey : concerns, caution and suggestions

I don't know enough about this to comment rigorously. A key issue would be the point at which **content diverges from fundamental understanding that everyone needs** to have for more specialized and more rapidly changing subjects.

There will be **ownership/copyright issues**; will this be supplement or replace existing classroom education? students have a lot of things on their current curriculum and activities already.

Does open source mean free? What is the **incentive** other than good will?

Depending on number of faculty and individual interest + workload, I could envision one or possibly two current faculty with interest. I do worry about **long term stewardship** of the initiative, could be launched but who responsible for ongoing maintenance, UMC?

Has the team considered working with High School level science book publishers to **push MSE content into those (high school) textbooks**? I appreciate that open source is basically the opposite...but the goals are similar--expanding access to MSE content to improve appreciation/interest in our field.

It's **hard to get students to read** the assigned reading.

Callister is not very rigorous and **students are bored by it**. There is a better way, certainly, but somebody would have to take the work on.

Open comments in the UMC survey : concerns, caution and suggestions

While I agree that an open source of basic MSE knowledge has considerable value for the education community, some meaningful discussion about the role of **publishers** in education **vs.** the **wiki-approach** is needed. Someone has to pay for the work done, but who? Who contributes to the Wikipedia? Are there any foreseeable unintended consequences from this project? Of course, we can't see the unforeseeable consequences...

Good idea in principle, but **who would do it**, and what is the canon?

It's still **hard to see how a department** that's providing funding support **would benefit** from this. Like many professional service activities, the benefit is much more for the individual faculty member. I understand that positive recognition brings "value" to a department, but it's an intangible value, not concrete. Specifically, it's a value that doesn't typically equate to a clear payback.

We already struggle to convince students there is value in the university rather than watching YouTube videos. I think this effort might reinforce the idea that **brick-and-mortar schools, traditional publishers, etc. are outdated modes.**

Summary

1. There is strong support for the concept of open-source MSE textbook (77% Yes, 23% Maybe, 0% No).

2. Project can be particularly valuable if it includes interactive modules, homework/exam problem sets and lecture slides.

Open-source text-book project can be effective in raising awareness of MSE in middle/high school students and parents, and help recruit more engineering UG majors in MSE.

3. There are concerns/issues that should be addressed such as ownership/copyright, long term stewardship, business model of publisher vs wikipedia style, incentive to authors/editors, online vs in-person, standardized content, etc.