Transforming Education Practices

through Open Educational Resources

COLORADO
Department of
Higher Education

**Prepared and submitted by
the Colorado Department of Higher Education with the OER Council
under the Executive Leadership of Dr. Angie Paccione
Pursuant to the statutory authority of §23.-4.5-103**

October 2023

1600 Broadway, Suite 2200, Denver, CO 80202

2022-2023 OER Council Membership

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COLORADO
Department of
Higher Education

1600 Broadway, Suite 2200
Denver, CO 80202

Jared Polis
Governor

Dr. Angie Paccione
Executive Director

Dear Members of the Colorado General Assembly and the Colorado Commission on Higher Education:

It is with great pleasure that we submit the 2023 Open Educational Resources Report – *Transforming Educational Practices through Open Educational Resources* — pursuant to CRS 23-1-135.

The cost of college or technical school remains a barrier for many. Containing costs for students in higher education is a significant priority for both the Colorado Department of Higher Education and the state. To that extent, the Department and OER Council champion OER as a strategic means of meeting the demand for low-cost, high-quality learning and teaching materials for Colorado students.

Since 2018, this concerted effort has resulted in growth and expanded expertise in the open education field, as well as cost savings to students throughout the state. More than 1,600 courses have been converted to OER by grantees with 131,000 students enrolled in courses utilizing open educational resources annually. Thus far, OER has resulted in more than **$31.5 million in cost savings for students**. This figure represents an **astonishing ninefold return on the state's investment** in OER and is clear evidence of the dedicated efforts of the higher education institutions' faculty and staff. This far exceeds our goal of a 3x return on the state's investment.

Colorado State University Pueblo has successfully implemented a zero-textbook cost Z-Degree in bachelor of arts in Spanish, Colorado School of Mines is launching a Z-degree master of science in mechanical engineering, multiple community colleges offer associate of arts and associate of sciences Z-Degrees and University of Colorado Denver is presently working on a Z-Degree bachelor of science in mathematics. With the new grant award categories and prioritization of Z-degrees that the Department and OER Council have implemented in this year's request for proposals, it is anticipated there will be further significant development of Z-Degrees across the state by 2026.

OER not only saves students money but offers opportunities for inclusive approaches to curriculum and course design, setting the stage for improving student success while making a clear case for OER in the pursuit of equity. Open education and OER remain a strategic priority for making higher education more affordable and promoting innovation and equity in higher education in Colorado.

Signed,

Angie Paccione
Executive Director
Colorado Department of Higher Education

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Executive Summary

Open Educational Resources are learning materials that are distributed at no cost with legal permission for the public to freely use and build upon, making education more affordable for students and enabling innovation in classrooms. Colorado students have saved more than $31.5 million on textbook costs from a $3.4 million investment from the state over four grant cycles.

Expanding Open Education and promoting development of OER have been a priority for the Colorado Department of Higher Education (CDHE) since 2018. The promotion of OER is an invaluable strategy for providing more affordable, high-quality, accessible, and equitable learning materials to Colorado students. With many international and national organizations recommending the implementation of OER to improve education, including UNESCO[1], Colorado stands proud as a champion of open education and OER as key components to best serve students and educators under these circumstances.

As a result of the grant program, more than 131,000 students have been enrolled in one of the 1,617 courses utilizing OER in the last four years. Notable examples of how OER has been embraced at institutions across the state include that 33% of courses at Aims Community College are OER, 90% of guaranteed transfer pathways courses at Colorado Northwestern Community College are OER, and 85% of courses in the School of Education at Colorado State University are OER.

Colorado State University Pueblo has successfully implemented a zero textbook cost Z-degree in its bachelor of arts in Spanish and is currently working on a master of science in social work Z-degree, Colorado School of Mines is launching a Z-degree master of science in mechanical engineering, multiple community colleges offer associate of arts and associate of science Z-degrees, and University of Colorado Denver is presently undertaking a Z-degree bachelor of science in Mathematics.

OER offers Colorado a means to help improve affordability and support high educational attainment and talent development. Thanks to the support of the legislature and professionals dedicated to making education more readily accessible, Colorado has become a national leader in OER development, and the high-quality resources produced and adapted through this program are sure to enhance affordability and accessibility of education in Colorado and beyond.

Containing costs for students in postsecondary education remains critical to CDHE and the state of Colorado. The cost of college or technical school remains a barrier for many Coloradans with tuition

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[1] UNESCO's mandate in OER: https://www.unesco.org/en/open-educational-resources/mandate

up more than 60% in Colorado and several other states since 2008[2], after adjusting for inflation. Pursuing this cost containment strategy was borne out of H.B. 18-1331, a bill that created the statewide OER Council and grant program that was informed by a 2017 CDHE report, and was expanded in 2021 with S.B. 21-215.

In the first year of the OER Grant Program, institutional grantees reported savings of more than $3.9 million to the students of Colorado, $2.4 million in the second year of the grant, $3.6 million in year three, and $1.3 million in year four. Over half of the cycle four grants are two-year projects. It is anticipated that cost savings in cycle five will increase as the two-year projects and multiple Z-degrees are implemented in Fall 2023 - Summer 2024. The total estimated savings are believed to exceed $11 million in the last year. The overall student cost savings of $31.5 million continues to represent more than a nine fold return on the state's investment in this initiative[3].
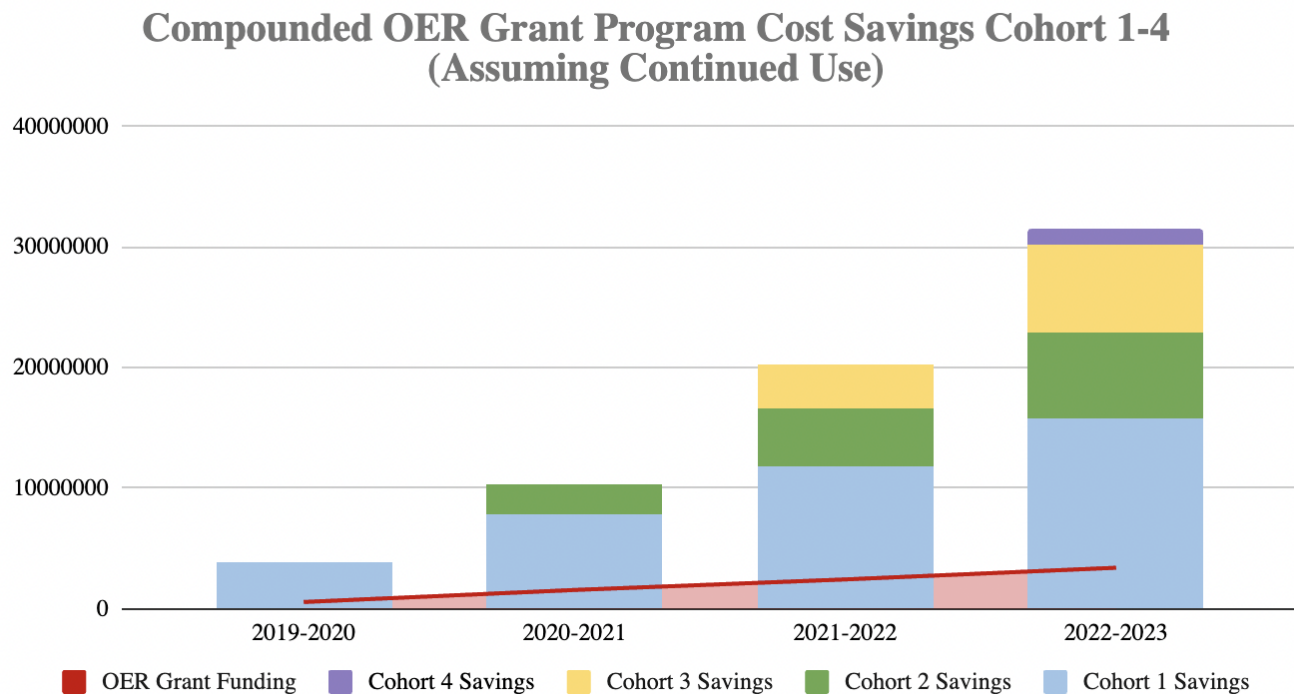

Compounded OER Grant Program Cost Savings Cohort 1-4 (Assuming Continued Use)

FIGURE 1: Compounded Savings from Grant Funded OER Cohort Cycles 1-4

Transforming Educational Practices through Open Educational Resources
COLORADO DEPARTMENT OF HIGHER EDUCATION

COLORADO
OER DASHBOARD

Grant Years 1-4:

INVESTMENT OF
$3.4
MILLION AWARDED

$1.37
million cost savings to students in fourth cycle

ROI goal

3x

9x

Reported cost savings to students over four years of grants exceeds 9 times the return on investment of state dollars

▶ actual return on investment

2022-2023 COHORT 4 GRANTEES

18 Institutional grants

2 small group grants

20 Colorado public institutions

11 cohort 4 proposals were awarded two-year project grants

1,671
course titles have been addressed by grantees over four years

$31.5
million estimated student savings over four years

113,000
students in Colorado are enrolled in a course with OER grant materials annually

Key Findings

Over the last four years, CDHE and the OER Council have established a community of learning, practice, and innovation for educators exploring open education. Key findings suggest a meaningful cumulative impact and promising future. Most significantly, the below findings demonstrate the impact and potential of open education and OER in Colorado.

1

OER grant implementation results in a striking return on the state's initial investment. Colorado students have saved an estimated $31.5 million from the state's investment of $3.4 million in grant funding - over a nine fold return on investment - and enthusiasm for OER development has continued to increase across the state.

Key Performance Indicators:
- In the fourth grant cycle, $1.3 million in student savings was reported. Cost savings from work produced in the fourth grant cycle is expected to increase during the 2023-2024 school year as developed open educational resources are implemented into classrooms and the program's first two year grant projects near completion. Assuming OER from the three cycles continue to be used with similar enrollments, those numbers are expected to compound year-over-year. There is an estimated cost savings of $11 million experienced by Colorado students in the 2022-2023 school year from OER resulting from four years of the grant program.
- Grantees addressed more than 100 courses in the first year through OER creation or adoption, more than 300 courses in the second year of the grant program, and 421 courses in the third year. After the fourth cycle, the program has now addressed 1,617 courses. More than 113,000 students[4] in Colorado are reached in courses with OER materials funded by the grant program annually.

2

OER transforming degrees to zero textbook cost. Degree programs at institutions across the state have embraced OER to the extent that students can complete certain associate, bachelor, and master degrees without any textbook cost.

Key Performance Indicators:
- Colorado State University Pueblo has successfully implemented a zero textbook cost bachelor of arts in Spanish Z-degree;
- Colorado School of Mines is launching a Z-degree master of science in mechanical engineering in Fall 2023;

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[4] Cumulative course titles, student impact, and savings as reported by year three grantees in their 2022 final reports.

- Multiple institutions offer associate of arts and/or associate of sciences Z-degrees, including Community College of Denver and Metropolitan State University of Denver;
- Arapahoe Community College is pursuing Z-degrees in communications and astronomy in their current grant; and
- University of Colorado Denver is presently undertaking a Z-degree bachelor of science in mathematics that is anticipated to be completed in 2024.

3

Building capacity and community for statewide OER adoption. The OER Council and CDHE coordinate the bulk of funding and professional development for the statewide open education community, providing the best opportunity for the broadest impact.

Key Performance Indicators:
- Collectively 87% of eligible institutions have received funding from the CDHE OER Grant Program[5] overall, signaling interest in open education across the State[6]. In the fourth year of the grant program, only 59% of eligible institutions were awarded a grant. Institutions that have not applied report staff and faculty capacity, rather than interest in OER, as the reason. The OER Council continues to aim to award OER grants to all eligible institutions and is implementing an ongoing professional development program in 2023-2024 for the Colorado open education community. For cohort 5 awards, 69% of eligible institutions applied and were awarded a grant.
- Over 120 open education community members registered for the 2023 Colorado OER Conference held in Denver in May, 48 faculty and librarians completed the Creative Commons Certificate[7] in 2022-2023, and 100 Colorado OER advocates will attend the national virtual 2023 Open Education Conference in November.
- There have been leaps in the adoption of OER at public institutions of higher education across the state. Notable examples include that 11% of all courses at Colorado Mesa University are OER, 14.5% of all courses at Metropolitan State University of Denver are OER, 17% of all courses at Community College of Denver are OER, and 33% of all courses at Aims Community College are OER. Frequently these high percentages reflect zero textbook cost general education courses that help create a realistic pathway for students to complete Z-degrees from start to finish with zero textbook cost.

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[5] One community college and 3 Technical Colleges have not applied directly for funding despite belonging to the Colorado Community College System which has received funding in all three cycles. All other eligible institutions have received funding in either the form of a grant or professional development funding in the first three years of the program, either directly or as part of system-wide initiatives.

[6] Note: several system or inter-institutional grant initiatives have been funded. Since the University of Colorado system grant specifies all four University of Colorado campuses, these institutions are included in this data.

[7] The Creative Commons Certificate is a professional development training for educators and academic librarians to provide comprehensive knowledge in open licenses, open educational resources, and open pedagogy. Learn more about CC Certificates: https://certificates.creativecommons.org

Background

Prior Legislation and Reports

In 2017, to address the issue of textbook/course material affordability and gauge interest for OER in Colorado, the legislature and the Governor, through S.B. 17-258, called for the creation of a statewide Open Educational Resources Council charged with developing recommendations for an OER initiative serving higher education in Colorado. The 2017 report on OER found overwhelming support for further exploration and implementation of OER in the state, particularly from the student respondents who comprised a significant fraction of survey respondents. Based on the findings of the statewide survey, a broad survey of the national landscape, and expert opinion informed by data, the Council and Department made the recommendations in their 2017 report[8]: scale the use of OER through targeted grant funding, support professional development through OER interest groups and an annual statewide OER conference, and establish structure and staffing at the state level through a state OER Council, full-time staff member in the Colorado Department of Higher Education, and an annual report.

Legislation from 2018

In 2018, H.B. 18-1331, sponsored by Representatives Rankin and Young and Senator Lundberg, was signed into law by Governor Polis. Consistent with many of the recommendations of the Council, this bill appropriated funds for the work of the OER Council including a dedicated staff member at the Department, continued existence of the OER Council and required appointment of Council members through fall of 2021. Dedicated funds for the OER Council's work and the statewide grant program were laid out through 2020, with the overall aim of increasing affordability of higher education in Colorado. Officially, the bill's purpose was "expanding the use of open educational resources at public institutions of higher education, and, in connection therewith, creating the Colorado open educational resources council, creating a grant program to support the creation and use of open educational resources, and making an appropriation."[9] As part of executing the identified responsibilities of this legislation by building a culture around open education as a best practice in Colorado institutions of higher education, Department staff have set forth an agenda to provide staff and faculty with professional development and engagement opportunities at the state level.

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[8] Report to the Joint Budget Committee and The Education Committees of the General Assembly Open Educational Resources in Colorado November 2017: https://highered.colorado.gov/Publications/Reports/legislative/OER/OER_Nov2017.pdf

[9] Higher Education Open Educational Resources: https://leg.colorado.gov/bills/hb18-1331

Legislation from 2021

Funding for the OER grant program was set to expire with the third cohort in November of 2021. Due to the success of the program so far and the incredible return on Colorado's investment, the Colorado General Assembly deemed this program worthy of continued support stating "that it is in the best interests of the state to continue and expand the open educational resources grant program to support the continued creation and use of open educational resources for individual courses and to support the creation and replication of zero-textbook-cost degree programs."[10] State Senators Chris Hansen, Bob Rankin and Dominick Moreno and House Members Leslie Herod and Julie McCluskie introduced S.B. 21-215 to the Colorado General Assembly in April 2021 to revise Statute 23-4.5-106 moving the repeal date from November 1, 2021, to November 1, 2026. In May of 2021, S.B. 21-215 was signed into law by Governor Polis. This bill also appropriated $1,108,200 to the grant program for the 2021-2022 state fiscal year, with funds allocated for dedicated staff within the department to manage this program. OER are certain to influence the future of higher education; as many OER programs across the state are in the early stages of implementation, continued support from the State is necessary to accelerate adoption and propel Colorado forward as a leader in this area. [11]

OER Grant Program

Summary

The 2018 legislation allocated $500,000 for the first-year grant cycle for public institutions of higher education in Colorado to initiate and expand the use of OER. Subsequent years were allocated approximately $1 million from cycle two in 2019 through the eight grant cycle to be awarded in 2025. The OER Council selected 20 grants in the fourth cycle in 2022, and 25 in the fifth grant cycle in 2023 to accelerate and continue to enhance the innovative landscape of higher education through Open Education work. This report primarily focuses on the fourth grant cycle where proposals were due in December 2021, grant recommendations were approved by the Colorado Commission for Higher Education in March 2022, and the grants were executed from May 2022 to June 2023.

Structure of Request for Proposals and Key Date

The OER Council in conjunction with CDHE staff outlined the structure of the request for proposals (RFP) and timeline for the fourth grant cycle that mirrored the first three cycles. The Council set broad parameters in the RFP to encourage proposals and expand reach for the program. For the first time two

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[10] Use Of Open Educational Resources In Higher Education: https://leg.colorado.gov/bills/sb21-215
[11] Concerning the Use of Open Educational Resources at Institutions of Higher Education, and, In Connection Therewith, Making an Appropriation: https://leg.colorado.gov/bills/sb21-215

year grants were introduced, for which institutions submitted a single proposal to cover grant cycles four and five. 11 of the 20 grants funded in cohort 4 were awarded two year grants.

GRANT TYPES

1

Institutional grants
Those from public institutions of higher education to support and expand creation, adoption, adaptation, and promotion of the use of OER across the institution and among multiple institutions; up to **$75,000**

2

Individual and small group grants
Those from faculty and/or staff of public institutions of higher education, individually or in small groups, to support the creation, adoption, adaptation, and promotion of OER for specific courses, disciplines or programs; up to **$10,000**

Changes to the Request for Proposals in Grant Cycle 5

The RFP for grant cycle 5 maintained the same scope and requirements as the first four cycles, but the RFP document was reformatted and expanded to include a detailed criteria list that corresponded to the rubric. A rubric had been established in prior grant reviews but was shared publicly for the first time as part of the cycle five RFP to aid applicants with drafting more successful proposals. Additionally, for the first time templates for the grant narrative and budget were released with the RFP with each section of the narrative template corresponding to the rubric. The changes to the templates aided the OER Council in reviewing the proposals and provided confidence to applicants that they were addressing all requirements of the proposal. The templates were successful and implemented again in the cycle six RFP. As in previous years, the OER Council hosted several webinars and the CDHE director of open education held several open office hours to assist potential grantees with the application process.

Open Licenses and Accessibility

Pursuant to statute, grantees agree to the following terms of receiving the funds to support their OER projects and initiatives:

1. Openly license and share, under the broadest possible license, any open educational resources developed or adapted using the grant;
2. Post new or adapted open educational resources to an open repository in editable file formats or with source code; and
3. Comply with the federal "Americans with Disabilities Act of 1990," 42 U.S.C. sec. 12101 et seq., as amended, to enable persons with disabilities to access the open educational resources developed or adapted using the grant.

These points of emphasis allow for the broadest possible foundation for sharing useful material in an inter-institutional approach. Open licensing and accessibility were reiterated as points of emphasis for grantees, both during the proposal and review process and continuing through the professional development activities sponsored by the CDHE. The most common license that grantees have selected is the Creative Commons Attribution Non-Commercial License / CC BY-NC, which permits the right for others to retain a copy, re-use, revise, remix, and share OER as long as the author is attributed and the use is non-commercial.

Year Four Grantees

At the close of the RFP in January 2022, there were 29 submissions for the grant, totaling more than $1.2 million in proposed projects. Cycle four proposals were for 19 institutional grants and 10 individual or small group grants. Additionally, for the first year, the OER grant program offered the option of applying for two-year grants. Out of the 19 institutional proposals, 11 grants requested two years of funding with a total requested amount for year two of $724,061. $968,803 was allocated for the cohort 4 grant cycle and 20 projects were awarded funding.

The OER Council and staff completed a month-long review period in which a comprehensive review and evaluation of each proposal took place. As noted in the RFP, there is a standard expectation and requirement for OER Council members to recuse themselves from reviewing proposals associated with their home institutions and systems. Department staff made pre-notifications of shortlisted proposals available to applicants in February 2022. This afforded institutions an opportunity for future planning with the understanding that final approval of their grant status would take place at the March 2022 CCHE meeting. Funds were distributed to grantees in May 2022.

Preliminary projections of total student cost savings from cycle four cohort are showing at least a full return on the State's dollars from the combined cost savings across all 20 grant projects, not accounting for continued cost-savings from annual reimplementation of prior funded projects. Final reports for each grant cycle is due August 15 each year and this report due October 1, which results in underreporting the impact of OER first implemented in the Fall semester following the conclusion of the grant period. The OER Council is planning for wider retrospective reporting of grant cohorts one through five to determine the full impact of the grants.

$1.69 MILLION
in cost savings from OER courses at Community College Denver in 2022-2023

$663,869
in cost savings from OER courses at Arapahoe Community College in 2022-2023

$1.23 MILLION
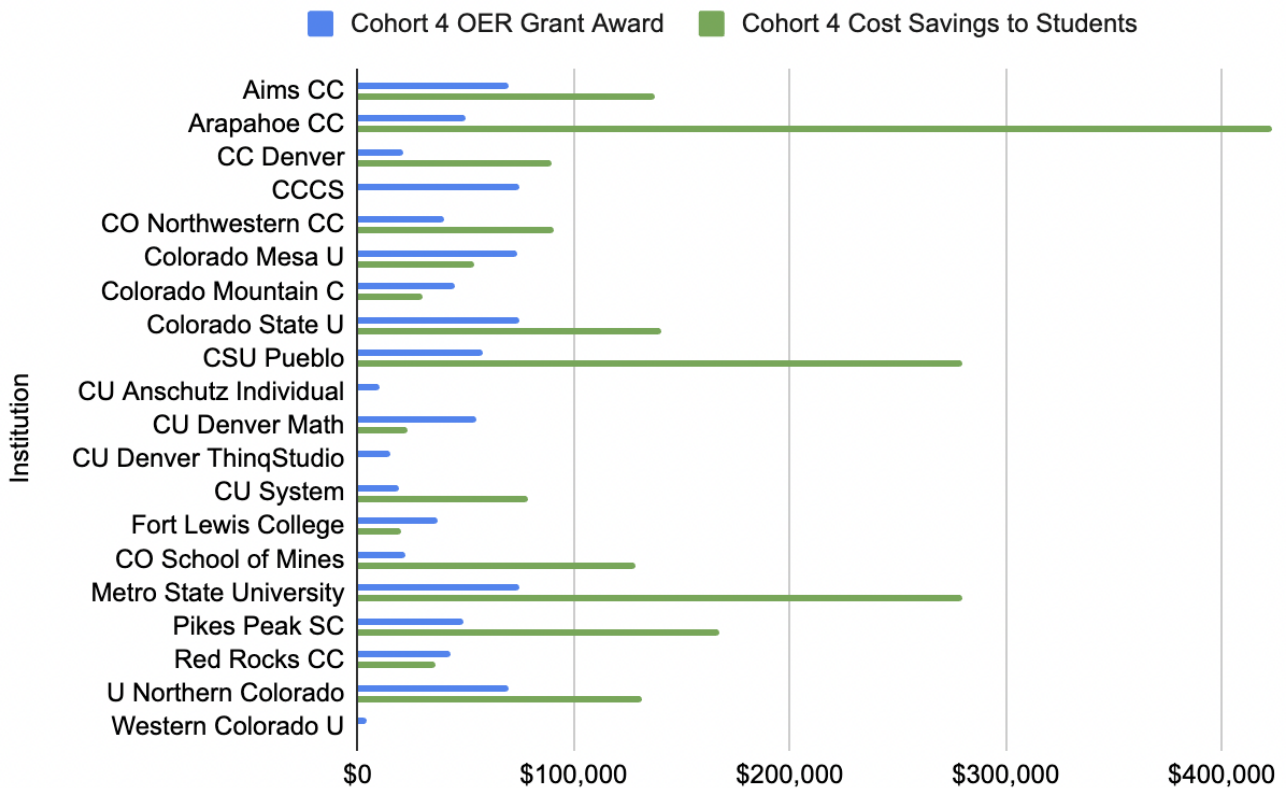in cost savings from OER courses at Metropolitan State University of Denver in 2022-2023

FIGURE 2: The invested amount into cohort 4 grants and the total reported student cost savings.

Strategic OER Planning at Aims Community College

Aims Community College (Aims) previously focused on coordinating a general incentive grant, which offers incentives to convert courses to OER, but without targeted outreach at specific disciplines or majors. During the cycle four proposals, Aims submitted three concrete activities targeted disciplines that would be executed during the grant period:

- The Early Childhood Education Department redesigned seven early childhood education courses using open source materials. All of these courses are now offered as zero textbook cost courses to students.
- Lab manuals in geology and physics were written by faculty and are available digitally at no cost, or $8.50 to cover the cost of the printed version. The lab manuals represented greater collaboration with a third faculty member from the biology department crafting the illustrations and diagrams for both manuals.
- The introduction to statistics course was redesigned with OER. Additionally, the mathematics faculty member delivered a training for concurrent enrollment math teachers to use the no-cost OER materials for their concurrent enrollment statistics course.

Colorado Northwestern Community College Guaranteed Transfer Pathways Growth

Colorado Northwestern Community College (CNCC) has participated in the OER grant program in cycles two, three and four. CNCC's grant work has primarily focused on general education courses with the additional strategy of targeted Guaranteed Transfer (GT) Pathways courses. CNCC made a dramatic increase of OER in GT arts and sciences courses in just three years of grant funding:

- 8% of GT courses at CNCC were OER by the end of grant cycle two in 2021
- 53% of GT courses at CNCC were OER by the end of grant cycle three in 2022
- 90% of GT courses at CNCC were OER by the end of grant cycle four in 2023

CNCC's strategic approach to use OER grant funding to convert the majority of their GT arts and sciences courses makes CNCC an affordable option for students to pursue their A.A. or A.S. degree.

Colorado State University Pueblo Becoming A DOER Campus by 2028

Colorado State University Pueblo (CSU Pueblo) aims to become a "DOER" (default OER) campus by 2028. During the fourth grant cycle, CSU Pueblo completed the work toward a B.A. Spanish Z-degree by refining six OER courses and creating an additional seventh course. OER adopted, adapted, and created for the Spanish Z-degree is featured on the world languages OER website[12]. CSU Pueblo also addressed eight social courses to begin converting the master of social work to zero textbook cost. The CSU Pueblo MSW OER public website[13] features the start of this work. CSU Pueblo, a Hispanic-Serving Institution, is the first institution in Colorado to offer both bachelor and master level Z-degrees.

"When we embarked in our Spanish z-degere journey we had a mission: first, that no student taking Spanish at our Hispanic serving institution would ever have to pay for a textbook again. Second, that our students would see their lives and cultures reflected in their textbooks, Third, that our pedagogical approach would match their learner needs, And fourth, that the content of our courses will be relevant to their interests. We have been able to achieve this mission thanks to this grant. There is nothing more joyful. We are forever grateful." - Professor Alegríaía Ribadeneira

33 PERCENT

of courses at Aims Community College are OER

90 PERCENT

of guaranteed transfer pathways courses at Colorado Northwestern Community College are OER

85 PERCENT

of courses in the School of Education at Colorado State University are OER

Year Five Grantees

At the close of the RFP in January 2022, there were 27 submissions for the grant, totaling more than $1.2 million in proposed projects. The OER Council selected 25 proposals to award funding; 21 institutional grants, 3 small group/individual grants, and 1 collaborative grant. Awarding the collaborative grant between five institutions is an exciting development for the grant program, because it illustrates interest in inter-institutional collaboration to advance OER across the state. All 11 grants awarded two years of funding in cycle four made satisfactory progress and were awarded their second

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[12] The World Languages OER website is publicly available at: https://csupworldlanguages.org/
[13] The CSU Pueblo MSW OER website is publicly available at: https://sites.google.com/view/msw-public-oer/home?pli=1

year of funding in cycle five. The fifth cohort of the OER grants runs from May 2023 through June 2024. Work remains to encourage participation from the remaining five institutions who have yet to directly receive funding.

Grant Analysis

In the continued reporting of progress coordinated by the CDHE, grantees were required to identify successes, challenges, and barriers to the current work of their local OER initiatives and projects. A qualitative review of the provided grantee feedback revealed the following themes first identified in the 2020 report remain true.

Support in the form of resources, training and grants are integral to the success of a scaled approach to OER.	**Some are still resistant to change and need further support as they explore OER as a potential fit for their curriculum.**	**Incentives for participation in OER make for the greatest impact.**

However, grantees expressed that although funding and incentives were critical in gaining momentum in OER, the most requested type of funding was toward course releases or reassigned hours. Grantees also expressed a desire for increased funding to address supplemental materials in their discipline from homework assignments to lab modules, assistance in data gathering, and difficulty gaining momentum for OER in certain departments at their institution. The feedback from the campuses, coupled with that of the Commission, shall guide CDHE staff and OER Council in future revisions to processes, offerings, and structure.

Upcoming Changes to the Request for Proposals in Grant Cycle 6

The first five years of the OER grant program followed a model of institutional, collaborative, and small group/individual proposals. This approach worked well for the grant program and allowed for a wider scope to aid in institutions across the state embracing OER. To increase momentum and the number of Z-degrees, pathways where students can complete their degree with zero textbook cost, offered at Colorado institutions the OER Council and CDHE significantly revised the awards for the cycle six RFP.

In cycle six, the Colorado OER Grant Program will fund five types of grants with a total allocation of $1,000,000. The OER grant review team aims to distribute the $1 million in funding for the cycle 6 OER grants to prioritize the funding of Z-degrees and collaborative grants by awarding at least $500,000 in grant funding to Z-degree proposals.

1A: Complete General Education/AA + Major Z-degree: Grants that will undertake a full zero textbook cost degree (Z-degree), providing OER course options regularly from start to finish in general education and major(s) so a student can complete their degree with zero textbook cost.

1B: Major Coursework Z-degree: Grants that will convert all required coursework in a major or certificate to OER whether through adoption, adaptation, or creation of OER. Students would be able to complete their major required coursework (except general education) without textbook cost.

2A: Collaborative: Grants awarded to two or more institutions (K-12 and private institutions eligible with a lead applicant that is a public institution of higher education) to adopt, adapt, and create OER for multiple courses.

2B: Collaborative Z-degree: Grants awarded to two or more institutions to adopt, adapt, and create OER with the express goal of establishing Z-degrees at each participating institution.

3: Small group: Grants run by a small group of committed faculty at a single institution to adopt, adapt, or create OER for multiple courses, but not undertake a Z-degree initiative.

4: General Incentive Grant: Grants that will fund an incentive or stipend grant program to be distributed by the institution to provide stipends to adopt, adapt, or create OER for multiple courses at the institution.

5: Individual Course: Grants that will adopt, adapt, or create OER for a single course.

Although institutions previously proposed and completed Z-degree initiatives under the prior general institutional grant type, the OER Council believes there will be increased proposals focused on Z-degrees due to the changes to the grant categories and result in greater affordability for Colorado students to pursue and complete their higher education programs. The majority of previous institutional grants fit into the category of "general incentive grant," which provides support for great growth in OER at their institutions that sporadically address courses in a variety of disciplines. Z-degree and collaborative categories funded at a higher threshold will result in the greatest return on investment.

Case Studies

Metropolitan State University of Denver: OER Faculty Learning Communities

In fall 2022 and spring 2023, Metropolitan State University of Denver (MSU) supported 34 faculty members across four OER faculty learning communities (FLC). Participating FLC faculty represented a variety of disciplines from communication studies to social work. A general OER FLC was offered in the fall semester with 12 participants and the spring semester with 15 participants. Additionally, a history-specific FLC was offered in the fall semester with 4 history faculty members, a Library of Congress representative, a history facilitator, and an OER co-facilitator; and a music theory-specific FLC was offered in the spring semester with three music faculty, a music facilitator, and an OER co-facilitator participating. MSU's faculty learning communities provide an excellent example of strategies to provide professional development around OER for faculty. The OER Council will invite MSU to present the faculty learning community to other grantees and the wider Colorado open education community in an online webinar as part of the 2023-2024 professional development series.

In addition to the FLCs, MSU completed the following OER projects:
- 30 faculty attended open education trainings and reviewed Open Education Network textbooks in their discipline,
- 25 faculty were awarded an OER grant to adopt an existing OER for their course in a variety of disciplines from biology to sociology,
- Two statistics faculty members created free online homework and other ancillary materials for Introduction to Statistics; and
- MSU faculty are addressing Elementary French I, Calculus I, Multicultural America, and Mobile and Social Media courses with OER.

Annually 16,230 MSU students are enrolled in one of the 104 OER courses at the university. Overall MSU has saved students an estimated $2.79 million in textbook costs over the past four years with $280,290 reported from the fourth cycle of the grant program. MSU has investigated student perspectives on OER[14], which MSU graduate Valeria Castaneda and Dr. Emily Ragan presented at the 2023 Colorado OER Conference.

"I'm not a science person, I'm a humanities person and so that I was able to take math for liberal arts and then to have the materials that were provided, that was like my first time I ever got an A in a math class."
- Student Maria (pseudonym) shared about OER use in MTH 1080

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[14] Student Perspectives on Course Materials, MSU Denver: https://drive.google.com/file/d/1QkNtLeoV7BhMg7L-NuaxIQ0JPtbh166Z/view

Dr. Emily Ragan, OER coordinator and associate professor in the department of chemistry and biochemistry at Metropolitan State University of Denver, will be on sabbatical in fall 2023 to focus on OER. Dr. Ragan plans to utilize the sabbatical time to improve MSU systems for OER reporting, course marketing, and formalizing institutional support for OER. MSU is a primary example of how successful OER can be at an institution when faculty coordinate OER programs[15] and course releases/reassigned time for faculty are utilized for OER development.
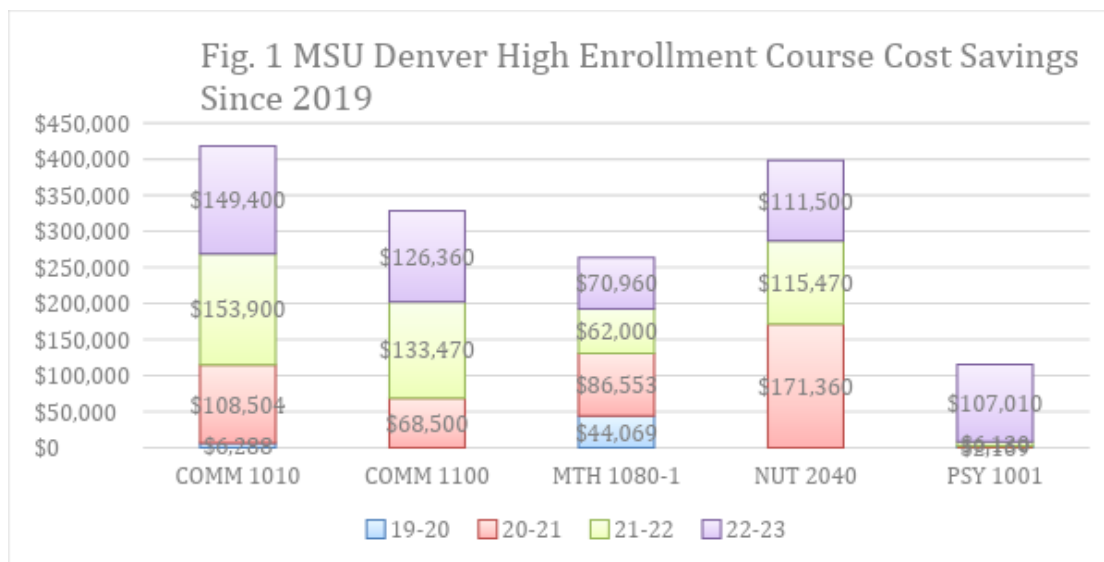

FIGURE 3: Figure provided by MSU as part of their 2023 institutional grant final report demonstrating the cost savings in high enrollment courses since 2019

Arapahoe Community College: Student Surveys

Arapahoe Community College has a strong track record of consistently surveying its students regarding OER. ACC's OER Committee partnered with the Office of Institutional Research to create, deploy, and analyze two student-focused OER surveys in 2022-2023, which were the fifth and sixth OER surveys since 2020 at the institution. The surveys used the Open Education Group's COUP (cost, outcomes, usage, perception) Framework for OER research to conduct two studies on the cost, outcomes, use, and perceptions of OER at ACC.

The surveys were 12 questions with multiple choice and short answers, open for two weeks at the end of the fall 2022 and spring 2023 semesters. The fall 2022 survey had more than 200 responses and the spring 2023 survey received more than 300 responses. Highlights from ACC's 2022-2023 surveys include:

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[15]MSU Denver faculty stories: https://www.msudenver.edu/open-educational-resources/faculty/stories/

- Nearly half of fall 2022 respondents indicated that textbook cost impacted their course selection (13% answered yes, significantly and 35% answered yes, somewhat)
- 17% of students who responded to the fall 2022 survey reported that they dropped a course because of the cost of textbooks or other materials. Although 17% is not a majority amount, any amount of students dropping a course due to cost is a concern.
- Students reported in the fall 2022 survey how they obtained their course materials with 34% reporting they purchased the materials, 30% used OER, 15% rented, 15% had no materials required, 4% chose not to obtain materials, and 2% used a library copy of the materials.
- In the spring 2023 OER student survey, 92 students reported they "really liked" their OER/ZTC course materials, 108 reported they "liked" the OER, 60 reported the OER " was okay," 7 reported they "didn't like" the OER, and 8 reported they "really didn't like" the OER.
- Students reported in the spring 2023 survey that they accessed their OER/ZTC materials in the following ways: 58% by computer, 20% on via phone, 7% via iPad, 6% via printed pages, and 2% purchased the printed bound copy offered at cost.
- More than 170 respondents in the spring 2023 survey reported they felt the OER material was the same as other materials in courses, with almost 80 respondents reporting OER was better than materials in other courses, and less than 10 respondents rating the OER as worse than other materials.
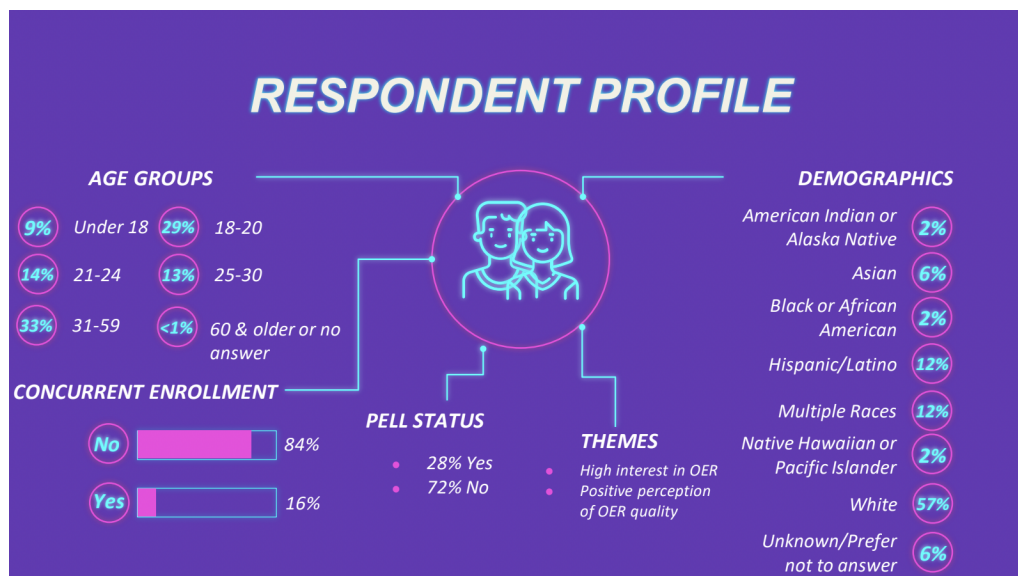

FIGURE 4: The breakdown of respondent profiles to Arapahoe Community Colleges' Fall 2022 OER student survey

The majority of students who responded to the OER survey reported they paid for their textbook or other course material with a credit card. ACC's student surveys provide great insight into student perceptions of OER and their behavior around course materials. The OER Council will invite ACC to

present to the cohort 5 and 6 grantees in an online webinar about their student survey approach as part of the 2023-2024 professional development series.
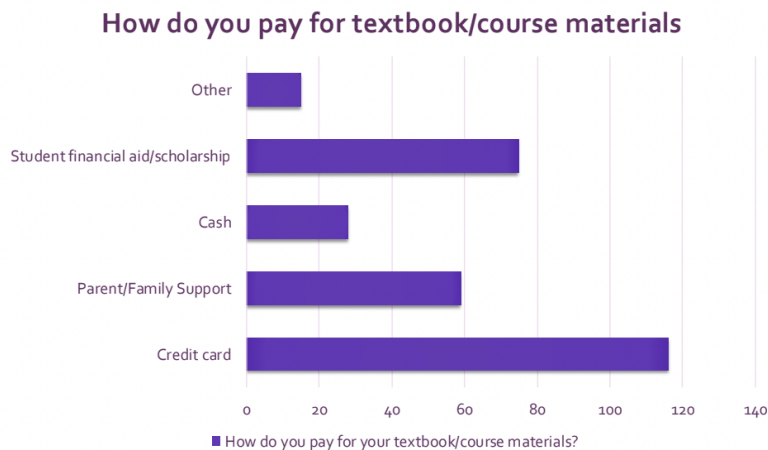
Cost

ACC
ARAPAHOE COMMUNITY COLLEGE

How do you pay for textbook/course materials

■ How do you pay for your textbook/course materials?

FIGURE 5: Graph from Arapahoe Community College's Spring 2023 OER student survey based on responses to the question "how do you pay for textbook/course materials?"

"Throughout the entire Fall 2022 semester I didn't need to spend a dime on textbooks other than a parking permit and tuition costs. This semester helped me save money and I wish that universities all over the world would be able to provide OER resources rather than students spending $100 or more on books that carry and provide so much knowledge. In my opinion, nothing should block you from educational and useful information that could transform this country and this world. I was able to use OER fine and I wished that Universities or Colleges provided their students with these resources because in the end, they're trying to learn new things and unlock opportunities in their chosen career paths." -ACC Student, Fall 2022 Student Survey

In addition to the survey work, ACC is working on expanding OER in mathematics, nursing, history; increasing OER in concurrent enrollment; offering professional development opportunities to faculty and staff; and progressing toward Z-degrees in communications and astronomy during their two year grant that covers the fourth and fifth grant cycles.

ACC reports a total student cost savings of $2.7 million over the last four years due to the conversion of high cost textbooks to OER. ACC's participation in the OER grant program has addressed over 200 courses and reached over 18,000 students since Fall 2019. During the 2022-2023 school year, 163

courses at AC used OER, with 10,479 students enrolled across those courses, and representing $421,618 cost savings over textbooks that would have otherwise been utilized by those courses. ACC brought 10 participants, including faculty, librarians, staff, and administrators to Arapahoe Community College.
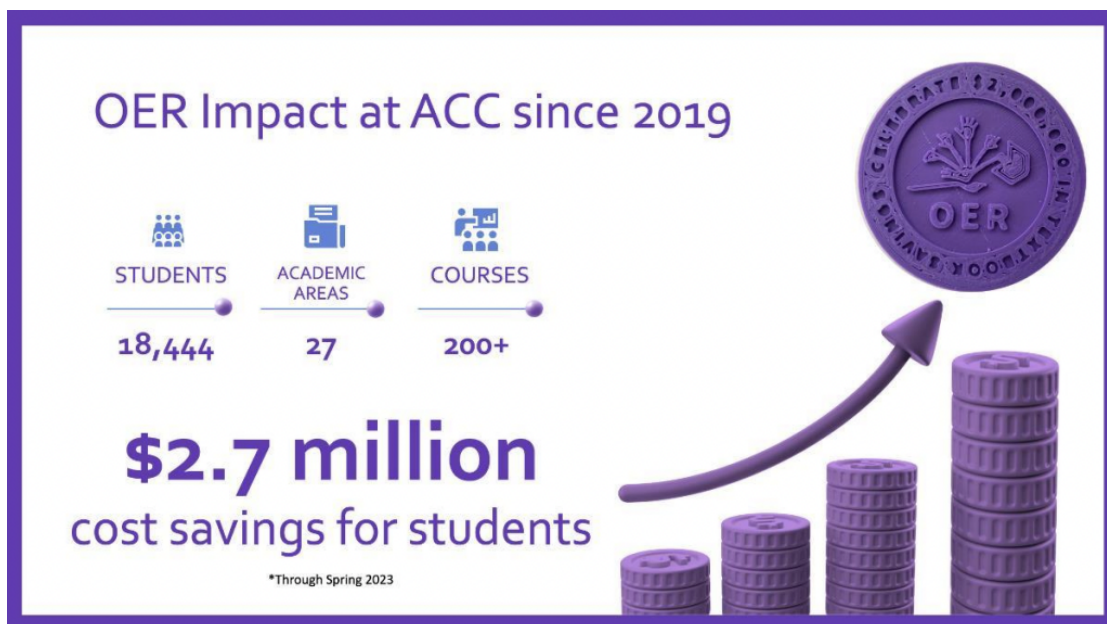

FIGURE 6: Graphic illustrating OER impact at Arapahoe Community College since 2019, provided by ACC through their final grant report for OER grant cycle four

Colorado School of Mines: Masters Z-degree and Global OER Impact

Colorado School of Mines (Mines) embarked on their fourth OER grant with the proposal to complete the Z-degree in master's of mechanical engineering. This Z-degree is the first complete graduate-level Z-degree offered in Colorado and will be offered through Mines Online beginning in the Fall 2023 semester. In total 21 courses were funded through the OER grant program with 17 having implemented the OER/ZTC resources and reaching more than 800 enrolled students. When all funded courses are implemented, Mines anticipates over 1,000 students will be impacted per semester and over $145,000 in savings each semester will be realized. This reflects over a 6.5 times return on investment, the highest in the four years of the Open Mines program.

Additionally, the fourth grant cycle reported the second greatest anticipated savings ($128,458) from a grant cycle in Mines program history despite the fourth cycle being the lowest funded cycle Mines has been awarded. Mines institutional grant was awarded $50,000 in the third grant cycle, $22,000 in the

fourth grant cycle, and $54,000 in the fifth grant cycle. The financial impact, and likely enrollment and student retention impact to be investigated later, is compounded in Z-degrees.

The strong track record of OER development at Mines provided the opportunity for Brianna Buljung, Teaching & Learning Librarian, and Seth Vuletich, Scholarly Communication Librarian, to share Mines' impactful work with the global OER community. Buljung and Vuletich presented the OER work achieved at Mines at the Open Education for a Better World Conference in Vipava, Slovenia, and the Taiwan Reading Festival in Taipei. The sharing of Mines' work in such venues helps to increase the reach and impact of the projects created under the grant.

FIGURE 7: Mines OER grant coordinators Brianna Buljung and Seth Vuletich are shown in a group photo after presenting on Mines OER work at the Taiwan Reading Festival in 2022

Staff & Council Recommendations

OER work in Colorado has gained a national reputation due to our strength in funding support and state level leadership. The Department commends the work of the OER Council as visionary, unifying, and motivating for change in the future. In prior annual reports, the OER Council recommended a comprehensive strategy to build structure, build culture, and build evidence. These priorities remain for the Department and OER Council. However, as the OER Council enters the program's sixth grant cycle, the Council seeks to thrust Colorado into the next phase of OER work with greater intention.

In the 2023-2024 academic year, the Department and OER Council are launching key initiatives that will support further OER development in Colorado:

- The Colorado OER Hub for Higher Education will be launched in early 2024 on the OER Commons platform as a repository to store and showcase OER created in Colorado;
- Colorado Pressbooks Network will launch in late 2023 to provide the opportunity for Colorado institutions to design and publish up to 45 OER books;
- The Governor's Z-Awards will return in 2024 as part of the OER Council's initiative to prioritize and recognize the impactful work of Z-degree development; and
- In addition to the annual Colorado OER Conference, professional development for the Colorado OER community will be supported by the Department and Council throughout the 2023-2024 academic year with monthly webinars, open education related trainings, and disciplinary community building opportunities to provide educators, librarians, and staff the foundational knowledge to confidently carry out OER work.

The latest request for proposals released in September 2023 emphasizes Z-degree and collaborative work and pledges to award half the allocated funds to Z-degrees. To continue the momentum of OER in Colorado, the Council recommends the expansion of funding to include supplemental or ancillary materials; exploring the potential benefits and drawbacks of automatic textbook billing programs, including negative impact on OER development and adoption; and growing collaboration between institutions of higher education as well as K-12 and concurrent enrollment.

The OER Council and CDHE recommend the following considerations for continued momentum regarding OER in Colorado:

EXPAND FUNDING AND ANCILLARY MATERIALS

Textbooks are just one part of the learning resources ecosystem. There is a growing need for the development of supplemental materials, such as homework systems, 3D lab models, simulations, case studies, and interactive assignments that can also be openly licensed and free to students. The OER grant program has been able to successfully fund some ancillary material grant projects, such as Dr. Chloe Page's

creation and open licensing of 3-D augmented reality brain models that afford spatial and holistic interaction with regions of the brain and Teresa Connolly's ancillary project for nursing pathophysiology materials from videos to case studies at the University of Colorado Anschutz. The University of Colorado Denver is undertaking a Z-degree in Mathematics that would benefit from open ancillary materials; however, the cost to fund the open source development of ancillary materials, particularly those in the health professions and sciences, exceeds the capacity of current OER grant program funding. Supplemental funding could support scaling this and other initiatives statewide.

Supplementary funding would enable disciplinary teams to develop these needed ancillary resources to support full conversion to Z-degrees. High-demand and high-need fields including mathematics, engineering, sciences, nursing, and other health professions have expressed the need for additional funds to develop such materials for their courses. Reducing the total cost of attendance will encourage more students to enter these fields, including more students of color, helping to diversify the STEM and healthcare workforce in Colorado. Funds would support faculty release time to focus on OER development, instructional design support, contracts for technical assistance from subject matter experts, and project management assistance. All materials developed would be openly licensed to permit the reuse by students and other institutions of higher education in perpetuity.

Institutions have also requested flexibility with the use of funds to increase the comprehensive approach to open education and the ability to receive no-cost extensions designated for OER in the event of interruptions to planned operations.

ADDRESS AUTOMATIC TEXTBOOK BILLING PROGRAMS

Automatic textbook billing programs, frequently labeled as "inclusive access[16]" and "equitable access" programs can prevent cost savings from OER being realized. "Inclusive access" and "equitable access" are marketing terms for textbook sales models that add the cost of digital course content into students' tuition and fees. The models are inclusive and equal as far as every student is included, and pay an equal amount for the cost whether they are in a philosophy or health professionals degree program. Automatic textbook billing programs are intended to address high textbook costs and to provide students with predictable costs, but typically the programs do not allow faculty with no course materials or those utilizing OER to opt out of their course. For example, an

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[16] More information onInclusive Access: https://www.inclusiveaccess.org/

institution that includes a $22 fee per credit hour for an "equitable access" program will charge students $66 for a three credit course utilizing OER, because the vendor agreement does not typically permit individual courses to opt-out. Students may opt out of these programs, but all are automatically enrolled and usually have to opt out of all their courses rather than specific courses that already have zero cost or affordable materials, such as OER. These programs can disincentivize the development of OER and result in net higher costs for some students.

CDHE and the OER Council decided that in the sixth grant cycle institutions with automatic textbook billing programs are not eligible for grant type 4: general incentive funds. General incentive funds sporadically support OER development and cannot address the scope of work needed to address OER in programs at the level needed for students to opt out of the automatic textbook billing program. The institutions are eligible for other categories and it is hoped that institutions with automatic textbook billing programs submit proposals to Z-degrees, as Z-degrees are the most efficient way for students to be able to confidently opt out of the automatic textbook billing programs. Institutions, faculty, and students have the right to select the materials best suited for their educational contexts. The OER Council hopes to address vendor contracts for automatic textbook billing programs to provide opt-out options for individual courses utilizing no cost or OER materials and provide transparency to students about what data is collected through their automatic participation in the program.

CULTIVATE COLLABORATION BETWEEN INSTITUTIONS AND K-12

OER has made great strides in Colorado over the last five years of Council-guided work and four cycles of grant funding. There are some positive OER collaborations, but generally, collaboration among institutions is still weak. The impact of OER will be increased through public institutions of higher education collaborating on OER projects, public institutions of higher education partnering with private institutions, collaborating with K-12 schools and the Colorado Department of Education, and increasing the number of OER concurrent enrollment courses.

The OER Council and Department seek to address further collaboration by prioritizing collaborative grants between two or more institutions and encouraging K-12 or concurrent enrollment collaborative partners, in the cycle six request for proposals.

Acknowledgements

Thank you to the following government leaders, staff members and collaborators for their ongoing support with this project!

Governor Jared Polis
Executive Director Angie Paccione
Senator Bob Rankin
Representatives Julie McCluskie and Chris Hansen
Original bill co-sponsors Rankin, Young and Lundberg
Extension bill co-sponsors Hansen, Rankin, Moreno, Herod, and McCluskie

Beth Hunter, Graphic Designer
Megan McDermott, Senior Director of Communications and Community Engagement
Chloe Mugg, Legislative Liaison
Kim Poast, Chief Student Success and Academic Affairs Officer
Chris Rasmussen, Senior Director of Academic Pathways and Innovation
Michael Vente, Chief Performance Officer

Transforming Educational Practices through Open Educational Resources
COLORADO DEPARTMENT OF HIGHER EDUCATION

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12. Original agenda item can be found in the CCHE meeting archive at:
   https://highered.colorado.gov/about-cche/general-information/2021-meeting-schedule.
13. See the dedicated webpage at:
   https://cdhe.colorado.gov/educators/administration/institutional-groups/open-educational-resources-in-colorado.
14. Report to the Joint Budget Committee and The Education Committees of the General Assembly Open Educational Resources in Colorado November 2017:
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Image Credits

FIGURE 1: Compounded Savings from Grant Funded OER Cohort Cycles 1-4
Source - Colorado Department of Higher Education

FIGURE 2: The invested amount into cohort 4 grants and the total reported student cost savings.
Source – Colorado Department of Higher Education

FIGURE 3: Figure provided by MSU as part of their 2023 institutional grant final report demonstrating the cost savings in high enrollment courses since 2019
Source – Metropolitan State University of Denver

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Source - Arapahoe Community College

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Source – Colorado School of Mines

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