

## Increasing Student Success: A Faculty Cohort Mentoring Story

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Mentoring has been used in higher education to support faculty growth and targeting the mentoring relationship to changes in classroom practice can help to inspire transformational growth in an institution. Further, pairing mentors and mentees in professional development focusing on constructing practices to support diverse learners builds reciprocal mentoring relationships in line with relevant literature. Such a reciprocal mentoring program was developed for mathematics faculty at a two-year Hispanic serving institution. Valencia College in Orlando, Florida, serves around 75,000 students annually with approximately 235 mathematics faculty. Faculty across the seven main campuses were given the opportunity to participate in the mentoring program and professional development designed to foster inclusive classroom practices and active learning. Cohorts underwent professional development in the summer and engaged in mentoring in the Fall semester. Two cohorts have participated in the faculty mentoring program (n=26, 25). Over 200 classroom lessons centered on inclusive active learning were developed and implemented from the pairings, indicating a substantial change in instructional delivery. Qualitative feedback from mentors indicated appreciation of the reciprocal nature of the mentoring relationship. In qualitative and quantitative preliminary results, mentees describe engaging in more student outreach and reported an increase in knowledge of inclusive active learning techniques and their importance.

*Keywords:* mentorship program, higher education, active learning

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### Introduction

Valencia College, a Hispanic Serving Institution (HSI), has strategic goals of improving student outcomes through the incorporation of more inclusive active learning (IAL). As an outgrowth of the college's goal, the mathematics department sought to create transformational change to a more inclusive active learning environment to improve student learning in math. Student Engagement: Active Learning in Mathematics (SEAL-M) is a 5-year National Science Foundation (NSF) funded grant with a long-term goal of increasing IAL as an adopted regular practice for math faculty members. Some barriers identified for adopting an active learning teaching pedagogy in mathematics include lack of familiarity, time, and support. The SEAL-M grant is focused on supportive professional development that fosters community building through a cohort experience with mentoring being an important component. The mentor supports the mentee in the creation and implementation of two IAL lesson plans with feedback, guidance, and classroom observations. Undergoing professional development (part paired with the mentee and part a deeper exploration by just mentors), the mentor engages in a course redesign with the creation of eight IALs that will be implemented the next semester. The objectives of this grant include supporting faculty developing activities aligned with IAL instructional practices, identify aspects

of faculty development courses and instructor differences that aligns with implementation of IAL strategies, and to support faculty implementing instructional practices that promote a sense of belonging and community to address disparity in outcomes in college mathematics. Designing and implementing a cohort model of professional development and mentorship that supports faculty collaboratively developing IAL activities for the mathematics curriculum is an important cornerstone to achieving the goals of the SEAL-M grant. Our model of recruiting new mentees yearly and involving new faculty members throughout the grant is a way to change the paradigm of teaching mathematics on a larger scale. The mentoring model utilized is an important component of engaging more math faculty members on a college-wide level.

### Literature Review

Mathematics educators have been called to place student engagement at the core of their teaching practice (MAA, 2018; Gyurko et al., 2016). Gyurko et al. (2016) assert that professional development is necessary to help faculty transform their practice and tie faculty professional development to positive student outcomes. Other researchers have found that professional development may not actually be helping instructors to transform their practice as much as they self-report (e.g., Ebert-

May et al., 2011). Thus, to transform a department into one whose faculty frequently engages students through IAL techniques, there must also be a professional development approach that immerses the faculty in both theory and practice.

Length of time teaching may influence a faculty member's professional development needs (Toth & McKey, 2010), so a holistic approach should allow faculty to adopt roles in the learning experience that best match their need. As mentoring can be pivotal to changing faculty's instructional practice (Richter et al., 2013; Nel & Luneta, 2017), embedding mentoring in a professional development experience that focuses on equipping faculty to build practices that support student learning may be ideal to supporting transformational departmental change. Intensive mentoring programs have been demonstrated to be effective in helping instructors develop a more engaging teaching style (Stanulis & Floden, 2009) and mentoring plays a role in enhancing instructional skill (Mok, 2021). Masina & Mbokazi (2023) showed a sample of mathematics teachers improved most in content knowledge and delivery when they were mentored by other mathematics instructors, so mentorship models that pair faculty by discipline may be an ideal way to help instructors transition to more student-centered teaching methods.

Straus et al. (2013) found that productive mentoring connections were defined by a reciprocal exchange, mutual regard, well-defined expectations, personal rapport, and alignment of values. In contrast, unsuccessful mentoring bonds suffered from inadequate communication, lack of dedication, clashing personalities, a sense of rivalry (whether real or perceived), conflicts of interest, and the mentor's lack of practical experience. Mentor proximity and availability is also key to success (Polikoff et al., 2015) and Maor & McConney (2015) highlight the importance of professional development for both the mentor and mentee. Thus, a peer mentoring program among educators should include training for mentors and mentees on the qualities and behaviors that lead to successful mentoring relationships, the content knowledge at the heart of the mentoring charge, and mentor/mentee pairing that is conducive to running into one another for casual conversations (i.e., proximity).

It may benefit the relationship most if training is ongoing, at least for the mentors (MacCallum, 2007; Sowell, 2017). Selection and preparation of mentors is important (Hobson et al., 2009) as mentors are tasked with guiding mentees in the development of a new skill set. For an educational peer mentoring program, it is essential that mentors have a foundation in student-centered teaching but need that information to be readily available when conversing with their mentee. Engaging together in professional development centered on content knowledge helps to facilitate mentor and mentee conversations, but having mentors additionally train on mentoring best

practices creates an environment where the mentoring relationship can thrive.

Peer mentoring among educators can have positive effects on both parties in the mentoring relationship. Spillane, Hopkins, & Sweet (2018) showed teachers' interactions with peers changed their instructional beliefs over time and Wang (2001) points out that instructional contexts have a profound influence on the guidance mentors provide. Therefore, when the mentors and mentees are engaged in directed pedagogical learning together, the dialogue inherent in the mentoring relationship will assist both instructors in shifting their beliefs toward more student-centered learning techniques. This form of mutual mentoring with continuous professional development follows the principles of cognitive apprenticeship outlined in Enkenberg (2001) and Dennen (2004), and the mentoring relationship itself is a continuous professional development experience (Luneta, 2006). A key to the mentors' professional development is the process of self-reflection during the experience (Lopez-Real & Kwan, 2005; Johnston, 2001). Smith and Nadelson (2016) found mentors derived numerous advantageous outcomes, such as exposure to novel concepts, heightened reflection of their teaching methods, improved student engagement levels, and in certain instances, transformations in their instructional approaches. Due to the literature research and review on the impact of mentoring relationships, developing a strong mentoring model for SEAL-M participants became an important component and focus. Our structure revolves around a strong professional development and mentoring model.

## **Program Design**

The first cohort (n=26) took place during Spring 2022 though Fall 2023. Faculty opted into the program and self-identified their role (mentor or mentee). Initially, mentors were paired with mentees by the courses they taught, but immediate feedback from participants indicated that being on the same campus better facilitated the relationship and was more important than matching by topics taught. Consequently, the mentors and mentees were repaired by proximity (campus location). Mentors and mentees both completed a pre-survey measuring teaching experience, professional development in active learning, willingness to experiment, perceived barriers to active learning, and growth mindset; growth mindset was included because it may affect adoption of active learning techniques (Aragon, Eddy, & Graham, 2018).

The mentors' journey started in Spring 2022 with a two-hour SEAL-M Mentor Training Course delivered through the Learning Management System (LMS), Canvas. The focus of this course was on forming effective mentoring relationships and helping participants to identify the difference between effective and ineffective mentoring relationships. The training engaged mentors in developing a shared understanding of mentoring

in the SEAL-M program and the creation of their own set of roles and responsibilities to follow throughout the duration of the program. This course was designed specifically to be partially an online experience with a mandatory Zoom meeting session near the end of the training.

At the beginning of Summer 2022, mentors and mentees began a five-week deep dive into IAL through Valencia College's Destination Program, a college-run professional development summer experience. During Destination, participants reviewed learning theories, active learning techniques, and explored extensively what an IAL lesson would look like in a classroom of varying modalities. All sessions were held via Zoom and asynchronous learning took place on Canvas. Between Destination sessions, mentors and mentees were creating and reflecting on their IAL lesson plans. Once Destination was completed, the mentors continued their mentoring training and IAL exploration through the SEAL-M Summer Institute (SI). The SI was an intensive, six-week course where session modality was a mixture of face-2-face and Zoom with asynchronous online learning on Canvas. Only one week was completely online for the mentors. During the SI, mentors were tasked with creating eight IAL Lesson Plans that were peer-reviewed throughout the institute and would be implemented in the Fall 2022. Additionally, the mentors were trained on using the Classroom Observation Protocol for Undergraduate STEM (COPUS; Smith et al., 2013). In these professional development opportunities, there was a focus on forming appropriate, strong mentoring relationships. Topics include fostering trust, maintaining confidentiality, and providing constructive feedback.

Pairing mentors with mentees as learning partners highlights the peer nature of the relationship and provides a structure for the mentoring dynamic. Providing extended mentor training helps mentors feel empowered to navigate their role in the mentoring relationship. Additionally, pairing mentors with mentees on the same campus, a practice requested by mentors in the first cohort and supported by literature (Polikoff et al., 2015), helped to create opportunities for mentors and mentees to interact.

The SEAL-M Mentorship Program kicked off on August 19th, 2022, and ran throughout the entire Fall 2022 semester. The Mentorship Program tasked the mentees with creating and implementing two IAL lesson plans while the mentors implemented the eight IALs designed during the SI. Mentors and mentees were required to meet for six meetings. The modality of their meetings was purely at the mentor/mentee pairings' discretion. The meetings were where mentors provided their support and guidance to their mentees throughout the creation and implementation of the IALs. Additionally, the program's goal was to have mentors and mentees observe each other's classrooms once during the semester when the IAL lesson plans were being implemented. All participants were asked to reflect

on their implementation and make improvements to the lesson plans prior to submitting them to the SEAL-M repository (<https://valenciacollege.edu/resources/grants/seal-m/index.php>). During this semester, mentees completed a weekly survey regarding their use of IAL.

Spring 2023 through Fall 2023 was the duration for our second cohort of mentors and mentees (n=25). As with the first cohort, the mentors had a two-hour SEAL-M Mentor Training Course in April. There were minor wording adjustments to the materials in the training course due to legislation in the state of Florida but, overall, the same training remained from the previous cohort with no significant changes.

Destination and the SEAL-M Summer Institute encompassed the Summer 2023. Wording adjustments, creation of brain-based learning material, and inclusion of more IAL strategies were changes to Destination. The redesign of the SI was extensive. First, Destination and the SI would overlap for the last two weeks of Destination and the first two weeks of the SI. Destination was reformatted to three face-to-face meetings with the remainder delivered through Canvas. The duration of the SI was extended two weeks for a total commitment of eight weeks by the mentors. COPUS training was removed from the SI, but mentoring topics such as building rapport, conflict resolution, and effective communication were expanded upon more in each week of the SI. Wording adjustments were also made to comply with legislation. Overall, the Destination experience for mentors and mentees continued to be a deep dive into IAL. The modality of Destination varied between online and face-to-face. The intent of the SI remained intact even with the expansion of mentoring topics as the mentors were still tasked with creating eight IAL lesson plans that were to be peer-reviewed throughout the duration of the SI. The modality for each week of the SI also varied between being face-2-face and Zoom. Like the previous year, there was one week that was completely online. The changes made from the first year helped to enhance the focus on mentoring and IAL lesson plans. These changes were made largely based on the feedback received from SEAL-M participants.

The second cohort SEAL-M Mentorship Program kicked off on August 18th, 2023, with an optional active learning refresher professional development opportunity. The program had minimal redesigning required with wording adjustments being the biggest hurdle. Mentees had to create and implement two IAL Lesson Plans while mentors implemented their eight IALs from the SI. Mentors and mentees were to collaborate six times throughout the Fall semester and mentees observed their mentor's class once while the mentor observed the mentee's class twice. Different examples of mentor/mentee meeting schedules were provided to show our participants the different ways and modalities in which to accomplish the requirements of the SEAL-M Mentorship Program.

## Results

Pre-surveys of the mentees in the year 1 cohort ( $n=18$ ) indicated all agreed that IAL was an important form of instruction and the group had significant experience with professional development involving active learning (61%), growth mindset (94%), and inclusive teaching practices (83%). Pre- to post-survey comparison ( $n=9$ ), mentees reported an increased familiarity with IAL classroom techniques ( $t(8)=-4.196$ ,  $p=.002$ ,  $d=1.986$ ) and the perception of the importance of it within the department ( $t(8)=-2.309$ ,  $p=.025$ ,  $d=1.732$ ). Survey data also indicated that participants increased their awareness of barriers to IAL, likely because implementing new practices resulted in new knowledge of obstacles. Specifically, instructors reported increased concerns about student prep/engagement ( $t(8)=-1.897$ ,  $p=.047$ ,  $d=-.632$ ), technological classroom constraints ( $t(8)=-1.890$ ,  $p=.048$ ,  $d=-.630$ ), seating layout limitations ( $t(8)=-1.941$ ,  $p=.044$ ,  $d=-.647$ ), and lacking sufficient time to advance their own knowledge ( $t(8)=-4$ ,  $p=.002$ ,  $d=-1.333$ ). The only decreased barrier to IAL implementation was around the time-intensive nature of selecting relatable content ( $t(8)=1.908$ ,  $p=.046$ ,  $d=.636$ ). This may have reflected gained skills curating materials. Data was not able to be gathered from mentors' COPUS coding of mentees in the first-year cohort due to insufficient interrater reliability (this practice of using mentors for coding was subsequently dropped).

Mentee focus groups ( $n=9$ ) revealed positive outcomes for mentees in the program. Most mentees experienced effective communication with their mentors and felt supported by them while implementing their IALs. Mentees felt they grew in their understanding of inclusive teaching practices, especially for individuals who were non-native English speakers, and reported perceiving increased student engagement during the implementation of their IALs.

Mentor focus groups ( $n=7$ ) revealed that mentors felt positive about their relationship with their mentees, and that the mentees welcomed feedback from the mentor. Mentors described mentees as putting great effort into their design of IAL lessons and felt the mentees strengthened their understanding of these classroom practices. Mentors also perceived increased student engagement in their classes and felt that the practice of mutual classroom observation between mentor and mentee was a strength of the program. Observing the mentee's class allowed mentors to determine how uncharacteristic active learning was based on student reaction. Mentors also described learning more about IAL practices from observing their mentees and through conversations with the mentees.

Both mentors and mentees acknowledged challenges in implementing IAL in online and mixed mode formats but reported increased student engagement. For example, one mentor stated,

"My students worked with each other online more than they did in the past so that was really great to see." Similarly, mentees acknowledged some students had initial resistance to IAL techniques; one mentee stated,

I'd say it's a challenge in the beginning because they're just not used to doing these types of activities in a math class. They're so used to having [the instructor] do a problem and then mimicking or doing a problem similar to it. Now they're actually having to engage with each other and collaborate and think creatively, and you know, it's kind of a learning curve for them and us.

The focus groups also revealed that reciprocal mentoring relationships developed; one mentor stated, "I would say [my mentee] knows active learning and is utilizing it in that class always. So I was very impressed. Wow, I learned a lot from him."

In the weekly survey, mentees' free responses indicated overall positive student reaction to IAL techniques and that the mentees discussed active learning with their mentors and other colleagues. The feedback from the participants is currently being used to improve the next iteration of the program.

## Conclusion

Receiving qualitative feedback from participants throughout the program was an essential aspect of guiding program iterative change, improving the experience and quality of the mentoring relationships. It is essential to monitor the progress of the mentoring dynamic and provide support as needed, be that peer support or support from the program. Communication was also a key component of the mentoring relationship and was carried out through in-person meetings, virtual meetings, and email. The SEAL-M professional development model focused on the formation and maintenance of strong mentoring relationships, encouraged instructor growth in their practice, fostered a reflective environment where instructors review and improve their teaching, and helps support institutional transformation. The mentors and mentees encourage one another to maintain IAL as a sustainable teaching practice beyond their participation in SEAL-M. Survey and focus group findings indicate that peer mentoring is a successful model for transitioning faculty into new classroom practices and a vehicle to support transformational departmental change.

Study limitations include small sample sizes, and that the qualitative data is from the instructor's perspective only. Future directions may include the students' perspective through surveys and focus groups. Another future direction may include focusing training on the challenges of active learning in mathematics, as doing so may help remove or mitigate barriers to implementing



active learning lessons. However, preliminary results demonstrate that having a strong cohort mentoring model leads to increased motivation, feelings of support, and sustained changes to how math faculty approach teaching mathematics.

Recommendations for establishing a shift in instructor practice derived from these preliminary results include (1) pairing colleagues in a mentoring model focused on professional development, (2) mentors and mentees engaging in the professional development together (3) creating opportunities for open communication between mentor and mentee pairs, (4) continuous monitoring of the paired mentoring relationship, and (5) training mentors in the skills needed to perform their role in a supportive, encouraging manner. Establishing community among the mentors and mentees allows the mentoring relationship to be reciprocal. This dyadic blurring of traditional mentor-mentee distinctions through enabling respected peer sharing fosters an instructor mindset shift that may last beyond the mentoring relationship.

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