

Impacting UTRGV First-Generation & STEM Undergraduate Students Through Family Centered Pedagogy

Overview

During the 2022-2023 academic year, the NSF-funded Family Centered Pedagogy intervention was implemented across 30 lower- and upper-level course sections in math, chemistry, physics, and astronomy (16 in Fall 2022 and 14 in Spring 2023) impacting over 1200 undergraduate students. Family-leaders from AVE Frontera, our community partner, made over 60 classroom visits to collaborate with STEM faculty and students as co-producers of knowledge. Students applied this knowledge to real life experiences in culturally relevant and culturally responsive ways resulting in over 350 undergraduate research projects presented during the Fall 2022 and Spring 2023 end of semester symposia. This document aims to assess the transformational impact of the family-centered theory of change (Salinas et al., 2024) on student success, specifically, its impact on first-generation and STEM undergraduate students' first-year retention rates.

The FIESTA (Family Integrated Education: Serving and Transforming Academia) symposium has become an iconic community event at the University of Texas Rio Grande Valley (UTRGV). The FIRSTA symposium promotes “Family and Education, the Future of a Nation,” a belief that guides AVE Frontera family leaders’ transformative work. The number of symposium participants has increased over the first three years of the project. Figures 1 and 2 show the impact on broadening participation, undergraduate research experience, and the exchange of scientific knowledge among students, families, and faculty.

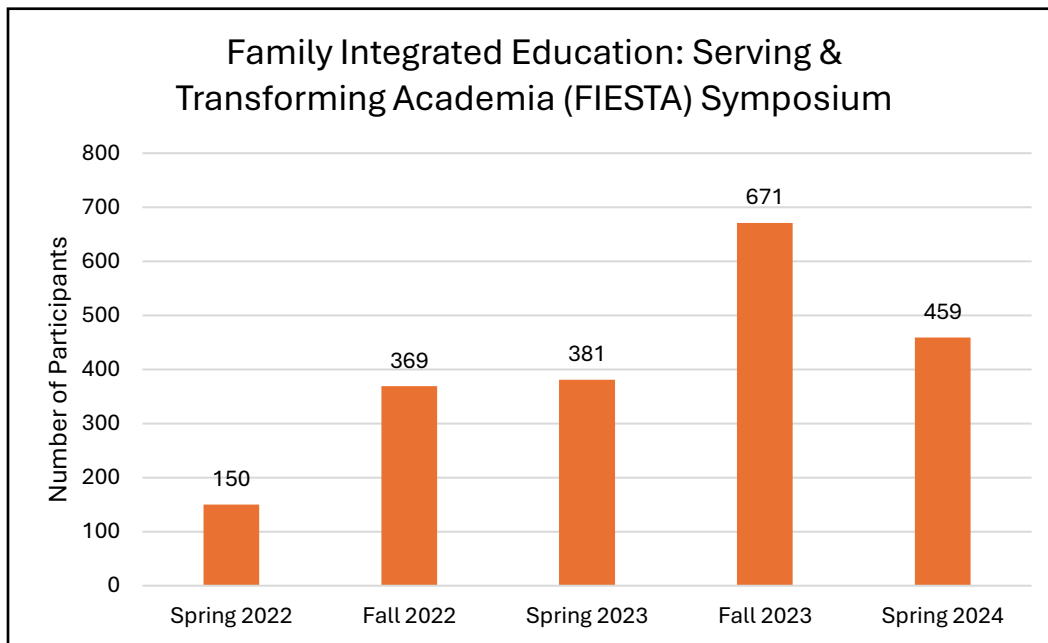


Figure 1: Broadening participation of students and families through STEM education



Figure 2: Undergraduate research experiences at FIESTA Symposium

Transformative Impact

Theme analysis performed in the Fall 2023 symposium on student, family, and faculty responses to open ended questionnaires (n=151) resulted in four major themes:

1. the importance and value of involving families in the learning process;
2. the vast exchange of academic and cultural wisdom between and among students, families, and faculty;
3. transformative collaborations of teaching and learning through Family Centered Pedagogy; and
4. a strong “sense of belonging with ownership and pride” among students, families, and faculty.

These emergent themes were then validated by Cohort 1 faculty testimonials showing evidence to the transformative impact of the family-centered theory of change (Salinas et al., 2024).

Student Success

First-year retention rate is an indicator of institutional effort and student success. Nationally and across all sectors, Fall 2021 retention rates for Hispanic or Latino students were 63% and 67% was the national average (Santiago et al., 2024). At the University of Texas Rio Grande Valley (UTRGV), the Fall 2021 retention rate for all full-time students was 76% and 79% for the Fall 2022 cohort (UTRGV SAIR, n.d.).

Out of the approximately 1200 students impacted by the Family Centered Pedagogy intervention during the 2022-2023 academic year, the first-year full-time student cohort resulted in a Course Intervention sample (n=284, 14%) that is representative of the entire UTRGV first-year, full-time student population (n=2043). About half of the students in the sample were first-generation and almost two-thirds were STEM majors. Table 1 and Figure 3 show the full-time students’ descriptive statistics and overall, first-year retention rate results, respectively.

	Institution (n=2043)	Course Intervention (n=284, 14%)	FIESTA Symposium (n=76, 4%)
Gender	57% Female 43% Male	56% Female 44% Male	45% Female 55% Male
Ethnicity	94% Hispanic, 2% White 1% Asian, 3% Other	93% Hispanic, 2% White 2% Asian, 3% Other	96% Hispanic, 0% White 1% Asian, 3% Other
Pell Grant	72% Pell 28% Not Pell	67% Pell 33% Other	70% Pell 30% Not Pell
First-Generation	51% First-Gen 49% Other	48% First-Gen 52% Other	42% First-Gen 58% Other
STEM Major	47% STEM 53% Other	62% STEM 38% Other	72% STEM 28% Other

Table 1: Descriptive statistics for institution, intervention, symposia.

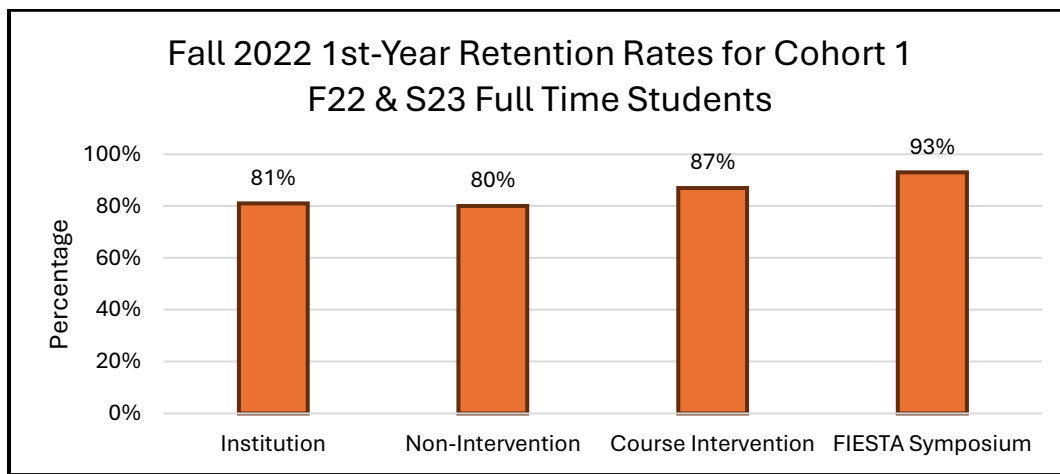


Figure 3. 2022-2023 overall academic year retention rates.

The intervention was implemented twice during the 2022-2023 academic year, Fall and Spring semesters. Retention rates were consistently higher for intervention students than non-intervention and institution retention rates in both semesters. Students who presented at the end of semester symposia are highly likely to enroll at UTRGV for their second academic year (see Figure 4).

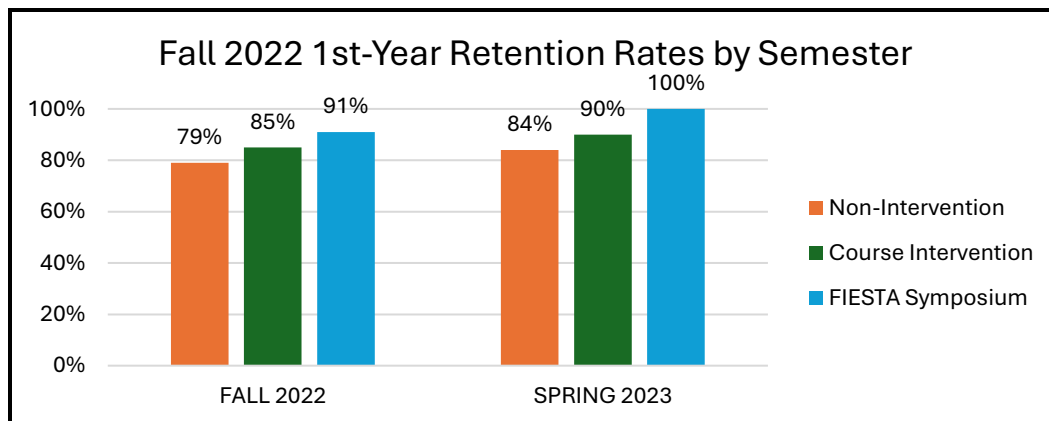


Figure 4. Retention rates by semester.

First-generation students benefited from the intervention reversing the retention gap from -5% for Institution to +2% for Course Intervention. The intervention helped both, 1st GEN and Others (see Figure 5).

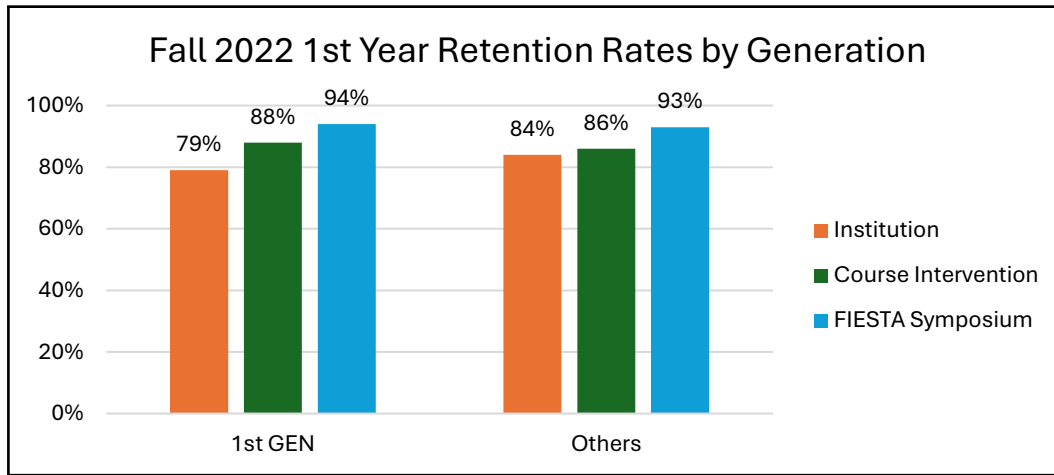


Figure 5. Retention rates by generation.

Almost two-thirds of the intervention sample were STEM students. The intervention improved the retention of both STEM and Others students (see Figure 6).

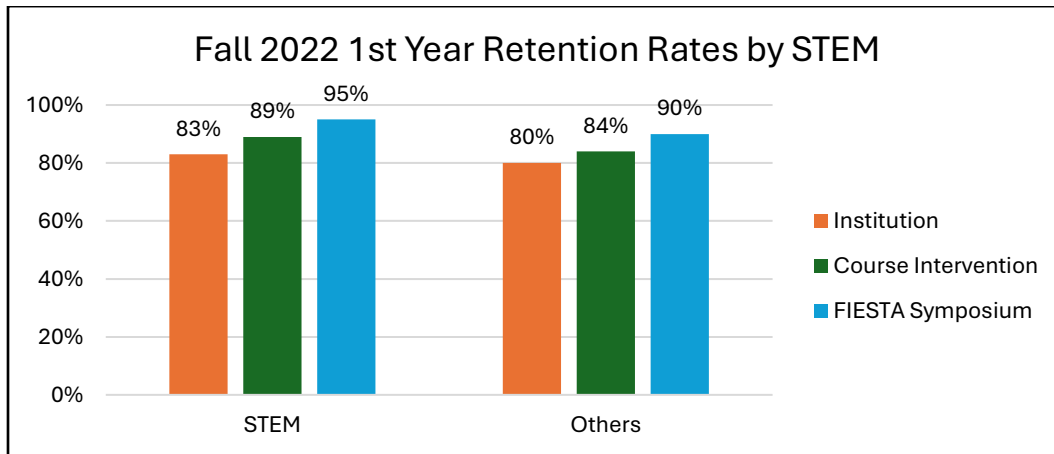


Figure 6. Retention rates by STEM.

Conclusion

Students and faculty have consistently expressed that Family Centered Pedagogy integrates families well into the STEM curricula in mathematics, chemistry, physics, and astronomy undergraduate courses. Through the family centered class projects students apply concepts studied in class into real world, lived experiences and applications. The family centeredness of the research projects allows students to make meaningful connections with their families' funds of knowledge in culturally and linguistically responsive ways. Sustainability efforts are underway in Year 4 of the institutional transformation project starting in Fall 2024.

REFERENCES

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