Engaging and Retaining Learners in Higher Education Family and Consumer Sciences Degree Programs

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This study examined the relationship between student engagement and numerical grade scores between family and child development and interior design students in post-secondary family and consumer sciences education (FCSE) programs using the perceptions of student engagement instrument. A one-way multivariate analysis of variance was performed to compare engagement scores with numerical grade scores between the two groups. The result of the MANOVA was statistically significant and the null hypothesis was rejected at a 95% confidence level where $F(2,164) = 11.68$, $p < .01$, partial $\eta^2 = .125$. Suggestions for future research include repeating the study with other higher education FCS programs, between broader groups of residential classes, and examining the impact of instructional pedagogy methods on student engagement and achievement in residential learning.

Keywords: *student engagement, student achievement, higher education, family and consumer sciences*

Introduction

Student engagement (SE) is a component of higher education that increases and sustains retention rates, academic achievement, and student satisfaction; therefore, SE has been a focus of research for more than three decades (Aparicio et al., 2021; Bowden et al., 2021; Pulay & Tibbitts, 2022; Snijders et al., 2022; Sujet, 2022; Tanaka, 2019). Broadly defined, SE is student involvement in education (Ben-Eliyahu et al., 2018; Bowden et al., 2021; Haug et al., 2019; Maguire et al., 2017); it is the continuous participation of students with their coursework, motivated by their interests and internal drive (Tani et al., 2021).

Researchers have classified engagement into three categories: behavioral, cognitive, and social engagement. Residential learning, also referred to as face-to-face instruction, is a traditional teaching approach that comprises cognitive, social, and behavioral engagement (Barlow et al., 2020). Behavioral engagement is the tenacity to maintain active course participation (Havik & Westergard, 2020; Lee, 2014); it is the drive and motivation to achieve educational goals. Cognitive engagement is a student's feelings and emotions toward education (Aparicio et al., 2021; Bowden et al., 2021; Groccia, 2018; Havik & Westergard, 2020; Lee, 2014). Social engagement is student connectedness or their sense of belonging. The combination of behavioral, social, and cognitive engagement contributes to

student achievement (Ben-Eliyahu et al., 2018; Lei et al., 2018). Achievement can be assessed by final numerical grades, student attitudes, retention rates, course completion, and attainment of a degree (Kahu & Nelson, 2018).

The increase of retention rates and decrease of course offerings in family and consumer sciences education (FCSE) higher education programs has led to scrutinizing the link between SE and achievement (Bowers & Myers, 2019; Dainty et al., 2011; Pulay & Tripp, 2022; SCSU, 2018; Stephenson et al., 2020; Wilmarth & Milstead, 2021). As a result, educators are making strides to improve SE, achievement, and retention rates in post-secondary FCSE (Dainty et al., 2011; Wilmarth & Milstead, 2021).

Researchers have investigated instructional pedagogy and its contribution to course achievement (Hodges, 2020; Kahu & Nelson, 2018). FCSE instructors use an assortment of pedagogies, such as lecture-based instruction, project-based learning, and experiential learning (Deaton et al., 2018; Smith, 2018). Pedagogy approaches vary in post-secondary FCSE, especially in the fields of family and child development (FACD) and interior design (INDE). FACD courses use lecture-based instruction and experiential learning methods through practical field experience hours, practicums, and observation studies (Williams-Wheeler et al., 2022). INDE courses use lecture-based instruction and experiential learning, but mainly utilize project-based learning which strives to produce a tangible product through instruction (Poirier et al., 2017). Project-based learning allows students to articulate ideas to apply knowledge that will be used in real-life circumstances (Durr et al., 2021). The primary difference between the two is that lecture-based instruction is teacher focused, while project-based learning is student focused.

Evidence shows that attendance and achievement scores in residential FCSE courses are suffering (Bowers & Myers, 2019; Wilmarth & Milstead, 2021). These insufficiencies may be a consequence of curriculum design, teaching styles, and engagement in the classroom (Moores et al., 2019). An adaptation towards strategies that employ cognitive, behavioral, and social engagement, is necessary for student achievement and degree attainment in face-to-face instruction (Bowden et al., 2021; Knudson, 2020). The problem is that connections between cognitive, behavioral, and social engagement and academic achievement, in the form of numerical grades, have not been fully addressed. There is limited data exploring the relationship between SE and academic achievement in residential learning in FCSE programs with different instructional approaches, as often found in FACD and INDE (Bowden et al., 2021). Recent data evaluating engagement and overall success rates in FCSE are also limited. This research was designed to answer the research question: Is there is a difference in residential FCSE SE scores and numerical course average scores among those students enrolled in FACD courses versus those enrolled in INDE courses?

Literature Review

Engagement Theory

Engagement theory was established by Kearsley and Shneiderman in 1998. Both theorists believed experiential and social learning were the basis for teaching and learning (Miliszewska, 2006; Payne, 2016; Zarzycka et al., 2021). Engagement theory is a leading social theory in higher education. Its premise is that effective learning should have cognitive, social, and behavioral engagement through social interaction and the completion of authentic task-centered assignments (Payne, 2016; Zarzycka et al., 2021).

Relate-Create-Donate

Kearsley and Shneiderman believed students should engage in rich and meaningful learning experiences (Hew et al., 2018; Kearsley & Shneiderman, 1998; Payne, 2016; Romaker, 2021; Smallwood & Brunner, 2017). With the implementation of technology into the classroom, Shneiderman partnered with Kearsley to further expound on engagement theory (Feroz et al., 2022; Kearsley & Shneiderman, 1998). Their work sought to integrate the influence of technology on SE in the classroom, providing a basis for technology-based instruction (Feroz et al., 2022; Kearsley & Shneiderman, 1998). Their work suggests a theory that focuses on three factors: relate, create, and donate (Hew et al., 2018; Kearsley & Shneiderman, 1998; Payne, 2016; Romaker, 2021).

Relate. The first factor, relate, is the process of interacting in group contexts to stimulate planning, managing, and communication (Kearsley & Shneiderman, 1998). In this component, students should engage with peers, the instructor, and course content while completing assignments and activities (Kearsley & Shneiderman, 1998; Smallwood & Brunner, 2017).

Create. The second factor, create, involves the application of knowledge in a meaningful and specific project (Kearsley & Shneiderman, 1998). In this factor, students should be given authority to identify a problem and create a project about a topic of interest (Kearsley & Shneiderman, 1998; Payne, 2016; Shaughnessy et al., 2010). The create element is usually facilitated through team-based learning (Kearsley & Shneiderman, 1998).

Donate. The final factor, donate, is the act of "contributing while learning" (Kearsley & Shneiderman, 1998, p. 20). Student work should provide value for greater purposes to an individual, circumstance, or organization (Kearsley & Shneiderman, 1998; Payne, 2016; Shaughnessy et al., 2010; Zarzycka et al., 2021). The term "donate" is the act of "giving" work to real-life settings (Feroz et al., 2022; Shaughnessy et al., 2010; Zarzycka et al., 2021).

Defining Student Engagement

SE can be further understood through examination of student perceptions and achievement in higher education. SE in relation to FCS has been questioned and researched, particularly over the last decade.

Student Perception About Engagement

Students are engaged when they participate in learning; whereas student

perception of engagement is a student's view of engagement in the classroom (Bacon, 2016; Haug et al., 2019). If students lack enjoyment in a course, they are more likely to have a skewed view of engagement, earn lower course grades, and retain less course information (Mahdi, 2021; Martin & Bolliger, 2018). Students also gauge whether course content is useful to their endeavors, which can distort their view of engagement approaches (Mahdi, 2021). Student self-efficacy, which is their view of their personal abilities to achieve course objectives and succeed in a course, is influential in student perception of engagement (Mahdi, 2021; Martin & Bolliger, 2018).

Engagement and Achievement in Higher Education

Achievement is subjective but can be measured using several variables: student attitudes, mastery of skills, attainment rates, retention rates, numerical grades, and course completion (Kahu & Nelson, 2018; Tight, 2020). Academic achievement is described as acquiring proficiencies to succeed academically and in society (Lindholm-Leary & Borsato, 2002). In higher education courses, students obtain metacognitive skills by utilizing assessment tools to achieve final numerical scores. These scores are markers of achievement (Tight, 2020; Winnie & Nesbit, 2010).

The connection between SE and achievement is reflected by course grades and retention rates (Brown et al., 2022; Kobicheva, 2022; Lee, 2014; Peiser et al., 2022; Tight, 2020). As mentioned, SE increases retention and course completion rates and produces higher grades (Kobicheva, 2022; Lee, 2014). Courses that have high levels of behavioral, cognitive, and social engagement result in higher course grades, which are often a factor of assessment for universities (Tight, 2020). An absence of engagement connects to lower course grades, fewer complete assignments, higher withdrawal and retention rates, and poorer achievement of course outcomes (Naibert et al., 2022).

Student Engagement and Pedagogies in Family and Consumer Sciences

FCS involves an integrative approach to teaching and learning (Haapaniemi et al., 2019; Poirier et al., 2017; Smith, 2018). Instructors use an assortment of pedagogies by blending lecture-based instruction, project-based learning, and experiential approaches (Deaton et al., 2018; Smith, 2018). Project-based learning is found deep in the historical roots of the profession (Deaton et al., 2018; Poirier et al., 2017). One of the profession's notable founders, Ellen Swallow Richards, grounded home ecology on the ideology that authentic experiences are indispensable for students to learn and meet the needs of society (Deaton et al., 2018).

Family and Consumer Sciences Retention and Sustainability

As previously mentioned, the regression of retention rates in residential FCSE higher education programs has led to scrutinizing the link between SE and achievement (Bowers & Myers, 2019; Dainty et al., 2011; Pulay & Tripp, 2022; SCSU, 2018; Stephenson et al., 2020; Wilmarth & Milstead, 2021). Retention is usually a result of a student's expectations being met. Expectations can relate to

class anticipations, lack of motivation, student interest, nuisances, and institutional tuition and fees (Sara et al., 2022; Stephenson et al., 2020). The lack of faculty involvement also contributes to retention rates (Stephenson et al., 2020). Retention sustainability is a current issue for institutions that host FCSE departments. The decrease of enrollment in FCSE post-secondary programs as well as the shortage of qualified FCSE faculty in post-secondary education are also concerning to the profession (Duncan, 2018; Werhan, 2013; Werhan & Whitbeck, 2017). There is a need to evaluate the factors that impact retention and program sustainability which point to SE and achievement (AAFCS, n.d.; Pulay & Tibbitts, 2022).

Methods

A causal-comparative, non-experimental design (Creswell & Creswell, 2014; Gall et al., 2010; Lenell & Boissoneau, 1996) was utilized in this study to explore relationships between independent and dependent variables. This approach was chosen to examine relationships of SE between pre-existing groups within higher education FCSE courses (Lenell & Boissoneau, 1996; Umstead et al., 2018).

The purpose of this study was to identify the cause-and-effect relationship between SE and numerical grade scores between the two groups of FCSE courses, FACD and INDE (Lenell & Boissoneau, 1996; Umstead et al., 2018). This study observed the relationship between SE scores (student connection, pedagogical factors, classroom environment factors, and student motivation factors), and numerical grade scores between the two groups (Gall et al., 2010; Haug et al., 2019).

The independent variables for this study were categorical: residential FACD courses (FACD 3000, FACD 3001, FACD 3002) and INDE courses (INDE 3000, INDE 3001, INDE 3002). Dependent variables included SE scores and numerical grade scores (Lenell & Boissoneau, 1996; Umstead et al., 2018).

Student Perceptions About Class Engagement Measure

Haug et al. (2019) believed there was a correlation between SE and achievement. They developed the *Student Perceptions About Class Engagement Measure* (SPACEM) questionnaire to explore undergraduate students' ideas about engagement as these contribute to course achievement (Haug et al., 2019). The SPACEM proves reliability with a Cronbach Alpha Coefficient of .814 and statistical power greater than 0.7 (Haug et al., 2019).

Haug et. al's (2019) SPACEM questionnaire contains 28 questions relevant to SE in the higher education classroom. The scale is categorized into four categories:

1. *Student Connection*: includes questions about student connection within the classroom, with the instructor, with peers, and the course content.
2. *Pedagogical Strategies*: includes questions about teaching strategies and course activities.
3. *Classroom Environment Strategies*: includes questions about the

classroom environment.

4. *Student Motivation Strategies:* comprises questions pertaining to student cognitive and motivation perception about education and coursework (Haug et al., 2019).

Each of the 28 questions in SPACEM is an item within the four subscales. This scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.765 (DeVellis, 2003; Kline, 2005).

The SPACEM is a psychometric 5-point Likert scale questionnaire that ranged from strongly agree (5 points) to strongly disagree (1 point) (Haug et al., 2019; Preedy & Watson, 2010). The combined possible scores on the SPACEM ranged from 28 to 140 points. A score of 28 points is the lowest possible score, meaning students selected *strongly disagree* for all 28 factors about SE. A score of 140 points overall is the highest score, indicating that students scored *strongly agree* for all 28 factors on the Likert scale.

The SPACEM was administered electronically during scheduled class periods. The approximate time to complete the survey was 15 minutes per student. A total of 20 minutes was allotted for the survey to be completed. The instrument was scored by the researchers. Within each FCSE class, the medians, means, and sums were calculated for each survey question.

Numerical Grade Average

Instructors calculated the final numerical grades of students and hosted the data in the university's learning management system. Instructors of the six courses used in this study retrieved numerical grade score data after course completion in the spring of 2023. Numerical grades were based on a 1000-point grade scale. The highest score was 1000 and the lowest score was 0. Numerical scores and demographics were compiled by class section and name and gathered into an individual report.

Participants and Setting

Population

Participants for this study were selected by using a convenience sampling method of undergraduate college students in Virginia. The population included residential students living on campus completing face-to-face courses in the FCSE department. The university residential population was 53% female and 47% male. The department population was approximately 98% female students and 2% male students. Programs assessed in this study had a higher enrollment of female students, and, as a result, participants for this study were primarily female with an average of one male student per class. The specific population for the study comprised freshmen, sophomore, junior, and senior status students enrolled in FCSE residential FACD and INDE courses. All students enrolled in the selected FCSE courses could participate in the study regardless of their majors. The age of these students was 18-23 years old.

Participants

This study's sample was derived from the institution's residential FCSE department. Within this department, six residential classes were selected from two degree program majors: FACD, which used lecture-based instruction with experiential learning, and INDE, which used project-based learning. All FCSE courses seek to prepare students for a professional career improves the quality of life for communities, individuals, and families (Pucciarelli et al., 2016).

The intended groups were selected based on class size, instructional strategies, and variation of course content to adequately compare the cause-and-effect relationship between SE and achievement among the two groups. The groups were naturally occurring as participants were not recruited, and regularly met in class (Brown, 2015). There were 23 out of 82 students in the FACD group declared another major, whereas only 5 out of 90 students in the INDE group were declared another major. All students enrolled in the selected FCSE courses were invited to participate in the study regardless of their majors while involvement in the study and completion of the survey was voluntary.

The sample size was 172 participants, which exceeds the required minimum of 144 for a MANOVA when assuming a medium effect size with statistical power of .7 and alpha level, $\alpha = .05$ (Gall et al., 2010, p. 145). The sample consisted of 7 males and 165 females. A total of 82 students completed FACD courses: FACD 3000, FACD 3001, and FACD 3002. Of these students, 22 completed FACD 3000, 36 completed FACD 3001, and 24 completed FACD 3002. A total of 90 students completed INDE courses: INDE 3000, INDE 3001, and INDE 3002. Of these students, 28 completed INDE 3000, 21 students completed INDE 3001, 41 students completed INDE 3002.

Data Analysis

To compare the differences between groups, a multivariate analysis of variance (MANOVA) was performed to examine the differences between the two groups on multiple dependent variables (Gall et al., 2010). A MANOVA was the best statistical analysis for this study as there were multiple continuous dependent variables, two or more independent groups, different participants in each group, and a sufficient sample size (Finch, 2016; Gall et al., 2010). Data screening included visual screening of the data set to check for missing data points and inaccuracies. Data screening was essential to ensure the distribution of data is normal and to eliminate distortion of central tendency (Gall et al., 2007; 2010). Box and whisker plots were used to check for extreme outliers for each group and an assumption of normality testing, Shapiro-Wilks, was conducted.

An assumption of multivariate normal distribution was performed to identify a linear relationship between each pair of dependent variables. The test for this assumption was achieved by plotting a scatterplot matrix for each group of the independent variables. An assumption of homogeneity of variance-covariance matrices was tested using Box's M tests of equality of covariance. The failure of this assumption required Levene's test of homogeneity of variance to determine the problem. Furthermore, an absence of multicollinearity test was completed to determine if the dependent variables were moderately related. A

correlation over .80 presents a concern for multicollinearity. The effect size was reported using a partial eta squared. The null hypothesis was rejected at the 95% confidence level. Since this is the first time the survey was used outside of the instrument developers, Cronbach alpha was tested and reported at .765 and statistical power greater than .7.

Findings

A one-way MANOVA was performed to observe the cause-and-effect relationship between SE scores and achievement scores among both groups of FCSE students. Data screening was conducted on each group's dependent variable, and data were scanned for entry errors and inconsistencies. No data errors or inconsistencies were identified, each assumption test was found tenable, and all data points were retained. Students in FACD scored slightly higher on engagement scores than INDE students (M = 113.48, SD = 8.94, M = 112.57, SD 10.61, respectively), while students in FACD scored lower on grades than INDE students (M = 872.76, SD = 72.17, M = 920.92, SD 58.14, respectively).

Hotelling's T^2 was used to test the null hypothesis that there is no difference between residential FCSE SE scores and numerical course average scores. The differences between the groups on the combined dependent variables were statistically significant and the null hypothesis was rejected at a 95% confidence level where $F(2, 164) = 11.68$, $p < .01$; Wilks' $\Lambda = .88$; partial $\eta^2 = .125$. Follow up univariate ANOVAs showed that grade scores $F(1, 165) = (22.713)$, $p < .001$: $\eta^2 = .121$ were statistically significant between the groups but survey scores $F(1, 165) = (.348)$, $p = .556$: $\eta^2 = .002$ were not statistically significant between the groups.

Results

Upon reviewing the survey results, FACD and INDE students believed that engagement is an important factor in their overall satisfaction with classroom work. There was a statistically significant difference $F(1, 165) = (22.713)$, $p < .001$: $\eta^2 = .121$) between FACD grades (M = 872.76, SD = 72.17) and INDE grades (M = 920.92, SD = 58.14). However, no statistically significant difference $F(1, 165) = (.348)$, $p = .556$: $\eta^2 = .002$) was found between the FACD engagement scores (M = 113.48, SD = 8.94) compared to INDE engagement scores (M = 112.57, SD = 10.61).

Since the univariate ANOVA for engagement scores was not statistically significant, a post hoc power analysis was conducted which found that the power was .99. This finding supports the idea that though the null hypothesis could be rejected, individual engagement scores were not statistically significant. There was, however, sufficient power to support these overall findings. Students perceived that instructor presence in residential learning is valuable. It is the responsibility of the instructor to create an engaging learning environment (Martin & Bolliger, 2018; Sriram et al., 2020). The results from this study indicated that students shared common perceptions of SE, but the types of assessments in a course and their point distribution likely affected achievement scores.

Limitations

The study was a causal-comparative design, which cannot confirm results like an experimental design. The design made claims about a relationship between the variables (Gall et al., 2010). Sample size was a limitation that affected internal and external reliability. The researchers exceeded the required minimum sample size for a MANOVA and surveyed 172 students: 82 from the FACD group and 90 students from the INDE group. Seven students were eliminated from the study due to earning an NA (non-attendance), I (incomplete), or a W (withdrawl) in the course, totaling a final sample size of 165. In addition, two extreme outliers were removed from the study, data points 5 and 9 of the FACD group. The students who declared another major may have lacked interest in the course topics, which could have affected their engagement and final numerical scores, especially in the FACD group.

Although the researchers collected a sufficient sample size, the FCSE department has over 500 students. The six classes surveyed were selected to avoid conflict of interest, as one of the researchers was a professor within the department overseeing two of the academic degree programs. Data collection was narrowed to two of the largest programs outside the one researcher's oversight, INDE and FACD, with 172 students sampled. If there was a larger sample, it would have helped with the generalizability of this study.

Conclusion

Students' perception of engagement in this study did not impact their course grades alone, meaning students could have high perceptions of engagement and still earn low numerical scores. However, students must be motivated and willing to participate in class and complete the work to meet learning objectives and pass a course. The results of this study suggest that pedagogical strategies can influence student achievement. As seen by the INDE group, integrating project-based learning methods can produce higher numerical scores.

The mission of FCSE is to develop the individual well-being, strengthen the family unit, create professionals, and make contributions to the community (AAFCS, n.d.; McGregor, 2020; Nickols et al., 2009; White & White, 2018). Hands-on and project-based learning instruction that aligns with course learning objectives could increase overall student achievement. An additional study focusing on the constructs of instructional design and the impact of faculty instruction on SE and achievement in residential learning is suggested.

Since this study only evaluated two groups of students in two programs (FACD and INDE) within a FCSE department at one institution, it would be beneficial to repeat the study to include other programs, such as fashion design and merchandising, event planning, and creative industries, and to include diverse student demographics at additional institutions. This study could also be replicated to examine SE and achievement in similar FCSE programs across the country, which could help improve retention and enrollment in the field overall.

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