# High Impact Practices and Professional School Acceptance in Health Science Concentrations

*Lori H. Richard, Nicholls State University*
*Jennifer M. Plaisance, Nicholls State University*
*Brigett Scott, Nicholls State University*
*Ruston J. Poché, Nicholls State University*

*Graduate-level professional health care programs have a highly selective admissions process. Applicants can distinguish themselves by participating in High Impact Practices (HIPs) to enhance their undergraduate experience and academic and professional success. The variables analyzed in this study included acceptance, grade point average (GPA), minor attainment, items from the National Survey of Student Engagement (NSSE), and HIPs. Results of the analysis indicate a significant positive association between professional school acceptance and GPA, minor attainment, and capstone course completion. Data analysis suggests specific HIPs correlate with admission to desired graduate programs, and implications for advising students with this goal are discussed.*

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Academic advisors in the health sciences help college students navigate and prepare to meet professional-school admission requirements. This work often centers around nurturing the student's hopes and dreams while navigating academic drive, realistic expectations, and acceptance into a chosen graduate school. Student acceptance into professional graduate health care programs is highly competitive. Undergraduate preparation can be difficult for academic advisors and students alike. In recent years, acceptance rates for physical therapy (PT), occupational therapy (OT), and physician assistant (PA) programs average between 17% and 32% (American Occupational Therapy Association, Inc., 2018; Commission on Accreditation in Physical Therapy Education, 2020; Physician Assistant Education Association, 2018). Admission consideration for these health science programs, and many like them, requires rigorous academic preparation and a minimum GPA, most often of 3.0 or better. However, the average GPA for admission is 3.5 or better (American Occupational Therapy Association, Inc., 2018; Commission on Accreditation in Physical Therapy Education, 2020; Physician Assistant Education Association, 2018). Many of these programs also require observation or patient contact hours supervised by licensed practitioners, letters of recommendation, or a minimum score on standardized exams (e.g., GRE, DAT, MCAT).

These additional criteria—and even minimum score requirements—often vary between programs and fields of study. Academic advisors and students should have a basic understanding of these requirements to maximize the student's experiences and efforts in them. For example, some required standardized exams assess concepts and fundamentals prerequisite to the field of study, (e.g., DAT or MCAT). Other professional programs require the GRE to measure a student's ability in "verbal and quantitative reasoning, and analytical writing skills" (ETS, 2021). Data suggest the cumulative verbal and quantitative GRE scores predict success on licensure exams taken after professional school (Coleman-Salgado & Barakatt, 2018). However, not all data agree. There is variance in the standardized exam requirement across the disciplines and within professional programs of the same field, where one PT program may require a GRE score while another will not. Minimum score requirements can vary by discipline and program.

Professional programs also base admission decisions on factors including letters of recommendation, observation hours, patient contact experience, or an interview. These application variations require academic advisors to play an essential role in guiding students to complete these while simultaneously obtaining the prerequisite coursework. With such variety in these admissions criteria, and students being encouraged to apply to multiple programs because of their competitive admissions standards, academic advisors must be well versed in the minimum requirements for professional programs and determine the

differences between them. In addition, academic advisors must encourage students to do the same research early in their academic careers so they have time to obtain the minimum standards necessary for each professional program before applying.

Potential applicants must also differentiate themselves. Academic advising can guide aspiring professional school students to participate in extracurricular activities or High Impact Practices (HIPs, Bok, 2008; Kuh, 2008). In 2008, Bok stated that "if colleges exercise such a pervasive influence, they should presumably try to help undergraduates develop in even more ways than those fostered by the curriculum alone" (p. 59). Bok (2008) explained that extracurricular activities and skills enhance students' personal growth and development beyond the prescribed curriculum. He argued that these experiences teach students to communicate, think, build character, prepare for citizenship, live with diversity, prepare for a global society, acquire broader interests, and prepare for a career.

Similarly, Kuh (2008) defined some specific undergraduate student experiences as High Impact Practices (HIPs). Kuh (2008) explained that for the experience to be a HIP, the experience must provide meaningful interactions between students, a variety of faculty members, and professionals with expertise. HIPs should also expose students to broad knowledge and ethical and civic responsibility. Kuh's (2008) list of HIPs include first-year seminars and experiences (FYS); common intellectual experiences; learning communities; writing-intensive courses; collaborative assignments and projects; undergraduate research; diversity/global learning; service and community-based learning; internships; and capstone courses and projects.

The significance of out-of-classroom activities was also documented by Rust (2011), who explained that liberal education focuses on four goals: developing communication skills, enhancing critical thinking, enabling cross-disciplinary awareness, and preparing for citizenship. He explained that academic advisors communicate the added value these experiences bring and without such opportunities, "students might find their course of study and future professional opportunities limited" (Rust, 2011, p. 9).

Academic advisors have an opportunity to be "intentional interaction designers" by recommending student experiences that will help advisees meet postgraduation goals (Shockley-Zalabak, 2012, p. 13). Through advising interactions, academic advisors can teach students to become more intentional about their education and to value integrative educational experiences while promoting the long-term benefits of such experiences (Robbins, 2014).

## Research Questions

With the value of out-of-classroom experiences being well documented and the idea that academic advisors should encourage students to participate in these practices, researchers hypothesized that a health sciences undergraduate students would benefit in the professional school admissions application process if they were to participate in one or more HIPs as defined by Kuh (2008).

Researchers also sought to increase literature available to this subset of students by including statistical analysis on the impact that GPA and the attainment of a minor have on professional school acceptance.

## Methods

### Site of Study

This study was conducted at a midsized (N = 6506) regional institution in the southeast United States that seeks to foster success in professional school placement and provide students with an excellent educational experience that will contribute to success in all aspects of life. The university offers a FYS, honors program, undergraduate research, service/community-based learning, ePortfolio creation, capstone and writing-intensive courses, and internships. The institution requires all students to participate in the FYS and a writing-intensive course; the other HIPs are optional. As defined in the literature, HIPs offered at this institution and considered for analysis in this study are listed below.

### High Impact Practices

Study abroad experiences can enhance student career placement due to a wide variety of skills, like learning a second language, cultural sensitivity, and risk-taking that can be attained by participating in world travel (Di Pietro, 2019). Cardwell (2019) found that studying abroad can lead to higher academic achievement. The longer the study-abroad experiences, the more significant the improvement in GPA. However, Gaia (2015) found that even short-term study abroad trips can increase students' understanding of other cultures, enhance language skills, and solidify perceptions of self-identity. Students

return with intercultural competence and diversity improvements, engaging in their local and expanded communities, persisting with eagerness towards graduation (Hunter et al., 2010).

Electronic portfolios, widely known as ePortfolios, provide feedback about student performance and mastery of learning to improve curricula within and across institutions. They also assist planning and goal setting (Knight et al., 2008). ePortfolios are becoming more prevalent in the undergraduate experience and can be used in the classroom, academic advising, or institutional offices. In 2013, more than 50% of American colleges and universities offered some type of ePortfolio experience (Dahlstrom et al., 2013). In addition, Knight et al. (2008) noted that the average cumulative GPA for students who utilized ePortfolios is higher than students who did not.

Service-learning is meant to engage students in activities outside of the classroom and involves more reflection than other courses (Molee et al., 2010). Service-learning connects ideas with real people in real situations; learning is integrated through active participation (Hunter et al., 2010). These courses attempt to integrate community service as a learning strategy within an academic curriculum (Celio et al., 2011).

Similar to service-learning, internships and practicum courses allow students to apply knowledge gained in the classroom to real-world situations. Internship programs vary across institutions and disciplines; however, all designs enrich learning and enhance student growth. These experiences assist in developing workforce-related tools vital to student success (Kuh et al., 2010).

Additionally, undergraduate research can maximize interaction and collaboration between faculty members and students and increase intellectual development. Undergraduate research allows students to receive knowledge and empowers them to be active participants in the pursuit of new knowledge, sharpening their critical-thinking and problem-solving skills (Hunter et al., 2010). Researchers have confirmed that undergraduate students who conduct research are "more likely to complete their undergraduate education and more likely to go on to graduate school or professional training compared to students who do not have a research experience" (Hunter et al., 2010, p. 180).

Active and collaborative learning strategies, such as learning communities, have been proven to engage students and accommodate diverse learning styles while teaching problem-solving skills that will be useful during and after the undergraduate experience (Kuh et al., 2010). For each student, there is an intentional focus on interdisciplinary knowledge, campus and community engagement, and relationship development with both faculty members and peers (Felten et al., 2016). The honors program at the site of this study is classified as a learning community as it seeks to foster and challenge its students' academic and personal development by creating diverse experiences and meaningful relationships in and out of the classroom.

Capstone courses are typically a culminating class in a curriculum where students learn to integrate and synthesize what they have studied under the direction of a faculty mentor within the student's major (Felten et al., 2016). Researchers have found that this practice requires engagement from both students and faculty members and is most meaningful. Capstone courses range in pedagogical structure and can include research, portfolio creation, a comprehensive examination, or an internship (Hauhart & Grahe, 2015). Although they can be interdisciplinary, many institutions use this HIP to culminate both the content and experiences within a major, where completion ultimately signifies that the students have finished one phase of their journey and are ready to transition to the next (Kuh et al., 2010). Capstone courses are typically one to three credit hours and often require a final project that is the student's culminating experience in the degree program.

**Sample**

This retrospective cohort study consisted of 386 students and was a census of all students who graduated in health science-related concentrations between 2012 and 2018. This study considered one objective outcome—professional school acceptance—and six items from the National Survey of Student Engagement (NSSE) retrieved in 2018. These six items assess student participation or intention to participate in service-learning, learning communities, undergraduate research, internships, study abroad, and a capstone course. This project was approved by the institution's Human Subject Review Board in the Fall of 2018. Data generated was obtained from the university's Office of Institutional Research Effectiveness and Planning (IREP). In addition, IREP provided requested data from the

university's database and the National Student Clearing House. Researchers also utilized their faculty-kept database of health science alumni for professional school placement and occupations. They sought out the unknown placement of alumni by searching their occupational and professional school status from publicly available information from alumni social media accounts.

The population of this study includes students who graduated from biology, chemistry, and health sciences degree programs. These concentrations are specific for students who have intentions to apply and earn acceptance into graduate-level professional schools to practice within a health sciences occupation upon graduation. Data requested from IREP included transcripted information—GPA upon graduation, minor attained, and participation in HIP courses. Additionally, data on completion of an academic minor was included in the dataset because researchers were interested to learn if a minor might influence success in professional school program admission. GPA was also included in the dataset, as it is traditionally the primary marker used for professional school admission applications.

Also requested from the university's IREP were the NSSE student responses for the target population to gather graduates' self-reported data of their participation in HIPs, such as service-learning, learning communities, undergraduate research, internships, study abroad, or a capstone course, during their tenure at the university. Unfortunately, available NSSE data was limited because the survey was administered to juniors only every other spring semester. Furthermore, the survey was not required by the institution; therefore, targeted students could opt-out.

At this institution, 100% of graduates complete a writing-intensive course and the FYS; those HIPs were intentionally absent from analysis. Also, the use of ePortfolios within the targeted population of students is not recorded or used systematically, making it impossible to capture all relevant data for this HIP. Therefore, ePortfolios were also eliminated from the study. Honors program participation was also excluded from the analysis because a large portion of the data was missing or unverifiable. Service-learning courses were also not included in the analysis as no standardized records exist for identifying the level of service-learning within courses on campus.

To determine professional school admission status, data was requested and obtained by the IREP from the National Student Clearinghouse database for the target population. Data collected included the target population's graduate enrollment status and the degree pursued. A limitation identified by researchers is that not all universities subscribe to the National Student Clearing House; students may have been admitted and enrolled in a professional graduate program but not included in the data set. Researchers sought missing student admission and program data from an internet search of graduates using social media sources. They also requested information from faculty members about known student activity since graduation. Researchers then gathered data in a Google Sheets spreadsheet, and SPSS Version 25 was utilized for data analysis.

## Analysis and Results

The population of graduates who pursued a degree in a health science concentration (N = 386) was analyzed. A descriptive statistics analysis and Pearson correlation was conducted on the data set, followed by multiple regression analysis to determine predictors of professional school acceptance. NSSE data points were analyzed from the available sample of students from the population who completed the NSSE survey (n = 50) in comparison to graduate school acceptance utilizing an independent sample *t*-test.

The mean graduating GPA was 3.275 (+/– 0.498 SD). Table 1 details the academic characteristics of the students. Of the population, 28.2% (n = 109) were accepted into a professional program. A recorded 25.6% (n = 99) completed a minor. Only 2.6% (n = 10) participated in a study-abroad experience. The sample also contained 26.4% of students who participated in the honors program at some point (n = 102); however, only 37 are verified to have completed all aspects of the program. Demographic data on the students was not available at the time of analysis. However, the demographic breakdown of the university for the fall of 2018 reflects that the university population is 65.34% female, 34.66% male, 69.31% Caucasian, 18.23% African American, 4.10% Hispanic, and 8.36% other populations. Ninety percent of the students are undergraduates, and 78.62% are enrolled full time.

Results of the Pearson correlation indicated there was a significant positive association between GPA and professional school acceptance (r(254) =

**Table 1.** Academic Characteristics of Participants

| Characteristic | *n* | % | *M* | *SD* |
|---|---|---|---|---|
| GPA | 386 | 100 | 3.27 | .498 |
| Professional School Acceptance | | | | |
| Yes | 109 | 28.2 | 3.65 | .326 |
| No | 145 | 37.6 | 3.17 | .433 |
| Unknown | 132 | 34.1 | 3.08 | .517 |
| Major | | | | |
| Biology | 243 | 62.9 | 3.30 | .517 |
| Chemistry | 36 | 9.4 | 3.39 | .481 |
| Health Sciences | 107 | 27.7 | 3.21 | .456 |
| Completed a Minor | | | | |
| Yes | 99 | 25.6 | 3.45 | .419 |
| No | 287 | 74.4 | 3.22 | .509 |
| Honors Program Member | | | | |
| Yes | 102 | 26.4 | 3.57 | .347 |
| No | 284 | 73.6 | 3.17 | .501 |
| Participated in Study Abroad | | | | |
| Yes | 10 | 2.6 | 3.67 | .274 |
| No | 376 | 97.4 | 3.26 | .498 |

.519, $p < .001$), completing a minor ($r(254) = .128$, $p = .041$) and professional school acceptance. A multiple linear regression was calculated to predict professional school acceptance based on GPA and minor attainment. A significant regression equation was found ($F(254) = 6.842$, $p < .001$, with an R2 - .309). Participants' predicted graduate school acceptance is equal to −1.463 + .558 (GPA) + .029 (minor completion), where GPA is measured on a 4.0 scale, and minor completion is coded as 1 = completed minor, 0 = did not complete a minor. Another regression analysis was calculated to predict professional school acceptance based on GPA, completion of a minor, and student NSSE response of a capstone course experience ($r(50) = .379$, $p = .007$). Students' predicted professional school acceptance is equal to −1.398 + .119 (capstone completion) + .436 (GPA) + .101 (minor completion). The predictors were examined further and indicated that GPA ($t = 3.078$, $p = .004$) and capstone experience ($t = 2.166$, $p = .036$) were significant predictors in the model as indicated in Tables 2 and 3. This suggests that as GPA increases, the chances of being accepted into professional school rises, and completing a capstone course improves the chances of professional school acceptance.

Results of the independent sample *t*-tests ($n = 50$) indicated a significant difference in capstone course experience between the students who were accepted to professional school and those who were not accepted ($t(22) = -2.837$, $p = .007$). Table 4 depicts the results of all NSSE variables included in the analysis. Students were asked if they had completed a culminating senior experience. Students who reported that they completed a capstone course were more likely to be accepted into a professional program. There was a significant difference for accepted students ($M = 3.18$, $SD = 1.006$) versus not accepted students ($M = 2.29$, $SD = 1.182$); $t(22) = -2.837$, $p = .007$).

**Table 2.** Regression Analysis of Professional School Acceptance by GPA, Minor Attainment, and Capstone Course Experience

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Regression | 3 | 3.801 | 1.267 | 6.842 | .001 |
| Residual | 46 | 3.519 | .185 | | |
| Total | 49 | 12.320 | | | |

## Limitations of the Study

The researchers acknowledge limitations in this study. The most significant limitations include that HIP participation data is not well documented at this institution and one-third of students' professional school placement remains unknown. Also, NSSE survey participation ($n = 50$, 13%) proved to be relatively low and could not provide much supplemental information on student HIP involvement. Additionally, several study-abroad experiences were available but not utilized at that time. Another limitation is the inconsistency in internship experiences and availability across the health sciences curricula. For example, not all concentrations require an internship, and not all concentrations offer it. Yet, most graduate professional programs require observational or patient contact hours for application. When internships are not a course option, students are required to attain the experiences independently, creating potential barriers to access for some students and significant variability in the quantity and quality of the experience.

## Discussion

A significant, positive association ($r(254) = .128$, $p = .041$) of professional school admission was found if the student earned a minor. Very little research is available on a minor's impact on professional school admission requirements; the researchers suggest that more studies examine if these results can be replicated.

**Table 3.** Coefficients for Regression Analysis of Professional School Acceptance by GPA, Minor Attainment, and Capstone Course Experience

| Variable | *B* | *SE* | *SE B* | *t* | *p* | 95% CI |
|---|---|---|---|---|---|---|
| 1 (Constant) | −1.398 | .482 | | −2.901 | .006 | [−2.368, −.428] |
| Minor | .101 | .138 | .095 | .728 | .470 | [.151, .721] |
| GPA | .436 | .142 | .388 | 3.078 | .004 | [−.178, .379] |
| Capstone Course Experience | .119 | .055 | .280 | 2.166 | .036 | [.008, .229] |

As expected, GPA had a positive, significant correlation ($r(254) = .519$, $p < .001$) with successful professional school admission. This finding reinforces the need for early and continuous academic advising for students who declare a health science major and intend to apply to professional graduate programs.

The study findings also indicate a significant difference in capstone course experience between those accepted to professional school and those not accepted ($t(22) = -2.837$, $p = .007$). Students who reported capstone completion were more often accepted into a professional program. Thus, health sciences program faculty members should work to add a capstone experience to enhance learning, preparation, and application acceptance.

### Implications for Academic Advising Practice

While this study set out to examine the relationship of HIPs to professional school admissions, researchers also identified several areas that can improve the undergraduate health sciences student experience. Many require minimal shifts in the academic advising process.

It was no surprise that undergraduate GPA played a significant role in the admissions decision for aspiring professional students. When considering this distinguishing factor, health sciences academic advisors and advising administrators should be reminded of the critical role advising practices can play in influencing these majors. Academic advising allows faculty members to provide students with advice specific to their goals. Early and proactive academic advising can help students make sound academic decisions about course enrollment, scheduling balance based on course rigor, credit hour load, tutoring and supplemental instruction referrals, and the need for course load reductions during the semester. These course management and advising strategies can help students avoid adverse consequences that could negatively affect their GPA and professional school acceptance. Academic advisors must be well versed in the curriculum and course requirements of their programs and professional school prerequisites to offer sound course management advice to students.

In addition to course-management strategies, academic advising sessions should review professional school admission criteria beyond the classroom, (standardized exams, observation hours, letters of recommendation, and personal interviews) so students can accomplish these tasks throughout their academic tenure rather than just before application. These items vary significantly between discipline and programs; therefore, students and their academic advisors should review them early and often. There are also changing trends in the usage of many of these practices, including standardized exams for admission criteria, specifically the GRE. An emerging debate exists regarding the GRE's ability to predict success in graduate programs and some of the

**Table 4.** Results of Independent Sample t-test for Professional School Acceptance and NSSE HIP Responses

| | Accepted | | Not Accepted | | | |
|---|---|---|---|---|---|---|
| **Professional School** | ***M*** | ***SD*** | ***M*** | ***SD*** | **t(49)** | ***p*** |
| Internship | 2.95 | 1.253 | 2.54 | 1.261 | 1.169 | .248 |
| Learning Communities | 2.5 | 1.102 | 2.25 | 1.175 | 7.67 | .447 |
| Study Abroad | 2.14 | .774 | 2.00 | .981 | .534 | .596 |
| Undergraduate Research | 2.55 | 1.057 | 2.36 | 1.096 | .613 | .543 |
| Capstone Course | 3.18 | 1.006 | 2.29 | 1.182 | 2.837 | .007 |
| Service-learning | 1.50 | 1.102 | 1.32 | 1.056 | .582 | .563 |

barriers and disparities it creates for underrepresented minorities in admissions (Miller & Stassun, 2014). Many professional programs are taking an in-depth review of their admissions processes to determine what works best for their program while promoting a holistic review of applicants to increase diversity and inclusion in their respective fields. As such, undergraduate academic advisors should be aware that requirements may change yearly; therefore, admissions criteria for each program should be reviewed at least annually.

Part of the academic advising process is developing meaningful relationships with students that guides them in academic processes and assists them in self-exploration and reflection as they navigate their academic career. Academic advisors of preprofessional health sciences majors must be ready to help students explore alternative career options if professional school admission is unattainable.

Academic advisors and advising administrators should encourage increased participation in HIPs to enhance a student's college experience. These activities can create and develop the skills—such as maturity and professionalism—that professional health care programs seek (McDaniel et al., 2013). Brenneman et al. (2018) argued that selecting these attributes in applicants, rather than teaching them in professional programs, positively affects diversity and should be considered in the admissions process. As such, undergraduate students applying to professional programs need to have measurable noncognitive attributes that can boost their application.

Student participation in HIPs will remain low unless undergraduate academic advisors make a concerted effort to explain the value of HIPs. Academic advisors should target first-generation students who may be less knowledgeable about these opportunities and the benefits to their academic experience and future career. This opportunity is especially meaningful to the researchers considering many students at their institution are first-generation college students (n = 3903, 60%) who require increased guidance through the college experience. Participation in a capstone course may be especially beneficial to first-generation students because it will help them synthesize and communicate their undergraduate degree program and academic experiences (Felten et al., 2016).

Another impact on advising discovered in this study is that capstone courses positively influence a preprofessional student's application for admissions. Academic advisors and advising administrators should use this knowledge to encourage faculty members and academic programs to develop capstone courses if one is lacking. Academic advisors can also assist faculty members in developing course learning outcomes to maximize the student experience and meet the needs of individualized career paths. The experience gained through a capstone course often culminates the content and experiences within a major. Successful completion can indicate that the student is prepared to transition to the next phase of academic development.

## Future Directions

When trying to replicate this study, researchers recommend finding another way for academic departments within an institution to denote HIP activities within their database system and record student participation in such activities. NSSE recommends that students participate in at least two HIPs during their undergraduate program: one should occur during the freshman year and the second should correspond to the student's field of study (National Survey of Student Engagement, 2018). This study did not consider student classification at the time of their participation in a HIP. However, university policy dictated that all students participate in an FYS during their first year and a writing-intensive course after their first year; those who had a capstone course likely took it in their final semester. Researchers suggest that further data collection track the timing of HIP participation to determine if student classification at the time of the HIP increases success in professional school attainment.

Additionally, a small number of students participated in study-abroad experiences. Further study needs to determine barriers that deter students from participating in this experience and strategies to increase participation in study abroad. If increased study-abroad participation can be achieved, this HIP should be reexamined to determine if student participation influences successful professional program acceptance.

Data should also be collected regarding campus extracurricular activities such as intercollegiate athletics, music, drama, and arts. These activities also provide knowledge, skill attainment, and meaningful relationships. This study did not consider participation in these extracurricular activities as factors that could positively influence professional school admissions.

Based on the results of this study, the health science programs plan to develop and implement a more comprehensive alumni tracking system to maintain a complete database for outcome measurement. Tracking in the workforce or graduate school could include a state-level system that tracks all graduates within a state (Groves & Palmer, 2015). Utilizing a state's licensure database would help the health sciences accomplish this (Lessne, 2004). Fiorentino and Haley (2017) recommended utilizing social media to obtain higher response rates on postgraduate questionnaires. Creating online groups for alumni connections may enhance tracking and recruiting professionals to provide internships for current students. Ultimately, better tracking of alumni is imperative to help future and current students make more informed decisions regarding major and career paths (Polka et al., 2015).

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**Authors' Notes**

*Dr. Lori H. Richard serves as an assistant professor of teacher education and coordinator of the master of arts in teaching program at Nicholls State University. Her research interests are grounded in student success and retention utilizing the catalyst of academic advising, coaching, and mentoring. She has worked as an academic advisor in various settings, including as an advisor for first-year students, an athletic academic advisor, and a faculty program advisor. She can be reached at lori.richard@nicholls.edu.*

*Jennifer M. Plaisance, PT, DPT, CSCS is as an assistant professor of health sciences at Nicholls State University and a licensed physical therapist. Her research interests include student success in the transition to clinical, professional programs and in orthopedic physical therapy treatment interventions.*

*Dr. Brigett Scott serves as professor of dietetics and director of the University Honors Program. She is also associate dean of the College of Sciences and Technology at Nicholls State University. Her research interests include lactation and breastfeeding, survival nutrition, and student success.*

*Ruston J. Poché is a graduate of the health sciences program at Nicholls State University and is enrolled in the doctor of physical therapy program at Texas Woman's University.*