# First-Year and First-Gen: Assessing the Information Literacy Skills of First-Year, First-Generation College Students

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As higher education continues to focus its attention on first-generation college students, academic libraries are increasingly interested in designing outreach and instruction programs to support these students, especially during their first year of college. This study informs these efforts by implementing a standardized test to assess the information literacy skills of first-year, first-generation college students. Study results reveal that first-year, first-generation college students demonstrate substantial information literacy skills. However, gaps remain in comparison with first-year, continuing-generation students, particularly in understanding the research process and scholarly communication.

## Introduction

Professors and employers agree that students need information literacy skills in order to be successful.[1] However, at some academic libraries, it can be challenging for librarians to target information literacy instruction to the students who most need it. At Texas A&M University, librarians commonly note that some upper division students will have received half a dozen library sessions, while others will ask why they're just now learning this for the first time. One way that librarians try to improve allocation of information literacy instructional resources is by focusing on underserved students.

At many colleges and universities, first-generation college students are an underserved population. Many of these colleges have developed programs to better support first-generation students and improve their likelihood of retention and completion.[†] Librarians can be an active partner in these efforts, creating outreach programs aimed at increasing first-generation student awareness of library resources. However, it is unclear if there are specific ways library

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[†] *At Texas A&M, the 2022 Quality Enhancement Plan (QEP) focuses specifically on first-generation students' sense of belonging, academic and professional development, and social engagement from their freshmen to their senior years.*

information literacy programs could better support first-generation students. At Texas A&M, librarians partnered with other campus stakeholders to apply for a grant to explore this question, and ultimately found that first-generation students demonstrated gaps in a number of information literacy skill areas.[2]

Although this information was helpful as a first start toward revamping Texas A&M's libraries' information literacy collaboration with first-generation programs, additional questions remained. Specifically, this initial research did not uncover whether first-generation students exhibited different information literacy knowledge and skills at the first-year level. This question is significant at the Texas A&M University campus, as the majority of the campus' first-generation programming occurs at the first-year level. This study explores the specific information literacy skills of first-year, first-generation college students.

The research questions for this study focus on the performance of first-year, first-generation students on three measures of a standardized information literacy test, which will be detailed more thoroughly in the methodology. The research questions are as follows:

1. Are there differences in information literacy outcomes between first-year, first-generation students and first-year, continuing-generation students?
2. Are there differences in information literacy dispositions between first-year, first-generation students and first-year, continuing-generation students?
3. Are there differences in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students?

This study contributes to filling a gap in the literature about the information literacy skills of first-generation students by providing a quantitative comparison between first-generation and continuing-generation students during their first year of college.

## Literature Review

Research on the information literacy skills of first-year students is common in the library literature. This makes sense, because librarians devote considerable effort to first-year library instruction. Research by *Library Journal* and *Credo Reference* suggests that as many as 97 percent of academic libraries provide some sort of information literacy support for first-year students.[3] Research suggests that this support is needed; scholars report that librarians and faculty commonly perceive that first-year students are not adequately prepared for college-level research.[4]

Although first-year students in general are likely to benefit from information literacy support, libraries are also striving to provide targeted support for underserved students. For example, librarians at Purdue University embedded information literacy instruction into a summer bridge program aimed at underserved students.[5] Research by librarians at the University of West Georgia indicated that library instruction for summer bridge programs is common.[6] Other librarians have provided targeted support for adult learners,[7] international students,[8] and transfer students.[9] One specific underserved population that is increasingly of interest in higher education, and in libraries, is first-generation students.

Research suggests that first-generation students may not be fully aware of the breadth of resources available at the library.[10] Other scholars have found that first-generation students may be reluctant to seek help accessing library resources.[11] For this reason, researchers advocate for libraries to implement strategies to reduce access barriers for first-generation students and increase resource awareness. Arch and Gilman advise using teaching strategies like peer learning and metacognitive activities such as "asking students to engage in self-reflection about

the ways they use information and the ways in which conducting research can be useful and relevant in their own lives."[12] Folk advocates for individual consultations for first-generation students focused on facilitating information transfer and understanding course expectations.[13] Hands recommends transparency in assignment design, communicating clear expectations and requirements.[14] Though the specific strategies recommended by researchers vary, each advocates for increased support to improve outcomes for first-generation students.

In addition to resource awareness, librarians have explored the information literacy skills of first-generation students. Studies suggest that, while first-generation students bring with them both real-world and academic experience, they may be disadvantaged compared to their continuing-generation peers. Ilett explored the real-world information literacy skills of first-generation students and found that students had considerable experience finding and using information that could transfer to a higher education context.[15] Logan and Pickard found that, while first-generation students varied in their understanding of the research process, they "clearly knew how to look for quality information."[16] However, some researchers have found that first-generation students exhibit gaps in their information literacy skills. LeMire et al. found that first-generation students received lower scores on information literacy tests.[17] Similarly, Graves et al. found that first-generation students received lower scores when tested on their ability to select appropriate sources.[18] It is important to note that many scholars have critiqued the framing of differences as gaps, arguing against a deficit-based approach that shifts responsibility from society and systems to the individual.[19] Within the library literature, many researchers have used a deficit-based approach to describe first-generation students, which critics have argued positions those students "as a problem that needs to be solved."[20] Instead, researchers have advocated for replacing deficit-based models with strengths-based approaches.[21]

The body of library literature on first-generation students is growing rapidly, with an increased focus on those strengths-based approaches. However, there is little research focused on first-year, first-generation students. Hodge highlights the significance of this gap in her examination of literature on first-year, first-generation students, arguing that "first-generation students' first year of college is critical to their persistence and long-term academic success, yet little is known about these students' research behaviors and library use."[22] In their study comparing first-generation students in their first and senior years, Pickard and Logan found that first-year students exhibited less sophisticated information literacy skills, including a less advanced understanding of the research process.[23] This finding suggests that the information literacy skills of first-generation students improve over the course of their undergraduate program.[24] However, the extent to which first-year, first-generation students may experience challenges in library research compared to their continuing-generation peers remains unclear.

Hodge noted that "Additional research is needed on the first-year and first-generation student populations, especially where these populations overlap."[25] This study contributes toward filling that gap in the literature.

## Methodology

This analysis is part of a larger study intended to establish a baseline of undergraduate student information literacy knowledge and skills. The study employed the Threshold Achievement Test for Information Literacy (TATIL). TATIL is a standardized information literacy test developed by Carrick Enterprises following the creation of the ACRL *Framework for Information Literacy for Higher Education*. The test was developed and tested over a period of four years

before its official launch in 2018.[26] In 2023, the TATIL assessment was acquired by ACRL.[27]

The researchers chose to implement a standardized test in order to collect a large set of quantitative data that could be analyzed in multiple ways. The TATIL assessment was selected due to its alignment with the ACRL *Framework*, its robust scope, and its ease of implementation.

The TATIL assessment evaluates students' information literacy skills in four separate modules. Table 1 lists the four TATIL modules along with Carrick Enterprises' description of each module.[28]

**TABLE 1**
**TATIL Modules and Descriptions**

| Module Number | Module Name | TATIL Module Description |
|---|---|---|
| Module 1 | Evaluating Process & Authority (EP&A) | This module combines concepts from two of the ACRL information literacy frames, Authority is Constructed, and Contextual and Information Creation as a Process. It focuses on the process of information creation, and on the constructed and contextual nature of source authority. |
| Module 2 | Strategic Searching (SS) | This module relates to the Searching as Strategic Exploration frame. It focuses on the process of planning, evaluating, and revising searches during strategic exploration. |
| Module 3 | Research & Scholarship (R&S) | This module combines elements from the Research as Inquiry, and Scholarship as a Conversation frames. It focuses on the knowledge-building process and how scholars build knowledge. |
| Module 4 | Value of Information (VoI) | This module is inspired by the Information Has Value frame. It focuses on the norms of academic information creation and the factors that affect access to information. |

In order to assess the full breadth of skills assessed by TATIL, the researchers chose to administer all four modules of the test. However, each module of the test can take between thirty to fifty minutes to complete. For this reason, the researchers opted to have students complete only one module of the test. When students logged in to complete the assessment, they were randomly assigned one of the four test modules to complete.

The assessment was administered to students enrolled in core curriculum courses at Texas A&M University from fall 2018 and fall 2019. After receiving institutional review board approval for the study, the researchers asked instructors of core curriculum courses to share the study with their students. Instructors could, but were not required to, offer extra credit for completing the assessment, which would be done out of class. As an additional incentive, students who participated were entered into a drawing for gift cards at the end of the semester. Students who opted to participate logged into the assessment's demographic questionnaire with their Single Sign On (SSO) credentials and then assigned a module of the test to complete.

## *TATIL Assessment*

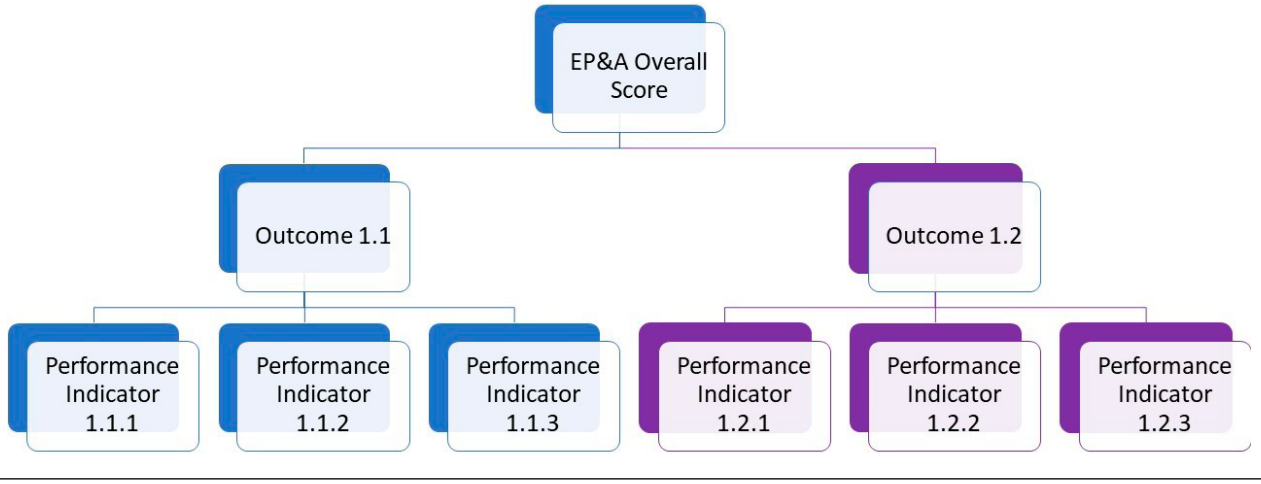
Each module of TATIL assesses information literacy skills in four ways:

1. Outcomes
2. Performance Indicators

3. Overall scores
4. Dispositions

The first metric, outcomes, measures students' information literacy skills in a particular category. For example, Outcome 1.2 is: "Apply knowledge of authority to analyze others' claims and to support one's own claims."[29] The second metric, performance indicators, consists of the individual questions that determine each outcome. Scores on each performance indicator are tallied to make up the score for that particular outcome. The overall scores reflect the outcome scores for that module. A sketch of the hierarchy of these first three metrics is available in Figure 1.

**FIGURE 1**
**Representation of the TATIL Overall/Outcome/Performance Indicator hierarchy**




TATIL's fourth metric is the disposition score. This score is separate from the other three metrics, and it measures attitudes or behaviors rather than skills or knowledge. This means that a student can score highly on their demonstrated knowledge of a concept (e.g., recognizing types of authority) but receive a lower score based on how they apply this knowledge in the disposition section.

## *Demographics*

A total of 680 first-year students at Texas A&M completed the TATIL assessment. To ensure that students spent enough time to finish the survey questions, we dropped all the observations whose total time of finishing the survey was less than ten minutes. One hundred and sixty-three first-year students completed the first module of the information literacy test—Evaluating Process and Authority. We dropped four students' information because their total participation time was less than ten minutes, with 126 continuing-generation students and thirty-three first-generation students completing the module. One hundred and seventy-two students completed the second module of the information literacy test—Strategic Searching. Among them, nine students' participation time was less than ten minutes. Therefore, 129 first-year, continuing-generation students and thirty-four first-year, first-generation students' information were included in the data analysis, with 163 in total.

In the third module of the information literacy test—Research and Scholarship, ten students' information was dropped because of the participation time (<ten minutes). One hun-

dred and twenty-one first-year, continuing-generation students and thirty-three first-year, first-generation students' information was included in the data analysis. In the fourth module of the information literacy test—Value of Information, we dropped six students' information since they completed the survey in less than ten minutes. Therefore, 131 first-year, continuing-generation students and forty-four first-year, first-generation students were included in the fourth module, with 175 in total. Initially, we included library experience as the control variable in the data analysis. Since we did not detect any statistical significance in the covariate, we excluded the control variable in the final model.

**TABLE 2**
**Number of Participants**

| Module | First-Generation | Continuing- Generation | Total |
|---|---|---|---|
| EP&A | 33 | 126 | 159 |
| SS | 34 | 129 | 163 |
| R&S | 33 | 121 | 154 |
| Vol | 44 | 131 | 175 |
| Total | 144 | 507 | 651 |

### *Data Analysis*

We employed four multivariate multiple regressions to investigate the difference in information literacy outcomes across four modules—Evaluating Process & Authority; Strategic Searching; Research & Scholarship; Value of Information—between first-year, first-generation students and first-year, continuing-generation students (the first research question). In the analysis, outcome scores were treated as the dependent variables and the group condition (first-year, first generation or first-year continuing-generation students) as the independent variable, with library experience as covariates. We chose multivariate multiple regression because the outcome scores are correlated. The least-squares estimation was utilized as the parameter estimation method.

To answer the second research question, four multivariate multiple regressions were analyzed to examine the difference in information literacy dispositions between first-year, first-generation students and first-year, continuing-generation students. The group condition and the library experience were used as independent variables while the disposition scores were used as the dependent variables. The least-squares estimation was utilized as the parameter estimation method.

Four multivariate multiple regressions were conducted to investigate the differences in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students (third research question). The group condition and the library experience were used as independent variables while the performance indicator scores were used as the dependent variables. The least-squares estimation was utilized as the parameter estimation method.

## Results

### *Overall Scores*

First, we analyzed first-year, first-generation students' overall scores in comparison to those of first-year, continuing-generation students. We did this by calculating students' percent-

age rate of knowledge performance levels for first-year students. According to TATIL, three performance levels—Conditionally Ready, College Ready, and Research Ready—are used to describe student achievement on the knowledge section of the test, with a cutoff score for each. Conditionally Ready is the lowest of the three scores, College Ready is the intermediate score, and Research Ready is the highest score. Table 3 and Table 4 provided detailed information about first-year students' percentage rate of knowledge performance levels for each outcome score across modules and overall score for each module.

The majority of first-generation and continuing-generation students scored at the College Ready level or higher for each of the four modules. Both groups scored fairly high on the Strategic Searching (SS) module, with two (5.88 percent) first-generation students and eleven (8.53 percent) continuing-generation students performing at the Conditionally Ready level. Similarly, few students (four, or 12.12 percent of first generation students and ten, or 7.84 percent of continuing-generation students) scored at the Conditionally Ready level for the Evaluating Process & Authority (EP&A) module. For both EP&A and SS, few students scored at the highest level; only one (2.94 percent) first-generation student and six (4.65 percent) continuing-generation students scored at the Research Ready level for SS. Notably, no student, regardless of first-generation status, scored at the Research Ready level for EP&A.

Students performed more highly for the Research & Scholarship (R&S) and Value of Information (VoI) module. Both first-generation and continuing-generation students scored highly in the Value of Information (VoI) category, with only two (4.55 percent) first-generation students and one (0.76 percent) continuing-generation students performing at the Conditionally Ready level. For R&S, very few students (three, or 9.09 percent of first-generation students and zero continuing-generation students) tested at the Conditionally Ready level. Additionally, quite a few students tested at the Research Ready level for the R&S module, which is the highest of the three performance levels. For R&S, three (9.09 percent) first-generation students and thirty-five (28.93 percent) continuing-generation students tested at the Research Ready level.

**TABLE 3**
**First-Year Students' Percentage Rate of Knowledge Performance Levels for Overall Scores (CdR= Conditionally Ready; CR = College Ready; RR= Research Ready)**

| | Module 1 (EP&A) | | Module 2 (SS) | | Module 3 (R&S) | | Module 4 (VoI) | |
|---|---|---|---|---|---|---|---|---|
| **Group** | **n** | **Overall Score (%)** | **n** | **Overall Score (%)** | **n** | **Overall Score (%)** | **n** | **Overall Score (%)** |
| **Firstgen CdR** | 4 | 12.12 | 2 | 5.88 | 3 | 9.09 | 2 | 4.55 |
| **Firstgen CR** | 29 | 87.88 | 31 | 91.18 | 27 | 81.82 | 40 | 90.90 |
| **Firstgen RR** | 0 | 0 | 1 | 2.94 | 3 | 9.09 | 2 | 4.55 |
| **Continuing CdR** | 10 | 7.94 | 11 | 8.53 | 0 | 0 | 1 | 0.76 |
| **Continuing CR** | 116 | 92.06 | 112 | 86.82 | 86 | 71.07 | 115 | 87.79 |
| **Continuing RR** | 0 | 0 | 6 | 4.65 | 35 | 28.93 | 15 | 11.45 |

To understand if there were significant differences between the outcome scores of first-generation and continuing-generation students, we employed four *t*-tests. We found that there were no significant differences between the two groups in module 1 ($p$=0.21), and module 2 ($p$=0.06). In module 3 (R&S), first-year, first-generation students' overall scores (*M=430.33*,

*SD=139.17*) were statistically lower than first-year, continuing-generation students' (*M=529.34*, *SD=135.87*) ($p<0.001$). In module 4 (VoI), first-year, first-generation students' overall score (*M=442.16*, *SD=123.91*) was statistically lower than first-year, continuing-generation students' (*M=490.66*, *SD=129.24*) ($p<0.05$).

## *Outcomes*

In addition to examining overall knowledge performance levels, we examined the knowledge performance levels on each of the eight outcomes across the four different test modules. The outcome scores are incorporated into the overall scores but provide greater granularity to expose whether student performance is consistent or varies within a module. Results revealed that there was some variation, particularly within EP&A, R&S, and VoI. In EP&A, first-generation and continuing-generation students alike were more likely to struggle with O12, "Apply knowledge of authority to analyze others' claims and to support one's own claims."[30] Within R&S, both groups of students were more likely to struggle with O31, "Understand the processes of scholarly communication and knowledge building."[31] And within VoI, both groups of students were more likely to struggle with O42: "Recognize social, legal, and economic factors affecting access to information."[32]

**TABLE 4**
**First-Year Students' Percentage Rate of Knowledge Performance Levels (CdR= Conditionally Ready; CR = College Ready; RR= Research Ready)**

| | Module 1 (EP&A) | | | | Module 2 (SS) | | | | Module 3 (R&S) | | | | Module 4 (VoI) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **n** | **O11 (%)** | **n** | **O12 (%)** | **n** | **O21 (%)** | **n** | **O22 (%)** | **n** | **O31 (%)** | **n** | **O32 (%)** | **n** | **O41 (%)** | **n** | **O42 (%)** |
| Firstgen CdR | 3 | 9.09 | 9 | 27.27 | 5 | 14.71 | 6 | 17.65 | 8 | 24.24 | 2 | 6.06 | 3 | 6.82 | 5 | 11.36 |
| Firstgen CR | 29 | 87.88 | 24 | 72.73 | 28 | 82.35 | 26 | 76.47 | 25 | 75.76 | 18 | 54.55 | 27 | 61.36 | 37 | 84.09 |
| Firstgen RR | 1 | 3.03 | 0 | 0 | 1 | 2.94 | 2 | 5.88 | 0 | 0 | 13 | 39.39 | 14 | 31.82 | 2 | 4.55 |
| Continuing CdR | 11 | 8.73 | 22 | 17.46 | 23 | 17.83 | 15 | 11.63 | 7 | 5.79 | 0 | 0 | 2 | 1.53 | 6 | 4.58 |
| Continuing CR | 114 | 90.48 | 104 | 82.54 | 97 | 75.19 | 104 | 80.62 | 100 | 82.64 | 54 | 44.63 | 92 | 70.23 | 113 | 86.26 |
| Continuing RR | 1 | 0.79 | 0 | 0 | 9 | 6.98 | 10 | 7.75 | 14 | 11.57 | 67 | 55.37 | 37 | 28.24 | 12 | 9.16 |

Multivariate multiple regression results showed statistical significance in information literacy outcome scores O31 [$t$ (153) = -3.77, $p < 0.001$], O32 [$t$ (153) = -2.76, $p < 0.01$], and O42 [$t$ (174) = -2.83, $p < 0.01$] between first-year, first-generation students and first-year, continuing-generation students across the four modules. Outcome score O12 [$t$ (158) = -1.98, $p$ =0.05] was also found to be marginally statistically different between the groups. First-year, first-generation students scored statistically lower than first-year, continuing-generation students across all scores. Descriptive statistics and the detailed information from the multivariate multiple regression results about the information literacy outcomes are included in Table 5 and Table 6.

**TABLE 5**
**First-Year Students' Outcome Scores**

| | Module 1 (EP&A) | | | Module 2 (SS) | | | Module 3 (R&S) | | | Module 4 (Vol) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **n** | **O11 (M/SD)** | **O12 (M/SD)** | **n** | **O21 (M/SD)** | **O22 (M/SD)** | **n** | **O31 (M/SD)** | **O32 (M/SD)** | **n** | **O41 (M/SD)** | **O42 (M/SD)** |
| Firstgen | 33 | 453.85/ 159.59 | 461.73/ 141.50 | 34 | 473.62/ 114.25 | 462.50/ 167.74 | 33 | 409.19/ 157.08 | 447.94/ 155.39 | 44 | 400.41/ 171.64 | 469.36/ 159.01 |
| Continuing | 126 | 466.00/ 143.62 | 517.13/ 143.81 | 129 | 512.00/ 152.10 | 523.88/ 188.16 | 121 | 532.11/ 168.22 | 527.15/ 143.62 | 131 | 408.39/ 182.37 | 543.83/ 148.03 |

**TABLE 6**
**Multivariate Regression Analysis Results for First-Year Students' Information Literacy Outcome Scores (Note: * *p*<0.05; ** *p*<0.01; ***p<0.001).**

| | Estimate | Standard Error | *t*-value | *p*-value |
|---|---|---|---|---|
| **O11** | | | | |
| Intercept | 466.00 | 13.10 | 35.58 | 0.000 |
| First-year Firstgen/Continuing | -12.15 | 28.75 | -0.42 | 0.673 |
| **O12** | | | | |
| Intercept | 517.13 | 12.77 | 40.50 | 0.000 |
| Firstgen/Continuing | -55.41 | 28.03 | -1.98 | 0.050* |
| **O21** | | | | |
| Intercept | 512.00 | 12.78 | 40.06 | 0.000 |
| Firstgen/Continuing | -38.38 | 27.98 | -1.37 | 0.172 |
| **O22** | | | | |
| Intercept | 523.88 | 16.21 | 32.31 | 0.000 |
| Firstgen/Continuing | -61.38 | 35.50 | -1.73 | 0.086 |
| **O31** | | | | |
| Intercept | 532.11 | 15.09 | 35.27 | 0.000 |
| Firstgen/Continuing | -122.93 | 32.59 | -3.77 | 0.000*** |
| **O32** | | | | |
| Intercept | 527.15 | 13.29 | 39.67 | 0.000 |
| Firstgen/Continuing | -79.21 | 28.71 | -2.76 | 0.007** |
| **O41** | | | | |
| Intercept | 408.39 | 15.71 | 26.00 | 0.000 |
| Firstgen/Continuing | -7.98 | 31.32 | -0.25 | 0.799 |
| **O42** | | | | |
| Intercept | 543.83 | 13.18 | 41.27 | 0.000 |
| Firstgen/Continuing | -74.47 | 26.28 | -2.83 | 0.005** |

## *Dispositions*

Next, we examined the disposition scores. Disposition scores in TATIL are separate from the Overall and Outcome scores, as they are intended to measure student "judgments regarding strategies. Students earn high scores on these items if they judge behaviors associated

with the disposition to be useful and behaviors not associated with the disposition to be not useful."[33] Because disposition scores measure attitudes rather than knowledge, students can perform highly on an outcome and lower on a related disposition, or vice versa. From the multivariate multiple regression analysis, we detected that there was statistical significance between first-year, first-generation students and first-year, continuing-generation students in D32 [$t$ (153) = -2.28, $p < 0.05$]. TATIL describes Disposition 3.2 as, "Learners who are disposed to demonstrate self-reflection in the context of research and scholarship consistently question their own assumptions as they are challenged by new knowledge."[34] Specifically, first-year first-generation students scored 5.72 units lower on the D32 score (*M = 70.36*, *SD = 14.51*) than the first-year continuing-generation students (*M = 76.08*, *SD = 12.29*). Detailed descriptive statistics for information literacy dispositions were reported in Table 7. The detailed information from the multivariate multiple regression analysis for information literacy dispositions were reported in Table 8.

**TABLE 7**
**First-Year Students' Disposition Scores**

| | Module 1 (EP&A) | | | | Module 2 (SS) | | Module 3 (R&S) | | | | Module 4 (Vol) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **n** | **D11 (M/SD)** | **D12 (M/SD)** | **D13 (M/SD)** | **n** | **D21 (M/SD)** | **n** | **D31 (M/SD)** | **D32 (M/SD)** | **D33 (M/SD)** | **n** | **D41 (M/SD)** | **D42 (M/SD)** |
| First gen | 33 | 52.45/ 10.01 | 58.85/ 11.82 | 63.61/ 11.48 | 34 | 62.98/ 10.54 | 33 | 53.73/ 11.36 | 70.36/ 14.51 | 49.97/ 8.84 | 44 | 64.48/ 11.72 | 70.93/ 6.92 |
| Continuing | 126 | 54.61/ 10.66 | 56.79/ 12.65 | 67.63/ 13.61 | 129 | 65.93/ 8.63 | 121 | 57.02/ 11.26 | 76.08/ 12.29 | 51.93/ 9.40 | 131 | 66.24/ 11.97 | 71.52/ 8.60 |

**TABLE 8**
**Multivariate Regression Analysis Results for First-Year Students' Information Literacy Dispositions (Note: * p<0.05; ** p<0.01; ***p<0.001)**

| | Estimate | Standard Error | *t*-value | *p*-value |
|---|---|---|---|---|
| **D11** | | | | |
| Intercept | 54.61 | 0.94 | 58.22 | 0.000 |
| First-year Firstgen/Continuing | -2.16 | 2.06 | -1.05 | 0.297 |
| **D12** | | | | |
| Intercept | 56.79 | 1.11 | 51.05 | 0.000 |
| Firstgen/Continuing | 2.06 | 2.44 | 0.84 | 0.400 |
| **D13** | | | | |
| Intercept | 67.63 | 1.18 | 57.49 | 0.000 |
| Firstgen/Continuing | -4.02 | 2.58 | -1.56 | 0.121 |
| **D21** | | | | |
| Intercept | 65.93 | 0.80 | 82.68 | 0.000 |
| Firstgen/Continuing | -2.96 | 1.75 | -1.70 | 0.092 |
| **D31** | | | | |
| Intercept | 57.02 | 1.03 | 55.59 | 0.000 |
| Firstgen/Continuing | -3.29 | 2.22 | -1.48 | 0.140 |

**TABLE 8**
**Multivariate Regression Analysis Results for First-Year Students' Information Literacy Dispositions (Note: * p<0.05; ** p<0.01; ***p<0.001)**

| | Estimate | Standard Error | *t*-value | *p*-value |
|---|---|---|---|---|
| **D32** | | | | |
| Intercept | 76.08 | 1.16 | 65.45 | 0.000 |
| Firstgen/Continuing | -5.72 | 2.51 | -2.28 | 0.024* |
| **D33** | | | | |
| Intercept | 51.93 | 0.84 | 61.50 | 0.000 |
| Firstgen/Continuing | -1.96 | 1.82 | -1.07 | 0.285 |
| **D41** | | | | |
| Intercept | 66.24 | 1.04 | 63.68 | 0.000 |
| Firstgen/Continuing | -1.76 | 2.07 | -0.85 | 0.398 |
| **D42** | | | | |
| Intercept | 71.52 | 0.72 | 99.67 | 0.000 |
| Firstgen/Continuing | -0.59 | 1.43 | -0.41 | 0.682 |

## *Performance Indicators*

Finally, we analyzed the most granular aspect of the four TATIL modules, the performance indicators and individual disposition questions. We employed four multivariate multiple regressions to examine the difference in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students across four modules.

In module 1, we found that first-year, first-generation students' outcome score D12a (*M = 14.09*, *SD = 4.59*) was statistically higher than first-year, continuing-generation students' D12a (*M = 12.02*, *SD = 4.81*) (D12a [$t$ (158) = 2.23, $p < 0.05$]). This disposition, titled Toleration of Ambiguity, is described by TATIL as follows: "Learners who are disposed to demonstrate toleration for ambiguity when they are evaluating sources of information treat authority as subjective because it is based on the context of the information need."[35]

Performance indicators p2111 [$t$ (154) = -1.98, $p < 0.05$] and D21c [$t$ (154) = -2.88, $p < 0.01$] in module 2 were also found to be statistically significant different between first-year, first-generation students and first-year, continuing-generation students. Many performance indicators in module 3 showed statistical difference between the first-year, first-generation students and first-year, continuing-generation students. They were performance indicators p312 [$t$ (153) = -2.15, $p < 0.05$], p314 [$t$ (153) = -2.22, $p < 0.05$], p325 [$t$ (153) = -2.52, $p < 0.05$], p3112 [$t$ (153) = -2.38, $p < 0.05$], p326 [$t$ (153) = -3.25, $p < 0.001$], p3212 [$t$ (153) = -4.04, $p < 0.001$], p319 [$t$ (153) = -2.37, $p < 0.05$], p3114 [$t$ (153) = -3.31, $p < 0.001$], and D32b[$t$ (153) = -2.72, $p < 0.01$]. Results also showed that there was statistical difference in performance indicators p416 [$t$ (174) = -2.99, $p < 0.01$] in module 4. In all these performance indicators, first-year, first-generation students scored statistically lower than the first-year, continuing-generation students except in D12a. Detailed information about information literacy performance indicator scores and multivariate multiple regression analysis for performance indicators were provided in Table 9 and Table 10.

**TABLE 9**
**First-Year Students' Performance Indicator Scores**

| | Module 1 (EP&A) | Module 2 (SS) | | Module 3 (R&S) | | | | | | | | | Module 4 (Vol) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group** | **D12a (M/SD)** | **p2111 (M/SD)** | **D21c (M/SD)** | **p312 (M/SD)** | **p314 (M/SD)** | **p325 (M/SD)** | **p3112 (M/SD)** | **p326 (M/SD)** | **p3212 (M/SD)** | **p319 (M/SD)** | **p3114 (M/SD)** | **D32b (M/SD)** | **p416 (M/SD)** |
| **Firstgen** | 14.09/ 4.59 | 166.59/ 228.95 | 14.12/ 2.73 | 164.55/ 253.41 | 138.42/ 248.50 | 307.67/ 213.44 | 310.18/ 242.64 | 122.27/ 136.02 | 332.55/ 253.88 | 257.15/ 206.55 | 235.45/ 176.58 | 11.70/ 3.07 | 358.09/ 304.78 |
| **Continuing** | 12.02/ 4.81 | 256.12/ 236.06 | 15.60/ 2.67 | 278.23/ 272.55 | 259.55/ 285.50 | 397.72/ 172.37 | 445.88/ 301.86 | 200.08/ 117.92 | 525.14/ 240.98 | 345.59/ 185.44 | 345.40/ 167.17 | 13.13/ 2.57 | 510.77/ 289.21 |

**TABLE 10**
**Multivariate Regression Analysis Results for First-Year Students' Performance Indicators in Information Literacy Skills (Note: * p<0.05; ** p<0.01;***p<0.001)**

| | Estimate | Standard Error | *t*-value | *p*-value |
|---|---|---|---|---|
| **Module 1 (EP&A)** | | | | |
| **D12a** | | | | |
| **Intercept** | 12.02 | 0.42 | 28.31 | 0.000 |
| Firstgen/Continuing | 2.08 | 0.93 | 2.23 | 0.027* |
| **Module 2 (SS)** | | | | |
| **p2111** | | | | |
| Intercept | 256.12 | 20.66 | 12.40 | 0.000 |
| Firstgen/Continuing | -89.54 | 45.23 | -1.98 | 0.049* |
| **D21c** | | | | |
| Intercept | 15.60 | 0.24 | 66.13 | 0.000 |
| Firstgen/Continuing | -1.49 | 0.52 | -2.88 | 0.005** |
| **Module 3 (R&S)** | | | | |
| **p312** | | | | |
| Intercept | 278.23 | 24.42 | 11.39 | 0.000 |
| Firstgen/Continuing | -113.69 | 52.76 | -2.15 | 0.033* |
| **p314** | | | | |
| Intercept | 259.55 | 25.28 | 10.27 | 0.000 |
| Firstgen/Continuing | -121.12 | 54.62 | -2.22 | 0.028* |
| **p325** | | | | |
| Intercept | 397.72 | 16.53 | 24.07 | 0.000 |
| Firstgen/Continuing | -90.05 | 35.70 | -2.52 | 0.013* |
| **p3112** | | | | |
| Intercept | 445.88 | 26.40 | 16.89 | 0.000 |
| Firstgen/Continuing | -135.70 | 57.03 | -2.38 | 0.019* |
| **p326** | | | | |
| Intercept | 200.08 | 11.09 | 18.05 | 0.000 |
| Firstgen/Continuing | -77.81 | 23.95 | -3.25 | 0.001*** |

**TABLE 10**
**Multivariate Regression Analysis Results for First-Year Students' Performance Indicators in Information Literacy Skills (Note: * p<0.05; ** p<0.01;***p<0.001)**

| | Estimate | Standard Error | *t*-value | *p*-value |
|---|---|---|---|---|
| **p3212** | | | | |
| Intercept | 525.14 | 22.16 | 23.70 | 0.000 |
| Firstgen/Continuing | -193.60 | 47.87 | -4.04 | 0.000*** |
| **p319** | | | | |
| Intercept | 345.59 | 17.28 | 20.00 | 0.000 |
| Firstgen/Continuing | -88.44 | 37.33 | -2.37 | 0.019* |
| **p3114** | | | | |
| Intercept | 345.40 | 15.38 | 22.46 | 0.000 |
| Firstgen/Continuing | -109.94 | 33.23 | -3.31 | 0.001*** |
| **D32b** | | | | |
| Intercept | 13.13 | 0.24 | 53.82 | 0.000 |
| Firstgen/Continuing | -1.44 | 0.53 | -2.72 | 0.007** |
| **Module 4 (VoI)** | | | | |
| **p416** | | | | |
| Intercept | 510.77 | 25.61 | 19.94 | 0.000 |
| Firstgen/Continuing | -152.68 | 51.08 | -2.99 | 0.003** |

## Discussion

Study results reveal that, while some disparities exist between first-year, first-generation students and their continuing-generation counterparts, there are also several commonalities between the two groups. These commonalities will be discussed below, followed by the disparities.

### *Common Strengths and Weaknesses*

As a whole, first-year students demonstrated substantial information literacy knowledge and skills. The majority of students in both the first-generation and continuing-generation groups scored at the College Ready level or higher in the overall scores for each module of the TATIL assessment. Only thirty-three students (5 percent) received a score in the lowest level, Conditionally Ready, on the overall score for any module. This finding suggests that librarians should not assume that first-year students, regardless of their first-generation status, are entering college with low-level information literacy skills.

Students from both groups shared strengths in the R&S and VoI categories, areas which focus on scholarly communication, ethical use of information, and the research process. Only five students (3 percent) received Conditionally Ready scores in this category, indicating that few students struggle significantly in this area. Indeed, a considerable number of students excelled: thirty-eight (25 percent) students scored at the highest level, Research Ready, in R&S, while seventeen (10 percent) students attained Research Ready status in VoI.

In contrast, students were more likely to struggle in the EP&A module, which is focused on the ACRL Framework's *Authority is Constructed and Contextual* and *Information Creation as a Process* frames.[36] This module received the largest number of students who scored as Con-

ditionally Ready, with fourteen (9 percent) scoring in this lowest category. Additionally, no student from either group attained Research Ready status in EP&A. Students from both groups particularly struggled with O12, "Apply knowledge of authority to analyze others' claims and to support one's own claims."[37] This finding suggests that, while librarians should not assume that first-year students lack information literacy skills, they should consider implementing pre-assessments to determine whether their first-year students would benefit from additional instruction in understanding the context and complexity of authority when evaluating sources.

## *Disparities*

Although there are similarities between the overall scores of first-generation and continuing-generation students, there are also differences that may support calls for additional information literacy support for first-year, first-generation students.

The most significant differences between first-generation and continuing-generation students appeared in the R&S and VoI modules. As was noted previously, students in both groups scored most highly in these two categories, with a substantial number of students even attaining Research Ready status in this category. Despite these positive results, first-generation students received significantly lower scores in these two modules, which are focused on the ACRL Framework *Research as Inquiry, Scholarship as a Conversation, and Information has Value* frames.[38]

The largest cluster of significant differences appeared in module 3, R&S. Although most first-generation students received College Ready scores, their outcome and performance level scores revealed that first-year, first-generation students experience knowledge gaps in this area in comparison to their continuing-generation peers. Disposition scores also revealed that first-generation students scored lower in Disposition 3.3, Mindful self-reflection. Table 11 depicts the significant R&S outcomes and performance indicators. Based on this finding,

**TABLE 11**
**R&A Outcomes and Performance Indicators with First-Generation Gaps**

| | |
|---|---|
| **Outcome 3.1** | **Understand the processes of scholarly communication and knowledge building.** |
| Performance Indicator 3.1.2 | Given a literature review, identify the gap that the authors have identified in the existing research. |
| Performance Indicator 3.1.4 | Recognize that scholars bring their own perspectives to the study of a research topic. |
| Performance Indicator 3.1.9 | Identify venues for scholarly communication, such as books, journals, conventions, blogs. |
| Performance indicator 3.1.12 | Evaluate an emerging scholar's likelihood of being accepted into the scholarly conversation. |
| Performance Indicator 3.1.14 | Given a set of research needs, match them to appropriate research methods. |
| **Outcome 3.2** | **Understand stages of the research process.** |
| Performance Indicator 3.2.5 | Order the stages of the research process when writing a research paper. |
| Performance Indicator 3.2.6 | Explain why research inquiry can be appropriate for personal information needs in addition to academic needs. |
| Performance Indicator 3.2.12 | Classify descriptions of specific actions taken during the research process by the stage in the research process when they are most likely to happen. |

first-generation students appear to have a less sophisticated understanding of the scholarly conversation and research process.

A second set of disparities is apparent in module 4, VoI. This module, which is based on the *Information has Value* frame,[39] reveals a more specific knowledge gap, as depicted in Table 12 below. Based upon this finding, first-year, first-generation students may benefit from additional instruction on the conceptual reasons for citing sources.

**TABLE 12**
**VoI Outcomes and Performance Indicators with First-Generation Gaps**

| | |
|---|---|
| Outcome 4.2 | Recognize social, legal, and economic factors affecting access to information. |
| Performance Indicator 4.1.6 | Given a list, select the purposes of citation. |

In addition to the areas where the scores of first-generation students suggested knowledge gaps, there was also an area where first-generation students demonstrated more sophisticated information behavior compared to their continuing-generation peers. First-generation students received significantly higher scores on one disposition question, D12a, which is part of the "Toleration of Ambiguity" disposition. This disposition assesses students' research behavior and choice of authoritative sources. First-generation students' high scores in this area support Ilett's assertion that first-gen students "recognize various types of authority and seek help from appropriate sources accordingly.[40]

## Limitations

There are several limitations to this study. First, the study was implemented at a single institution. Results may not be generalizable to other institutions. Next, it is important to note that standardized tests have limited utility. Students' ability to select a correct answer from multiple choices may not correlate with their ability to implement that knowledge in actual practice. There are also limitations to the way this study was implemented. The assessment was administered over multiple semesters to students enrolled in several different courses, with results aggregated into a single data set. It is possible that there were factors that differentiated results from different semesters or courses that are not accounted for in the results. The assessment was completed by students on their own time outside of the classroom environment. Because students opted into completing the assessment, there is potential for selection bias in the sample. Further, the lack of a controlled testing environment could have impacted the results. Finally, the assessment was conducted prior to the COVID-19 pandemic, which substantially impacted the academic experience.

## Next Steps and Future Directions

The results of this study suggest several potential changes to librarian practice. First, librarians should consider the pre-existing knowledge and skills of both first-generation and continuing-generation students. Both groups of students demonstrated substantial information literacy knowledge at the first-year level, indicating that librarians should not assume that students are entering college without information literacy skills. Additionally, both groups experienced the most challenges with the EP&A module, which focused on evaluating sources and considering issues of authority. Librarians may wish to consider increasing information literacy support in this area for all first-year students.

Librarians may also adjust how they work with first-generation students. Librarians who have the opportunity to engage directly with first-generation students should consider focusing information literacy support in the areas where first-generation students exhibited gaps. Additional support in understanding scholarly communication and the research process could help first-generation students gain better understanding of the larger information literacy landscape.

This study also reveals several opportunities for additional research. One potential area is the application of first-generation research skills. Although standardized testing revealed gaps, it is unclear if those gaps appear in actual practice. Additional research is needed to better understand how first- and continuing-generation students apply information literacy knowledge and skills. Research is also needed into effective information literacy support. Identifying effective library interventions in supporting first-generation student information literacy skill development would provide practitioners with insights that could guide practice.

## Conclusion

As libraries strive to better support first-generation students, information literacy instruction will be an important part of that support. Understanding the specific information literacy strengths and needs of first-generation students is an important step toward advocating for, designing, and implementing appropriate information literacy support. At many libraries, information literacy instruction is heavily concentrated at the first-year level. This study reveals that first-year, first-generation college students demonstrate substantial information literacy skills, especially in the areas of *Research as Inquiry, Scholarship as a Conversation, and Information has Value.* Despite these strengths, first-generation students appear to lag behind their continuing-generation peers in these same knowledge areas.

Closing the gap between first-generation and continuing-generation college students is key to ensuring an equitable academic experience for first-generation students. Librarians should consider whether first-generation students experience information literacy gaps and access barriers on their campuses. Although removing barriers and highlighting strengths is a best practice for supporting first-generation students,[41] librarians should also consider whether they can implement additional information literacy support to help first-generation students excel.

## Acknowledgements

Many thanks to Dr. Valerie Balester and Dr. Leroy Dorsey for their contributions to this project.

# Appendices

## Appendix A: TATIL Outcomes

| Code | Module | TATIL Outcome | TATIL Outcome Description[42] |
|---|---|---|---|
| O11 | 1 (EP&A) | Outcome 1.1 | Apply knowledge of source creation processes and context to evaluate the authority of a source. |
| O12 | 1 (EP&A) | Outcome 1.2 | Apply knowledge of authority to analyze others' claims and to support one's own claims |
| O21 | 2 (SS) | Outcome 2.1 | Plan, conduct, evaluate, and revise searches to achieve relevant results. |
| O22 | 2 (SS) | Outcome 2.2 | Compare and contrast a range of search tools. |
| O31 | 3 (R&S) | Outcome 3.1 | Understand the processes of scholarly communication and knowledge building. |
| O32 | 3 (R&S) | Outcome 3.2 | Understand stages of the research process. |
| O41 | 4 (Vol) | Outcome 4.1 | Recognize the rights and responsibilities of information creation. |
| O42 | 4 (Vol) | Outcome 4.2 | Recognize social, legal, and economic factors affecting access to information. |

## Appendix B: TATIL Dispositions

| Code | Module | TATIL Disposition | TATIL Disposition Description[43] |
|---|---|---|---|
| D11 | 1 (EP&A) | Disposition 1.1 | Mindful self-reflection |
| D12 | 1 (EP&A) | Disposition 1.2 | Toleration of ambiguity |
| D13 | 1 (EP&A) | Disposition 1.3 | Responsibility to community |
| D21 | 2 (SS) | Disposition 2.1 | Productive persistence |
| D31 | 3 (R&S) | Disposition 3.1 | Productive persistence |
| D32 | 3 (R&S) | Disposition 3.2 | Mindful self-reflection |
| D33 | 3 (R&S) | Disposition 3.3 | Responsibility to community |
| D41 | 4 (Vol) | Disposition 4.1 | Mindful self-reflection |
| D42 | 4 (Vol) | Disposition 4.2 | Responsibility to community |

## Appendix C: TATIL Performance Indicators and Individual Disposition Descriptions

| Code | Module | TATIL Performance Indicator/Individual Disposition | TATIL Performance Indicator/Individual Disposition Description[44] |
|---|---|---|---|
| D12a | 1(EP&A) | Disposition 1.2 | Toleration of ambiguity |
| p2111 | 2 (SS) | Performance Indicator 2.1.11 | Apply nested logic structures, Boolean operators, and truncation to successfully construct an advanced search. |
| D21c | 2 (SS) | Disposition 2.1 | Productive persistence |
| p312 | 3 (R&S) | Performance Indicator 3.1.2 | Given a literature review, identify the gap that the authors have identified in the existing research. |

| | | | |
|---|---|---|---|
| p314 | 3 (R&S) | Performance Indicator 3.1.3 | Recognize that scholars bring their own perspectives to the study of a research topic. |
| p319 | 3 (R&S) | Performance Indicator 3.1.9 | Identify venues for scholarly communication, such as books, journals, conventions, blogs. |
| p3112 | 3 (R&S) | Performance Indicator 3.1.12 | Evaluate an emerging scholar's likelihood of being accepted into the scholarly conversation. |
| p3114 | 3 (R&S) | Performance Indicator 3.1.14 | Given a set of research needs, match them to appropriate research methods. |
| D32b | 3 (R&S) | Disposition 3.2 | Mindful self-reflection |
| p325 | 3 (R&S) | Performance Indicator 3.2.5 | Order the stages of the research process when writing a research paper. |
| p326 | 3 (R&S) | Performance Indicator 3.2.6 | Explain why research inquiry can be appropriate for personal information needs in addition to academic needs. |
| p3212 | 3 (R&S) | Performance Indicator 3.2.12 | Classify descriptions of specific actions taken during the research process by the stage in the research process when they are most likely to happen. |
| p416 | 4 (Vol) | Performance Indicator 4.1.6 | Given a list, select the purposes of citation. |

## Notes

1. Laura Saunders, "Faculty Perspectives on Information Literacy as a Student Learning Outcome," *Journal of Academic Librarianship* 38, no. 4 (2012): 226-236; Sharon Weiner, "Information Literacy and the Workforce: A Review," *Education Libraries* 24, no. 2 (2011): 7-14.

2. Sarah LeMire et al., "Assessing the Information Literacy Skills of First-Generation College Students," *College & Research Libraries* 82, no. 5 (2021): 730-754.

3. Library Journal, "First-Year Experience Survey: Information Literacy in Higher Education," (Credo Reference, 2017). https://s3.amazonaws.com/WebVault/research/LJ_FirstYearExperienceSurvey_Mar2017.pdf.

4. Library Journal, "First Year Experience Survey"; Melissa Gross and Don Latham, "What's Skill Got To Do With It?: Information Literacy Skills and Self-views of Ability among First-Year College Students," *Journal of the American Society for Information Science and Technology* 63, no. 3 (2012): 574-583; Catherine Baird and Tiffany Soares, "Faculty Perceptions of Students' IL Learning in First-Year Writing," *portal: Libraries and the Academy* 20, no. 3(2017): 509–532; Eleonora Dubicki, "Faculty Perceptions of Students' Information Literacy Skills Competencies," *Journal of Information Literacy* 7, no. 2 (2013): 97-125.

5. Hal Kirkwood and Roy Dejoie, "Business Information Literacy Integration into a Freshman Summer Bridge Course for Underrepresented Minorities," *Journal of Business & Finance Librarianship* 21, no. 3/4 (2016): 198–209.

6. Anne C. Barnhart and Andrea Stanfield, "Bridging the Information Literacy Gap: Library Participation in Summer Transition Programs," *Reference Services Review* 41, no. 2 (2013): 201–218.

7. Andy Foskey and Amanda Roper, "Constructing Authority: Using the ACRL Framework to Connect with Underserved Students," *College & Research Libraries News* 81, no. 10 (2020): 508–511.

8. Mandi Goodsett, "Going the Distance for International Students: Academic Integrity Support Online," *Journal of Library & Information Services in Distance Learning* 14, no. 3–4 (2020): 209–227.

9. Andrew Kearns et al., "Agoge: An Information Literacy Game for Transfer Students," *Reference Services Review* 45, no. 2 (2017): 314-334.

10. Steve Borrelli et al., "Investigating First-Generation Students' Perceptions of Library Personnel," *Performance Measurement and Metrics* 20, no. 1 (2019): 27-36.

11. Juliann Couture et al., "'We're Gonna Figure This Out': First-Generation Students and Academic Libraries," *portal: Libraries and the Academy* 21, no. 1 (2021): 127-147.

12. Xan Arch and Isaac Gilman, *Academic Library Services for First-Generation Students*. (Libraries Unlimited): 97.

13. Amanda L. Folk, "Exploring the Development of Undergraduate Students' Information Literacy through Their Experiences with Research Assignments," *College & Research Libraries* 82, no. 7 (2021): 1035.
14. Africa S. Hands, "Tapping into the Assets of First-Generation Students during Times of Transition," *Information and Learning Sciences* 121, no. 7/8 (2020): 611–618.
15. Darren Ilett, "Beyond the Research Paper: First-Generation Students and the Framework in Everyday Contexts," *College & Research Libraries News* 81, no. 6 (2020): 287.
16. Firouzeh Logan and Elizabeth Pickard, "First-Generation College Students: A Sketch of Their Research Process," in *College Libraries and Student Culture: What We Now Know*, eds. Lynda M. Duke and Andrew D. Asher, (American Library Association, 2012): 113.
17. LeMire et al., "Assessing the Information."
18. Stephanie J. Graves et al., "Uncovering the Information Literacy Skills of First-Generation and Provisionally Admitted Students," *The Journal of Academic Librarianship* 47, no. 1 (2021): 102260.
19. Yana Kuchirko, "On Differences and Deficits: A Critique of the Theoretical and Methodological Underpinnings of the Word Gap," *Journal of Early Childhood Literacy* 19, no. 4 (2019): 533-562.
20. Darren Ilett, "A Critical Review of LIS Literature on First-Generation Students," *portal: Libraries & the Academy* 19, no. 1 (2019): 183.
21. Ilett, "A Critical Review of LIS Literature"; Amanda L. Folk, "Drawing on Students' Funds of Knowledge: Using Identity and Lived Experience to Join the Conversation in Research Assignments," *Journal of Information Literacy*, 12, no. 2 (2018), 44–59.
22. Megan L. Hodge, "First-Generation Students and the First-Year Transition: State of the Literature and Implications for Library Researchers," *The Journal of Academic Librarianship* 48, no. 4 (2022): 2.
23. Elizabeth Pickard and Firouzeh Logan, "The Research Process and the Library: First-Generation College Seniors vs. Freshmen," *College & Research Libraries* 74, no. 4 (2013): 399–415.
24. Ilett, "A Critical Review of LIS Literature."
25. Hodge, "First-Generation Students," 11.
26. "How the Test Was Developed," Threshold Achievement Test for Information Literacy, accessed January 6, 2023, https://thresholdachievement.com/the-test/background
27. Gena Parsons-Diamond, "ACRL Acquires Threshold Achievement Test for Information Literacy (TATIL)," *ACRL Insider*, accessed May 18, 2023, https://acrl.ala.org/acrlinsider/acrl-acquires-threshold-achievement-test-for-information-literacy-tatil/.
28. "Test modules," Threshold Achievement Test for Information Literacy, accessed January 6, 2023, https://thresholdachievement.com/the-test/test-modules.
29. "Module descriptions," Threshold Achievement Test for Information Literacy, accessed January 6, 2023, https://thresholdachievement.com/files/Module-Descriptions.pdf.
30. "Module descriptions."
31. "Module descriptions."
32. "Module descriptions."
33. "How the Test Was Developed."
34. "Module descriptions."
35. "Module descriptions."
36. "Test modules."
37. "Module descriptions."
38. "Test modules."
39. "Test modules."
40. Darren Ilett, "Beyond the Research Paper: First-Generation Students and the Framework in Everyday Contexts," *College & Research Libraries News* 81, no. 6 (2020): 287.
41. Xan Arch and Isaac Gilman, "First Principles: Designing Services for First-Generation Students," *College & Research Libraries* 80, no. 7 (2019): 996-1012
42. "Module descriptions."
43. "Module descriptions."
44. "Module descriptions."