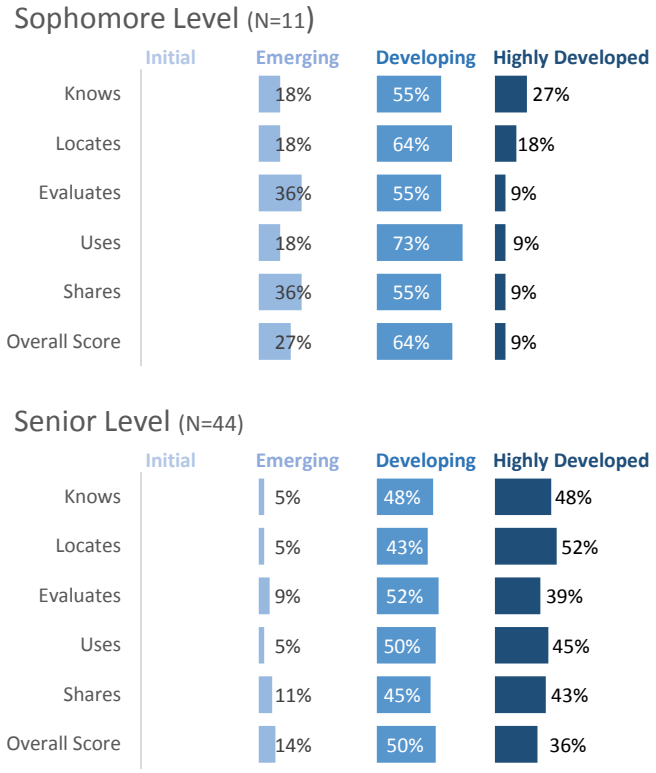
Assessment of Information Literacy and Critical Thinking at BYU-Hawaii

Winter 2016-17 Results Summary by the Office of Institutional Research

Similar to winter 2015-16, assessment results for Information Literacy in winter 2016-17 show improvement in scores between the sophomore and senior levels.

Photo courtesy of BYU-Hawaii Photography (University Communications)

Chart 1: For Information Literacy measures, sophomores are "developing" while seniors are "developing" to "highly developed"



The largest proportion of artifacts are at the "developing" stage for sophomores and the "developing" or "highly developed" stage for seniors.

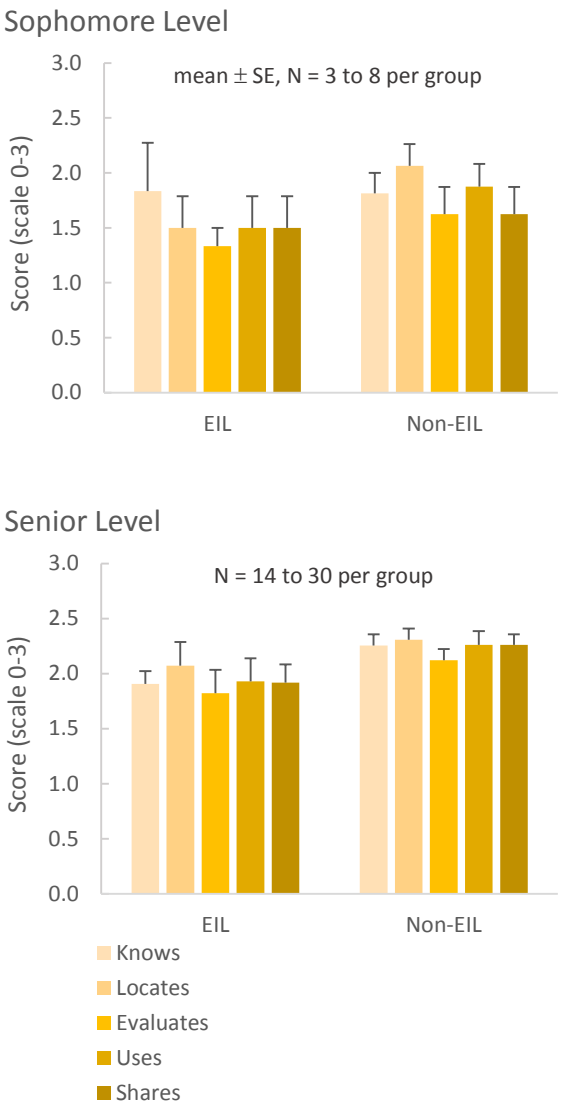
As shown in Chart 1, the largest proportion of artifacts at the sophomore level were at the "developing" stage for all criteria, while the largest proportion of artifacts at the senior level were at the "developing" or "highly developed" stage for all criteria. Artifacts at the senior level had a higher proportion at the "highly developed" stage than those at the sophomore level, while those at the sophomore level had a higher proportion at the "emerging" stage than those at the senior level. No papers at either level were scored solely at the "initial" level.

A comparison of means between these groups showed that seniors score significantly higher than sophomores for Overall Score ($p<.05$), with a medium to large effect size. Specifically, the seniors scored significantly higher than sophomores for Evaluates ($p<.05$) and Shares ($p<.05$) with medium to large effect sizes. This indicates a general improvement in information literacy scores between the sophomore and senior levels, albeit that improvement remains within the same "developing" stage range.

These findings are similar to those from the information literacy assessment conducted in winter 2015-16 where a modest improvement between the sophomore and senior levels was detected for three of four criterion as well as overall score.

There was a smaller number of artifacts in the 2016-17 (N=55) sample compared to the 2015-16 (N=149) sample which may affect these results.

Chart 2: Comparison of Information Literacy criteria at sophomore and senior levels



Information Literacy ratings between the papers written by EIL students and non-EIL students are not significantly different in 2016-17.

In contrast to the findings from the 2015-16 assessment, a comparison of means for the 2016-17 sample did not reveal significant differences between ratings for papers written by EIL and non-EIL students. Although mean scores are generally higher for non-EIL students compared to EIL students, these were not significantly higher for the majority of criterion at both the sophomore and senior levels. One exception to this is at the senior level where non-EIL papers rated significantly higher than EIL papers for the Knows criterion ($p<.05$) with medium effect size.

As seen in Chart 2, both EIL and non-EIL seniors on the whole received higher scores than sophomores. This indicates general but modest improvement between the sophomore and senior levels, as stated previously. There were no interaction effects between level and EIL status in the 2016-17 sample.

Mean scores for each criterion were also examined for differences at each level by gender, ethnicity, home area, and major college (see Table 3 on page 5). One-way analysis of variance showed no statistical differences for scores between these groupings except for major college at the senior level. A Tukey HSD post-hoc test revealed that seniors in the College of Math & Sciences scored significantly higher than seniors in the College of Arts & Humanities ($p<.05$) for the Shares criterion.

Chi-square Automatic Interaction Detector (CHAID) was employed to further explore the relationship between these variables. The tree graph in Chart 3 shows that for Overall Score the variable with the greatest impact is level, as confirmed by previous analyses (the same is also true for the Shares criterion). At the Senior level there is also significant difference by college where those in the Colleges of Arts & Humanities and Math & Sciences (including one Undecided major) together have

higher scores than those from the Colleges of Business Computing & Government and Human Development combined (including majors in Special programs). This is likely due to the differing assignments used for evaluation from these colleges and is discussed further in the Observations on Methodology section. In addition, for students in the Colleges of Business, Computing & Government and Human Development (including majors in Special programs), domestic students scored higher than international students and among those domestic students, males scored higher than females.

Inter-Rater Reliability

Inter-Rater reliability is calculated using a discrepancy index as shown in Table 1. The largest discrepancy between raters was for the Knows criterion, although general agreement for all criteria (discrepancy of 0) is fairly consistent falling in the fair to medium range.

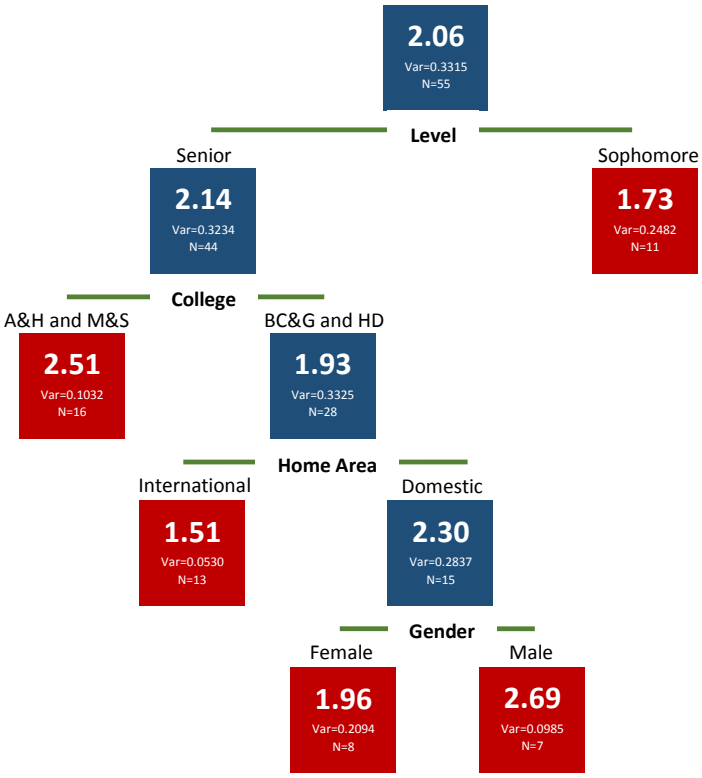
There were six different combinations of reader pairs for artifacts ranging in number from 4 to 16 papers for each pair. Essentially, there are not enough artifacts for each reader pair to calculate the inter-rater reliability with a high degree of confidence in this sample.

In order to effectively employ other measures of inter-rater reliability (e.g., Cohen's Kappa, correlation between paired readers), it is recommended that, in the future, at least 25-30 of the artifacts be evaluated by the same two raters.

Rubric Adjustments

In 2016, the Information Literacy ILO faculty group adjusted the Information Literacy rubric to break out one additional criterion -- Shares information effectively and responsibly. For this reason the number of criteria went from four in the 2015-16

Chart 3: Tree Graph for CHAID results on Information Literacy Overall Score



Mean scores for each group are shown in bold
A&H and M&S includes the Colleges of Arts & Humanities and Math & Sciences with one Undecided major
BC&G and HD includes the Colleges of Business, Computing & Government and Human Development, and Special programs
International includes students from Asia, Pacific and Other International areas
Domestic includes students from Hawaii and the U.S. Mainland

Table 1: Discrepancy Index for Information Literacy

	DISCREPANCY OF			
	0	1	2	3
Knows	42%	55%	4%	0%
Locates	56%	42%	2%	0%
Evaluates	47%	49%	4%	0%
Uses	45%	47%	7%	0%
Shares	53%	27%	20%	0%

version to five in the 2016-17 version. The version used in the winter 2016-17 assessment is attached to the end of this report. The major differences between the 2015-16 and 2016-17 rubric versions are outlined in Figure 1.

Figure 1: Criteria for the 2015-16 and 2016-17 versions of the Information Literacy rubric

2015-16	2016-17
KNOWS Knows when information is needed	**KNOWS** Knows when information is needed
LOCATES Locates information (Quantity and diversity of sources)	**LOCATES** Locates information
EVALUATES Evaluates information (Relevance of sources, and ability to draw appropriate conclusions from sources.)	**EVALUATES** Evaluates information
USES Uses information effectively and responsibly (Shares information effectively and responsibly)	**USES** Uses information effectively and responsibly
	SHARES Shares information effectively and responsibly

Observations on Methodology

A stratified random sample was used to select student artifacts from GE 110, ENGL 201 at the sophomore level, and from ENGL 315, BIOL 494, CHEM 494, and HIST 490 at the senior level. Table 2 on page 5 shows that the demographic proportions of the population are fairly well represented in this sample.

The faculty group for Information Literacy held a calibration session before the full norming session. During the norming session two separate readers rated each paper and a third reader was employed where there was disagreement greater than one whole point. The final score is found by taking the average of all readers.

This experience has garnered the following observations that will be helpful in guiding future efforts to assess Information Literacy at BYU-Hawaii.

Continuous assessment in small batches

Small sample size is a likely contributor to these results, especially for the sophomore level. However, it is taxing on faculty members to assess large numbers of artifacts. In order to gain the advantage of a larger sample and not overburden faculty members, assessment for Information Literacy could be conducted each year in small batches and then combined for overall analysis. To do this it is imperative that the same methodology and rubric be used for each assessment session.

Are the artifacts appropriate?

Assessment of learning informs instruction, but are these the appropriate artifacts to examine for discovering the learning of information literacy? There is heavy dependence on General Education courses that students may or may not be taking at their sophomore and senior years. It is apparent that the artifacts used from outside of GE (HIST 490, BIOL 494, CHEM 494) have an influence on the overall scores for their respective colleges. In addition, students take these courses at the end of their university careers while they may enroll in ENGL 315 at earlier points in their time at the university. Especially at the senior level, it would be well for the institution to consider assessing assignments other than ENGL 315, such as program capstones, that may be better evidence of a student's best and culminating effort.

Consider the instructors

Is the intructor a contributing factor in these results? It behooves the university to examine how variables such as the instructor's faculty status or length of time at the institution might affect these scores. This information will be useful for faculty coaches in the Center for Learning and Teaching to help begin conversations that can help inform improvement of pedagogy.

Sample and Representativeness

The sample and population proportions listed in Table 2 show that the sample is fairly representative of the population for most demographic categories. The population is based on Fall 2016 degree-seeking enrollment for all demographic groupings except level. Level (sophomore/senior) is based on the proportion of associates (sophomore level) and bachelors (senior level) degrees that were awarded during the 2015-16 academic year.

Table 2: Demographic proportions in the sample fairly well represent those of the population

	SAMPLE N=55	POPULATION N=2601
Gender		
Male	36%	41%
Female	64%	59%
EIL Status		
Enrolled in EIL	31%	33%
Did not enroll in EIL	69%	67%
Ethnicity		
American Indian/Alaska Native	0%	1%
Asian	23%	29%
Black	0%	1%
Hawaiian	11%	4%
Hispanic	5%	6%
Pacific Islander	18%	20%
White	36%	39%
Home Area		
Asia	27%	25%
Pacific	15%	15%
Hawaii	9%	10%
US Mainland	45%	46%
Other International	4%	4%
College		
Arts & Humanities	9%	17%
Business, Computing & Gov't.	35%	36%
Human Development	20%	15%
Math & Sciences	25%	23%
Special Programs	9%	4%
Undecided	2%	5%
Level		N=769
Sophomore (Associates)	20%	23%
Senior (Bachelors)	80%	77%

Mean Scores

Mean scores are listed by demographic variable grouping for sophomores and seniors in Table 3. The criterion with the highest mean score for each row grouping is highlighted.

Table 3: **Mean scores by level**

SOPHOMORE LEVEL (N=11)	KNOWS	LOCATES	EVALUATES	USES	SHARES	OVERALL SCORE
Gender						
Male	1.83	2.00	1.33	1.67	1.33	1.63
Female	1.81	1.88	1.63	1.81	1.69	1.76
EIL Status						
Enrolled in EIL	1.83	1.50	1.33	1.50	1.50	1.53
Did not enroll in EIL	1.81	2.06	1.63	1.88	1.63	1.80
Ethnicity						
Asian	2.00	2.17	1.83	2.17	1.83	2.00
Hawaiian	1.50	2.50	1.50	1.50	1.00	1.60
Hispanic	2.00	2.00	1.00	2.00	1.50	1.70
Pacific Islander	1.50	1.00	1.25	1.00	1.50	1.25
White	1.88	2.00	1.63	1.88	1.63	1.80
Home Area						
Asia	2.00	2.17	1.83	2.17	1.83	2.00
Pacific	1.50	1.00	1.25	1.00	1.50	1.25
Hawaii	1.50	2.00	1.00	1.50	1.00	1.40
US Mainland	1.90	2.10	1.60	1.90	1.60	1.82
College						
Arts & Humanities	1.00	1.50	1.00	2.00	1.00	1.30
Business, Computing & Gov't.	1.83	2.00	1.33	1.67	1.33	1.63
Human Development	2.00	1.67	1.50	1.67	1.83	1.73
Math & Sciences	1.67	2.17	1.83	1.83	1.67	1.83
Special Programs	2.50	2.00	2.00	2.00	2.00	2.10

SENIOR LEVEL (N=44)	KNOWS	LOCATES	EVALUATES	USES	SHARES	OVERALL SCORE
Gender						
Male	2.14	2.30	2.13	2.21	2.27	2.21
Female	2.15	2.19	1.96	2.12	2.07	2.10
EIL Status						
Enrolled in EIL	1.90	2.07	1.82	1.93	1.92	1.93
Did not enroll in EIL	2.26	2.31	2.12	2.26	2.26	2.24
Ethnicity						
Asian	1.97	2.17	1.97	2.09	2.06	2.05
Hawaiian	2.10	2.20	2.00	1.90	2.07	2.05
Hispanic	2.25	1.75	1.50	1.50	1.58	1.72
Pacific Islander	2.06	2.00	1.75	1.90	1.92	1.93
White	2.32	2.47	2.28	2.50	2.44	2.40
Home Area						
Asia	1.89	2.10	1.89	2.01	1.99	1.97
Pacific	1.92	1.83	1.67	1.75	1.81	1.79
Hawaii	2.38	2.50	2.25	2.21	2.33	2.33
US Mainland	2.36	2.43	2.23	2.39	2.40	2.36
Other International	1.75	1.75	1.50	1.75	1.33	1.62
College						
Arts & Humanities	2.38	2.75	2.63	2.75	2.88	2.68
Business, Computing & Gov't.	2.07	1.98	1.82	1.98	1.86	1.94
Human Development	1.96	1.88	1.81	1.88	1.81	1.87
Math & Sciences	2.36	2.59	2.32	2.45	2.62	2.47
Special Programs	1.88	2.38	1.88	1.96	2.00	2.02
Undecided	2.50	2.50	2.00	2.33	2.00	2.27