

Does knowledge and attitudes toward assessment affect the usage of assessment tools?

Lois D. Bryan
Robert Morris University

Tanya M. Lee
Valdosta State University

Mark J. Eschenfelder
Robert Morris University

ABSTRACT

A major goal of schools at all levels is to improve student learning outcomes, generally expressed in terms of learning objectives the schools want students to achieve. To improve student learning outcomes, one needs to assess what students have learned. Learning goals cover a broad range of outcomes and multiple tools/methods may be needed to adequately assess a set of learning objectives. Faculty willingness and ability to use a variety of assessment methods may vary with faculty knowledge of the assessment process and/or with faculty attitudes and beliefs about the process. This research study indicates that beliefs and attitudes do affect the number of assessment tools used. The researchers found that the level of knowledge of assessment varies in a systematic way with faculty opinions that could affect their willingness to actively engage in assessment practices. Level of knowledge is a factor that educational institutions can affect through seminars or discussions and that might affect future success with assurance of learning.

Keywords: Assessment, assessment tools, accounting faculty

INTRODUCTION

A major goal of schools at all levels is to improve student learning outcomes, generally expressed in terms of learning objectives the schools want students to achieve. One accrediting body refers to these in general as “intellectual and behavioral competencies” (AACSB 2013, p. 29). Systematic improvement in achieving these student learning objectives requires the identification of factors that affect learning related to them. For the assessment process to improve student learning it will likely have to assess outcomes that are quite diverse, ranging from comprehension of basic knowledge to the creation of new knowledge.

Courses may, and programs undoubtedly will, address different components of an education (e.g., theories, skills) and multiple levels of understanding (e.g., knowledge of, comprehension of, and ability to use in new situations). One possible framework for structuring different program and course objectives is Bloom’s taxonomy (1956). Assessment of student outcomes of these possibilities may be more easily and more appropriately done using a similarly wide variety of assessment methods. A question at this point is whether faculty members are aware of and/or use a variety of methods. If many do not, and the nature of learning objectives varies substantially, educational institutions may wish to find ways to help faculty understand and use a wider variety of assessment methods.

Willingness and ability to use a variety of assessment methods may vary with faculty knowledge of the assessment process and/or with faculty attitudes and beliefs about the process. Knowledge of the process can certainly be affected by actions educational institutions can take. Higher or lower levels of knowledge about the assessment process may be related to faculty attitudes and beliefs about the process and their use of few or many assessment methods. If factors affecting the use of a wider variety of assessment methods can be identified, and the use of a variety of methods is desired, schools could use knowledge of these factors to assist faculty in the improvement of the assessment process.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Assessment of student learning outcomes requires the use of appropriate tools. According to Callahan, Strandholm and Dziekan, “Different learning objectives may require different assessment tools,” (2010, p. 45). There are a number of different tools that faculty members can use which include: essays or written assignments with a rubric used to score student performance, a test map or embedded questions (mapping all or some of the questions on an examination to specific learning objectives), a portfolio of student work scored with a rubric, pre and post tests, and electronic discussion threads with a rubric. Learning objectives can relate to different components of course content (e. g. vocabulary, concepts, and methods) and to different levels of understanding (e. g. knowledge and comprehension, application and analysis, synthesis). Using examples from the AACSB Standard 9 (AACSB, 2013) to provide an additional viewpoint, these can include written and oral communications, the ability to frame and analyze problems, the ability to work productively with others, including with diverse others, and the ability to engage in reflective thinking.

The assessment of whether learning objectives are being attained requires the use of appropriate assessment measures (AACSB, 2013). As noted by a group involved in assessment (AACSB, 2013), *first* one should determine the learning objectives and *then* one should determine the assessment measures to be used. “If assessment measures or tests drive the

selection of learning goals (i.e., due to ease of use), there is high risk that more critical learning goals may not be considered or evaluated.” (AACSB 2007, p. 12). Knowledge of many possible methods for assessment would at least preclude faculty from automatically assuming that only multiple choice, or true false, or problem based questions were available, making it difficult to assess outcomes of all relevant types.

Given the broad range of learning objectives likely in most courses or programs, the use of a broad base of methods to assess student learning could be beneficial. While multiple choice questions can easily determine students’ grasp of terminology, they are less easily adaptable to determining how well students can communicate concepts to others. While problems (expressed as multiple choice questions or not) can assess students’ ability to apply learning to new material, they may not as easily assess whether students can determine the kind of analysis that is most appropriate for a particular set of data. When evaluating the ability to work in teams or to gather and process information, common objectives in capstone courses, one may wish to use something like a multidimensional template or rubric to determine whether the objectives have been achieved (Macaulay & Nagley, 2008; Payne, Whitfield & Flynn, 2002). Problem-based learning attempts to develop the ability to use a multidisciplinary approach to a problem, seeking answers from whatever skill set is appropriate. A student’s skill at this cannot be evaluated by testing facts but requires providing a realistic task and some form of assessment that is objective. One possible way to accomplish this is to have students evaluate their own progress in developing skills (Waters & McCracken, 1997).

According to Callahan et al., “each assessment tool has strengths and weaknesses and as such, multiple measures of assessment are necessary to assess student learning.” (2010, p. 46). Since the use of a variety of methods may be helpful/necessary in determining the extent to which students are achieving a set of learning objectives, it may be useful to identify factors that are associated with the use by faculty of a broad set of assessment methods. It is possible that knowledge of the assessment process, for instance how experts in the field believe student learning should be assessed, may help. Some light may be shed on this by identifying the assessment practices recommended by accrediting bodies and by experts in the field, and examining the knowledge faculty have of these recommended methods. It may also be helpful to examine faculty members’ attitudes toward and beliefs about the assessment process in general as attitudes and beliefs can affect behavior (McMillan & White, 1993; Nishii, Lepak & Schneider, 2008; Rediker, Mitchell, Beach, & Beard, 1993; and Sirota & Bailey, 2009). If either knowledge of assessment (practices desired by accrediting agencies) or attitudes toward the assessment process are associated with the use of a more varied set of assessment tools, and schools believe a broad set is needed to properly assess their learning objectives, then schools could attempt to affect relevant knowledge and attitudes through such things as workshops, seminars or faculty mentoring. This is expressed by the following hypotheses:

H1: Faculty attitudes toward and beliefs about the assessment process will vary with their level of knowledge of the assessment process, with more positive attitudes and beliefs associated with higher levels of knowledge.

The researchers expect that better knowledge of the assessment process and more positive attitudes toward and beliefs about the process would be associated with each other and with the use of a broader set of assessment methods. A negative attitude toward assessment could result in a desire to minimize faculty time and effort involved regardless of whether the quickest

assessment method is applicable to the particular learning objective being measured. A positive attitude could result in more time and effort being expended in matching assessment methods with the particular learning objective being assessed. Lack of knowledge of the assessment process in general might limit the methods considered and generate similar results to those produced by a negative attitude. These expectations are expressed in the following hypotheses:

H2: Faculty use of assessment methods will vary with their attitudes toward and beliefs about the assessment process, with more positive attitudes and beliefs associated with the use of a broader set of methods.

Workshops could improve knowledge of assessment methods and provide rationales for why and for what purpose these various methods are recommended. Knowledge gained through workshops might help faculty understand the usefulness of assessment and thus alter their attitudes toward the process. There is some evidence that changes in knowledge can affect attitudes (Davidson, Yantis, Norwood & Montano, 1985; Fabrigar, Petty, Smith & Crites, 2006; Fallan, 1999). Workshops could also provide information on the various methods available and on when specific assessment methods might be most appropriate for assessing particular types of learning objectives. Given the number of methods available, it is likely that experience with and understanding of the potential value of some of these tools may vary across faculty. Faculty use of assessment methods may vary with their knowledge level. This is expressed by the following hypothesis:

H3: Faculty use of assessment methods will vary with the level of their knowledge of the assessment process, with higher levels of knowledge associated with the use of a broader set of methods.

RESEARCH METHOD AND RESULTS

A survey of accounting faculty was conducted to determine their knowledge of assessment practices, their attitudes toward assessment, and their usage of assessment tools. A web-based survey instrument was used to gather data from college and university accounting faculty throughout the United States. The names and email addresses of the accounting faculty were obtained from Prentice Hall's Hasselback Accounting Faculty Directory. Several tables are provided describing the data gathered. The total number of responses differs across some of the tables due to missing responses. This work is part of an ongoing study on faculty attitudes toward assurance of learning. Some of the data used in this paper was previously reported by Eschenfelder, Bryan and Lee (2014).

Seven hundred responses were received from the 5,557 accounting faculty that were surveyed. Of the responses received 82% indicated that their institution was AACSB accredited or in the processing of seeking AACSB accreditation. Statistics describing the composition of the sample with respect to type and size of the institution are presented in Table 1 (Appendix).

Faculty Knowledge of Outcomes Assessment/Assurance of Learning (OA/AOL) Process

In order to examine faculty attitudes and beliefs by level of knowledge of the assessment process, a measure of knowledge was created using the eleven statements found in Table 2 (Appendix). Each statement was scored as 1 if the participant's response (agree/disagree)

matched that of experts in assessment, -1 if it did not, and 0 if the response was neutral/don't know. These response scores were then summed and two categories (High and Low) were created by dividing the participants into two groups using the approximate median response sum as the dividing point. Score for knowledge could vary from positive 11, for respondents who agreed with experts on all statements, to negative 11, for respondents who disagreed with experts on all statements. The approximate median score was used to break the variable for knowledge into high (3 and above) and low (less than 3). As indicated in Table 2 (Appendix) this resulted in 47% of the respondents being in the High category and 53% in the Low category. Levels of knowledge of the assessment process could reflect or generate interest in assessment or could be the result of an educational process on assessment provided by the faculty member's institution, reflecting an institutional interest in assessment.

There are three statements in Table 2 (Appendix) where over half of the respondents did not agree with the opinions of experts. Two of these statements involved technical terms (indirect measures and formative assessment measures) and knowledge of these may not affect faculty's effective performance of assessment. One of these statements involves the use of group projects to assess individual learning. This is an area where lack of faculty knowledge is an issue for the assessment of learning objectives.

Faculty Attitudes and Perceptions of Outcomes Assessment/Assurance of Learning (OA/AOL)

Prior research has found that attitudes and beliefs affect behavior (McMillan & White, 1993; Nishii, et al, 2008; Rediker, Mitchell, et al, 1993; and Sirota & Bailey, 2009). Faculty beliefs in the underlying motivation for and usefulness of assessment may affect their willingness to engage in it. Beliefs may vary with faculty level of knowledge of the assessment process and this variation may be associated with differences in faculty willingness to engage in a positive way in the assessment process.

When asked whether they agree or disagree with the following statement; "OA/AOL is a fad in higher education," faculty responded as shown in Table 3 (Appendix). Apparently, many believe it is a fad, potentially resulting in a lack of attention to assessment. This belief varies with faculty level of knowledge of how those in accrediting bodies feel assessment should be conducted (Table 2). When the responding faculty are split at the approximate median for level of knowledge, those with higher levels of knowledge are significantly more likely ($p < 0.0001$) than those with lower levels of knowledge to believe it is *not* a fad (Table 3).

Faculty beliefs about the process used to implement assessment could be related to their willingness to engage in it. Those who feel involved in the process may be more interested in the assessment process and spend more effort on assessment. When asked whether they agree or disagree with the following statements, faculty responded as indicated in Table 4 (Appendix).

Table 5 (Appendix) reports the test of significance for the group of tests in Tables 3 and 4. Thus the group of tests as a whole is significant ($p < 0.0001$). Thus level of knowledge of the process of assessment is associated with differences in the way faculty view the assessment process. Higher levels of knowledge were associated with stronger belief that the process was faculty driven ($p < 0.0008$) and that faculty were involved in the development of the learning goals used in the assessment process ($p < 0.0001$). This supports H1. See Table 4 (Appendix) for additional statistics.

Beliefs and attitudes were associated with the number of assessment tools used. When faculty are split approximately evenly between those who agree with the statement “OA/AOL is a fad in higher education” and those who disagree with that statement, there is a significant relationship between disagreeing with the statement and using more assessment tools ($p < 0.0154$). When faculty are split approximately evenly between those who agree with the statement “The OA/AOL process at my institution is faculty driven” and those who disagree with that statement, there is a significant relationship between agreeing with the statement and using more assessment tools ($p < 0.0002$). Similarly, when faculty are split approximately evenly between those who agree that the learning objectives are faculty developed and those who disagree, there is a significant relationship between agreeing with the statement and using more assessment tools ($p < 0.0001$).

Assessment Tool Usage and Level of Knowledge

The level of knowledge of the assessment process recommended by experts in the field does appear to vary in a systematic way with faculty opinions that could affect their willingness to actively engage in assessment practices. One aspect of knowledge is the knowledge of various tools that could be used in assessment of learning. Prior research has found the value in using multiple measures to test a finding (Ashton, 1998; Bloom, 1956; Campbell & Fiske, 1959; Suskie, 2004). The use of multiple tools can help assure more complete measurement of the achievement of an institution’s learning goals. A question is whether higher knowledge levels are associated with the usage of a broader set of assessment tools.

When the reported number of assessment tools used was analyzed by level of knowledge of assessment (low knowledge was fewer than 4 and high knowledge was 4 to 11 answers on assessment that agreed with responses by experts), faculty responded as shown in Tables 6, 7 and 8 (Appendix).

Only 15.1% of those with a high level of knowledge reported using none of the tools while nearly 26.6% of those with a low level of knowledge reported using none. For those with a high level of knowledge, 35.5% reported using 3 to 6 tools and for those with a low level of knowledge, 25.5% reported similar usage. These results provide support for H2.

Assessment Tool Usage and Attitudes and Beliefs Related to the Assessment Process

Given the potential for faculty attitudes and beliefs to affect behavior, the relationship between attitudes and beliefs related to the assessment process and the usage of multiple assessment tools was examined. When faculty are split at the approximate median for number of tools used, those with higher usage are significantly more likely ($p < 0.0001$) than those with lower levels to believe it is *not* a fad as indicated in Table 9 (Appendix).

Faculty beliefs about the process used to implement assessment could be related to their willingness to spend time on determining the precise tool needed for each learning objective and to end up using multiple tools. When asked whether they agree or disagree with the following statements, faculty responded as shown in Table 10 (Appendix).

When faculty are split at the approximate median for number of tools used, those with higher usage are significantly more likely ($p < 0.0001$) than those with lower levels to believe the assessment process is faculty driven and that faculty were involved in the development of the student learning objectives.

Table 11 (Appendix) reports the test of significance for the group of tests in Tables 9 and 10. Thus the group of tests as a whole is significant ($p < 0.0001$). Thus variation in the number of assessment tools used is associated with differences in the way faculty view the assessment process. Higher levels of usage were associated with stronger belief that the process was faculty driven ($p < 0.0001$) and that faculty were involved in the development of the learning goals used in the assessment process ($p < 0.0001$).

DISCUSSION

An interesting result from the above is that several assessment tools that could be particularly useful given the changes in accounting programs recommended by the Accounting Education Change Commission (AECC) and the American Institute of Certified Public Accountants (AICPA) do not appear to be used to any significant extent (AECC, 1990; AICPA, 1999; Albrecht & Sack, 2000). Particularly underutilized tools include pre and post-tests, and portfolios. It is very understandable that test maps are infrequently used (22% of respondents) as these require mapping all questions to objectives. The use of embedded questions (a subset of the questions asked) can obtain similar results with less need for data collection. The use of embedded questions is significantly higher (62% as compared to 35% of respondents) for those with a higher level of knowledge. It is also very understandable that electronic discussion threads are infrequently used (2% of respondents) as these generally relate to online classes, still a small part of most accounting programs. The use of essays and written assignments is significantly higher by those faculty with a high level of knowledge (31% and 56%) when compared to the use by those faculty with low level of knowledge (29% and 46%). These assessment tools can be used to help determine whether students truly understand the meaning of accounting methodologies and concepts. The use of pre and post tests is also very small (18% of respondents). Pre and post tests can help alert faculty to changes in (actual levels of) knowledge of students in a course. Higher than expected pre test scores can signal an opportunity to introduce higher level learning objectives (Boyas, Bryan & Lee, 2012). Unfortunately only about 18% of faculty use these and the level of usage is not affected by level of knowledge. The use of portfolios (used by 6% of respondents) can elicit performance on a broader set of skills than can examination questions or written assignments alone providing a more complete picture of student achievement of learning objectives. Such a portfolio could include written assignments, articles collected by students related to particular topics that are presented to the class to link concepts to current events, study guides created by students, or other course related work. Work included could thus relate to learning objectives on knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956). Portfolios assembled over a student's academic career may be used to track a student's progress toward meeting the learning objectives of the program as well as a student's final achievement of the learning objectives.

This study did find that attitudes affect the number of different tools used by faculty ($p < 0.0001$). Relevant attitudes included "AOL is a fad in higher education" and perceptions of faculty of involvement in the AOL process (Table 10). If institutions want to try to affect faculty usage of multiple tools, i.e., increase the variety of tools used by faculty, affecting the knowledge of AOL and attitudes toward it may be useful. Training, seminars, presentations by other faculty could all be used in this endeavor.

Faculty attitudes toward assurance of learning and faculty perceptions of faculty involvement in the development of student learning objectives are associated with the use of multiple assessment tools. The use of multiple assessment tools is important in measuring student attainment of a broad array of learning objectives. There are important implications for strengthening the assurance of learning process if there is a causal dimension to the associations between faculty attitudes toward assurance of learning and faculty perceptions of faculty involvement in the development of student learning objectives and the use of multiple assessment tools.

If faculty attitudes toward assurance of learning influence their willingness to use multiple assessment tools activities designed to inform faculty about alternative assessment tools may be less effective than activities that are also designed to influence faculty attitudes about assurance of learning. Informing faculty who believe assurance of learning is a fad about the nature and use of alternative assessment tools may fail to motivate faculty to actually use the tools. Changing faculty attitudes toward assurance of learning may be important in increasing faculty use of a broader array of assessment tools. Changing faculty attitudes about assurance of learning is also likely to be a more daunting task than simply making faculty aware of the use of alternative assessment tools.

If faculty perceptions of faculty involvement in the development of learning objectives influence faculty use of multiple assessment tools, institutions may be able to improve the assurance of learning process by increasing faculty participation and awareness of faculty involvement in developing program learning objectives. By increasing faculty involvement in the development of learning objectives and internally publicizing that work, an institution may be able to increase faculty use of alternative assessment tools.



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Appendix

Table 1
Faculty Responses by Type and Size of Institution

Type of Institution		
Highest degree granted	Responses	Percentage
Bachelors	58	8%
Masters	292	43%
Doctoral	336	49%
Total	686	100%

Size of Institution		
Number of Students	Responses	Percentage
Over 10,000	372	54%
7,500 to 10,000	75	11%
5,000 to 7,500	69	10%
2,500 to 5,000	104	15%
Under 2,500	66	10%
Total	686	100%

Table 2
Faculty Knowledge of Assessment Process

Statement:	Agree with Experts (1)	Disagree with Experts (-1)	Neutral or Don't Know
Faculty teaching evaluations completed by students are an important part of the OA/AOL process. (Disagree coded as 1, Agree coded as -1)	65%	30%	5%
In the OA/AOL process course grades are NOT direct evidence that student learning goals and objectives have been achieved. (Disagree coded as -1, Agree coded as 1)	60%	37%	3%
OA/AOL of a program requires the use of a standardized test (ex. CPA Exam) for at least a representative sample of students finishing the program. (Disagree coded as 1, Agree coded as -1)	54%	36%	9%
A purpose of OA/AOL is to evaluate faculty performance. (Disagree coded as 1, Agree coded as -1)	68%	27%	6%
When student written assignments are used in the OA/AOL process they must be evaluated using a rubric (a tool to score student performance). (Disagree coded as -1, Agree coded as 1)	76%	14%	10%
Accreditation agencies focus on indirect measures (indirect measures include: student surveys, graduation rates, starting salaries of graduates) of student learning. (Disagree coded as 1, Agree coded as -1)	47%	33%	20%

The use of course based OA/AOL instruments require faculty to dramatically change their existing methods of evaluating student performance. (Disagree coded as 1, Agree coded as -1)	74%	21%	5%
The OA/AOL process requires clearly delineated student learning goals and objectives. (Disagree coded as -1, Agree coded as 1)	84%	12%	4%
Group projects are NOT an acceptable way to assess individual student learning. (Disagree coded as -1, Agree coded as 1)	46%	47%	6%
Accreditation agencies focus on formative assessment measures designed to promote learning in a course. (Formative assessment tools are used in a course to guide instruction to improve student learning.) (Disagree coded as 1, Agree coded as -1)	25%	36%	38%
Summative measures of student learning are required in the OA/AOL process. (Summative assessment tools are used to measure student learning at the end of a course or program.) (Disagree coded as -1, Agree coded as 1)	57%	22%	20%

Table 3
Fulltime Faculty Level of Agreement with Outcomes Assessment Being a Fad

Statement:	Agree	Disagree	Neutral	Significance of the difference
OA/AOL is a fad in higher education.	262 (52%)	219 (44%)	20 (4%)	p<0.0001
High Level of Knowledge	110 (46%)	122 (51%)	6 (3%)	
Low Level of Knowledge	152 (58%)	97 (37%)	14 (5%)	

Table 4
Faculty Beliefs as to the Design of the Assessment Process and the Student Learning Objectives Used in that Process

Statement:	Agree	Disagree	Neutral	Significance of the difference
The OA/AOL process at my institution is faculty driven.	273 (55%)	201 (41%)	22 (4%)	p<0.0008
High Level of Knowledge	150 (63%)	83 (35%)	4 (2%)	
Low Level of Knowledge	123 (47%)	118 (46%)	18 (7%)	
Accounting faculty were involved in developing the student learning goals and objectives used in the OA/AOL process at my school.	426 (86%)	43 (9%)	25 (5%)	p<0.0001
High Level of Knowledge	220	13	5	

	(92%)	(6%)	(2%)
Low Level of Knowledge	206	30	20
	(80%)	(12%)	(8%)

Table 5
Multivariate Test for Data Reported on Faculty Opinions in Motivation Using Level of Knowledge

	Effect	Value	F	Hypothesis df	Error df	Significance
Multivariate test	Wilkes' λ	0.936	11.00	3	484	<0.0001

Table 6
Fulltime Faculty Usage of Various Assessment Tools: Variation with Level of Knowledge of the Assessment Process (Detail)

Type of Assessment Tool:	Yes	No	Significance of the difference
Essay with rubric			P<0.6644
High Level of Knowledge	73 (31%)	166 (69%)	
Low Level of Knowledge	78 (29%)	193 (71%)	
Written assignment with rubric			P<0.0201
High Level of Knowledge	134 (56%)	105 (44%)	
Low Level of Knowledge	124 (46%)	147 (54%)	
Used test map			P<0.9059
High Level of Knowledge	51 (21%)	188 (79%)	
Low Level of Knowledge	59 (22%)	212 (78%)	
Embedded questions linked to objectives			P<0.0001
High Level of Knowledge	147 (62%)	92 (38%)	
Low Level of Knowledge	96 (35%)	175 (65%)	
Portfolio with rubric			P<0.8451
High Level of Knowledge	14 (6%)	225 (94%)	
Low Level of Knowledge	17 (6%)	254 (94%)	
Pre post tests			P<0.9907
High Level of Knowledge	44	195	

	(18%)	(82%)
Low Level of Knowledge	50	221
	(18%)	(82%)
Electronic discussion threads with rubric		P<0.6613
High Level of Knowledge	4	235
	(2%)	(98%)
Low Level of Knowledge	6	265
	(2%)	(98%)

Table 7
Fulltime Faculty Usage of Various Assessment Tools: Variation with Level of Knowledge of the Assessment Process (Composite)

Level of Knowledge	High	Low	Significance of the difference
Wilcoxon Two-Sided			P<0.0021
t Approximation			P<0.0021

Table 8
Multivariate Test for Data Reported on Use of Assessment Tools Using Knowledge Level

Effect	Value	F	Hypothesis df	Error df	Significance
Multivariate Wilkes' λ	0.924	5.87	7	502	<0.0001

Table 9
Fulltime Faculty Usage of Multiple Tools and Belief that Outcomes Assessment is a Fad

Statement:	Agree	Disagree	Neutral	Significance of the difference
OA/AOL is a fad in higher education.	262	219	20	p<0.0001
High Level of Usage of Tools	(52%)	(44%)	(4%)	
Low Level of Usage of Tools	123	131	8	
	(47%)	(50%)	(3%)	
	139	88	12	
	(58%)	(37%)	(5%)	

Table 10
Faculty Beliefs as to the Design of the Assessment Process and the Student Learning Objectives Used in that Process and Usage of Multiple Tools

Statement:	Agree	Disagree	Neutral	Significance of the
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				difference
The OA/AOL process at my institution is faculty driven.	273 (55%)	201 (41%)	22 (4%)	p<0.0001
High Level of Usage of Tools	163 (63%)	93 (36%)	3 (1%)	
Low Level of Usage of Tools	110 (46%)	108 (46%)	19 (8%)	
Accounting faculty were involved in developing the student learning goals and objectives used in the OA/AOL process at my school.	426 (86%)	43 (9%)	25 (5%)	p<0.0001
High Level of Usage of Tools	238 (92%)	15 (6%)	6 (2%)	
Low Level of Usage of Tools	188 (80%)	28 (12%)	19 (8%)	

Table 11
Multivariate Test for Data Reported on Faculty Opinions and Use of Multiple Tools

	Effect	Value	F	Hypothesis df	Error df	Significance
Multivariate test	Wilkes' λ	0.912	15.62	3	484	<0.0001

