



## Internal Analysis Executive Summary Report

↓  
Inbound  
26

↑  
Outbound  
86



### **Assessment Period:**

August 1, 2023 - July 31, 2025



### **Academic Level/Assessment Solution:**

Bachelors Business Administration



### **Aggregate:**

Faith-based Institution



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## **Data Included in Report**

### **Inbound Assessments**

- ECON 2301 Principles of Macroeconomics , n=26

### **Outbound Assessments**

- BMGT 4375 Business Policy and Strategy , n=86

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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### Description of the report:

The Internal Analysis report is used for measuring learning outcomes. The report provides results of the Inbound and Outbound exams (and Mid-point Exam when available) by utilizing an analysis of means and frequency correct. The report is used for programmatic evaluation, identifying curriculum gaps and strengths, and provides one external benchmark with percentile ranking. The data are presented at the topic, subtopic, and subject levels.

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## Table of Contents

<b>Data Included in Report</b>	ii
<b>Description of the Report</b>	iii
<b>Table Of Contents</b>	iv
<b>Executive Summary</b>	1
<b>Comparison of Inbound Exam Results with Outbound Exam Results</b>	2
<b>Total Score Comparison of Inbound with Outbound Results</b>	3
Inbound Exam Completion Time and Total Result Summary	4
Comparison of Topic-level Inbound Results to Selected Aggregate Results	5
Inbound Exam Summary	9
Outbound Exam Completion Time and Total Result Summary	10
Comparison of Topic-level Outbound Results to Selected Aggregate Results	11
Outbound Exam Summary	15
<b>How to Read and Understand the Internal Analysis Executive Summary Report</b>	16
<b>Best Practices</b>	19
<b>Interpreting and Using Exam Scores</b>	20
<b>Validity and Reliability</b>	22
<b>Glossary of Terms</b>	24

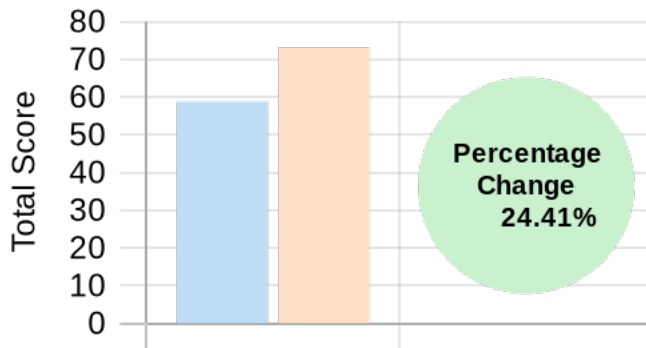
# Internal Analysis Executive Summary Report

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### Bachelors Business Administration

#### Executive Summary

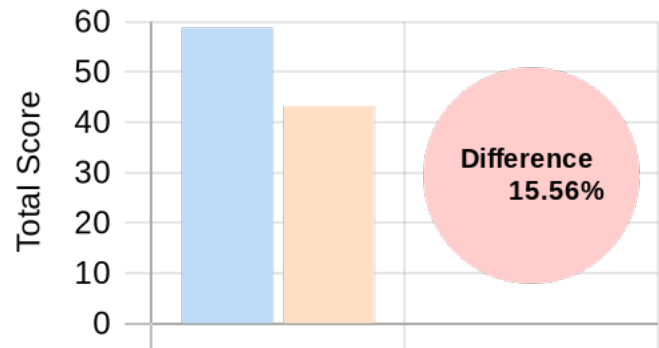
##### Inbound vs Outbound Exam (%)



University of the Incarnate Word Inbound: 58.75%

University of the Incarnate Word Outbound: 73.09%

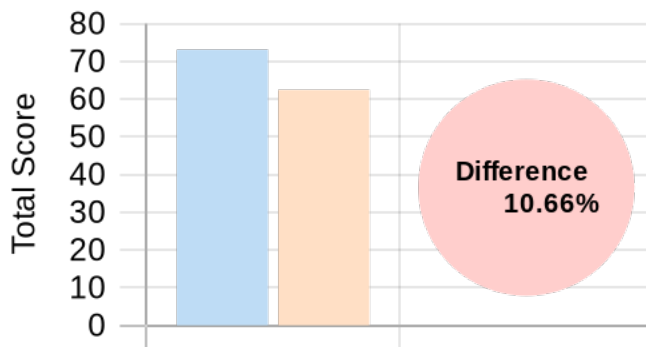
##### Inbound vs Aggregate (%)



University of the Incarnate Word Inbound: 58.75%

Faith-based Institution: 43.19%

##### Outbound vs Aggregate (%)



University of the Incarnate Word Outbound: 73.09%

Faith-based Institution: 62.43%

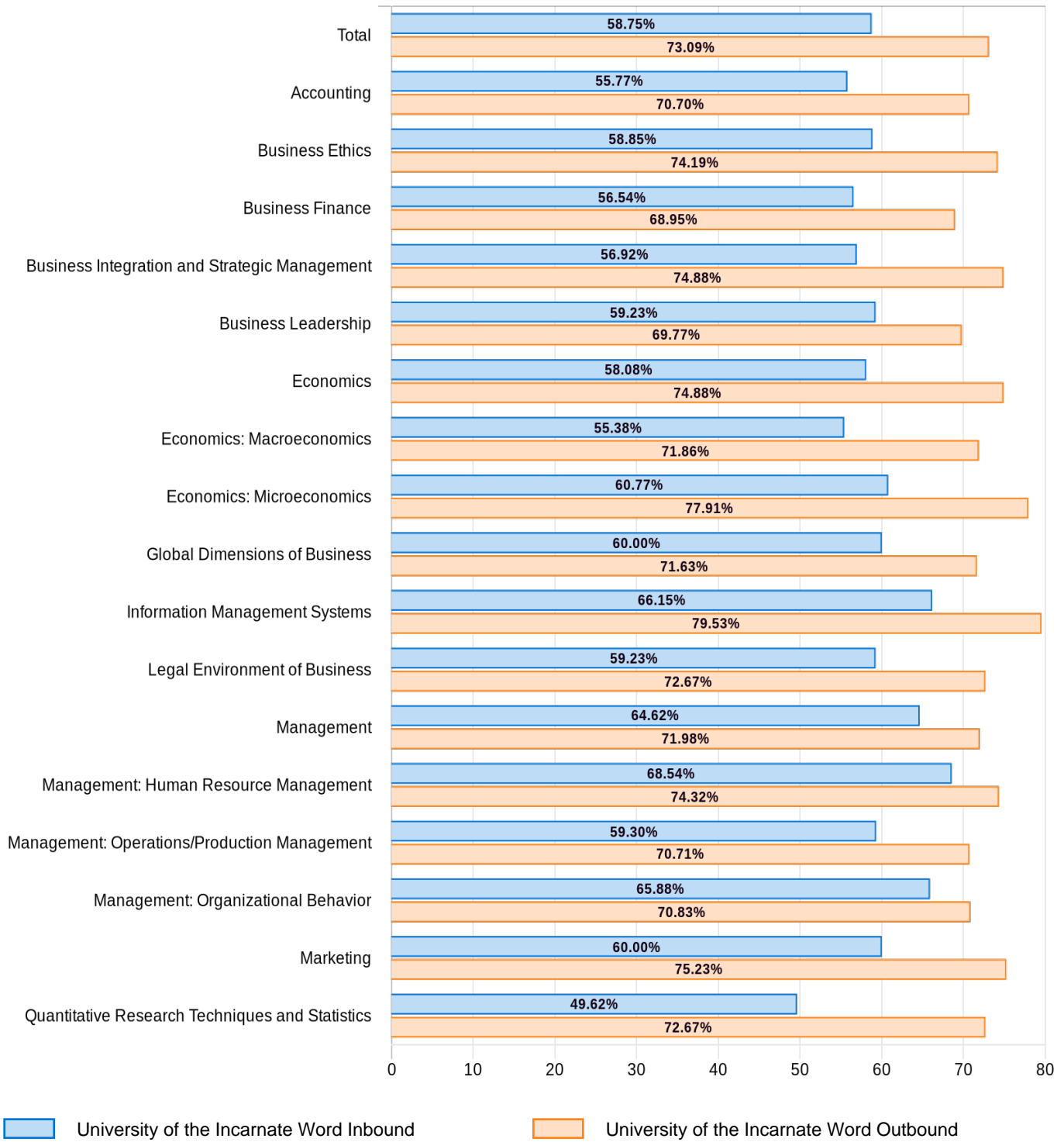
University of the Incarnate Word	
Top 3 Outbound Topic Scores	Bottom 3 Outbound Topic Scores
<ul style="list-style-type: none"> <li>Information Management Systems (79.53%)</li> <li>Economics: Microeconomics (77.91%)</li> <li>Marketing (75.23%)</li> </ul>	<ul style="list-style-type: none"> <li>Business Finance (68.95%)</li> <li>Business Leadership (69.77%)</li> <li>Accounting (70.70%)</li> </ul>

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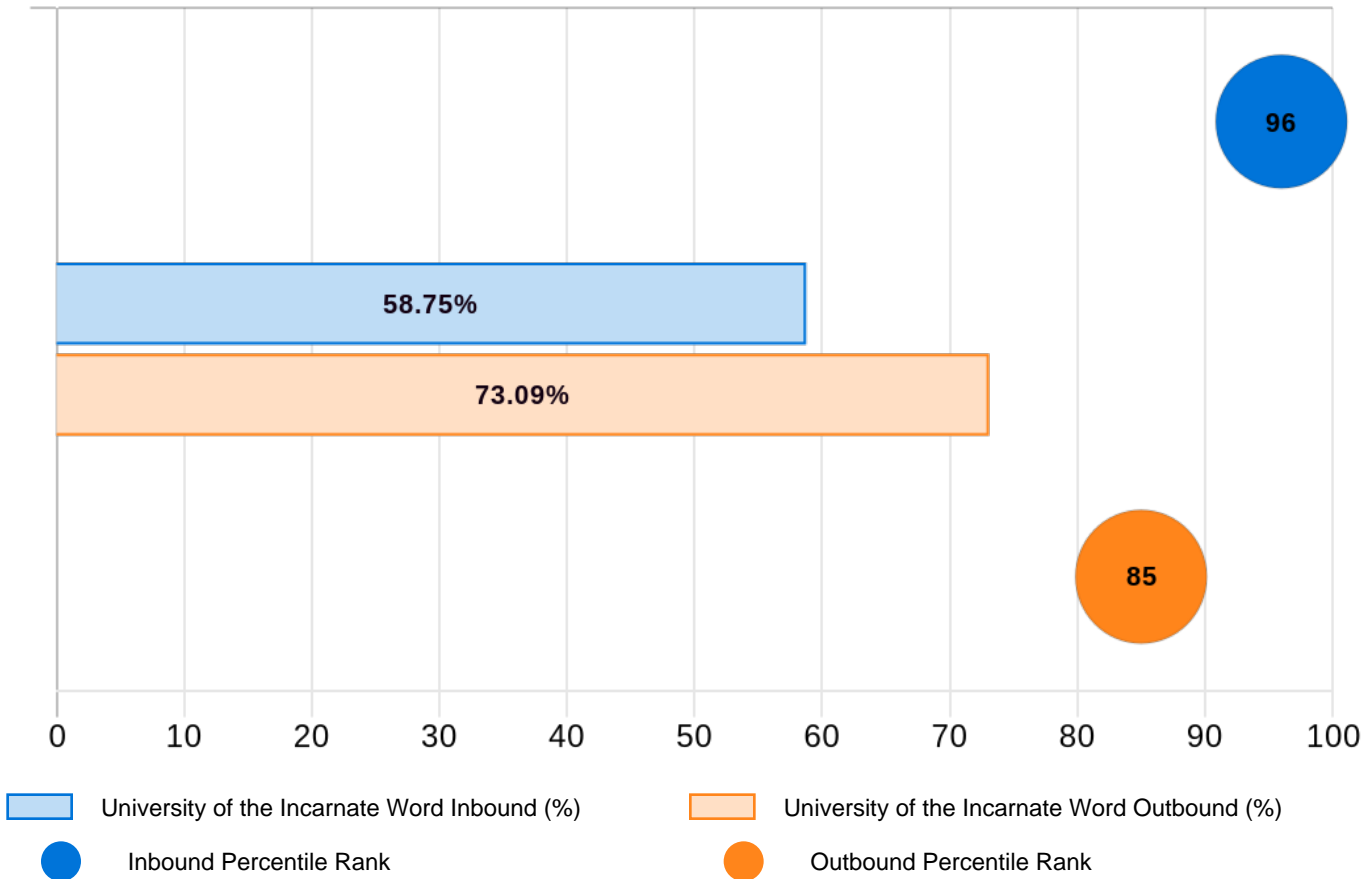
### Bachelors Business Administration

#### Comparison of Inbound Exam Results with Outbound Exam Results



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— University of the Incarnate Word  
Bachelors Business Administration

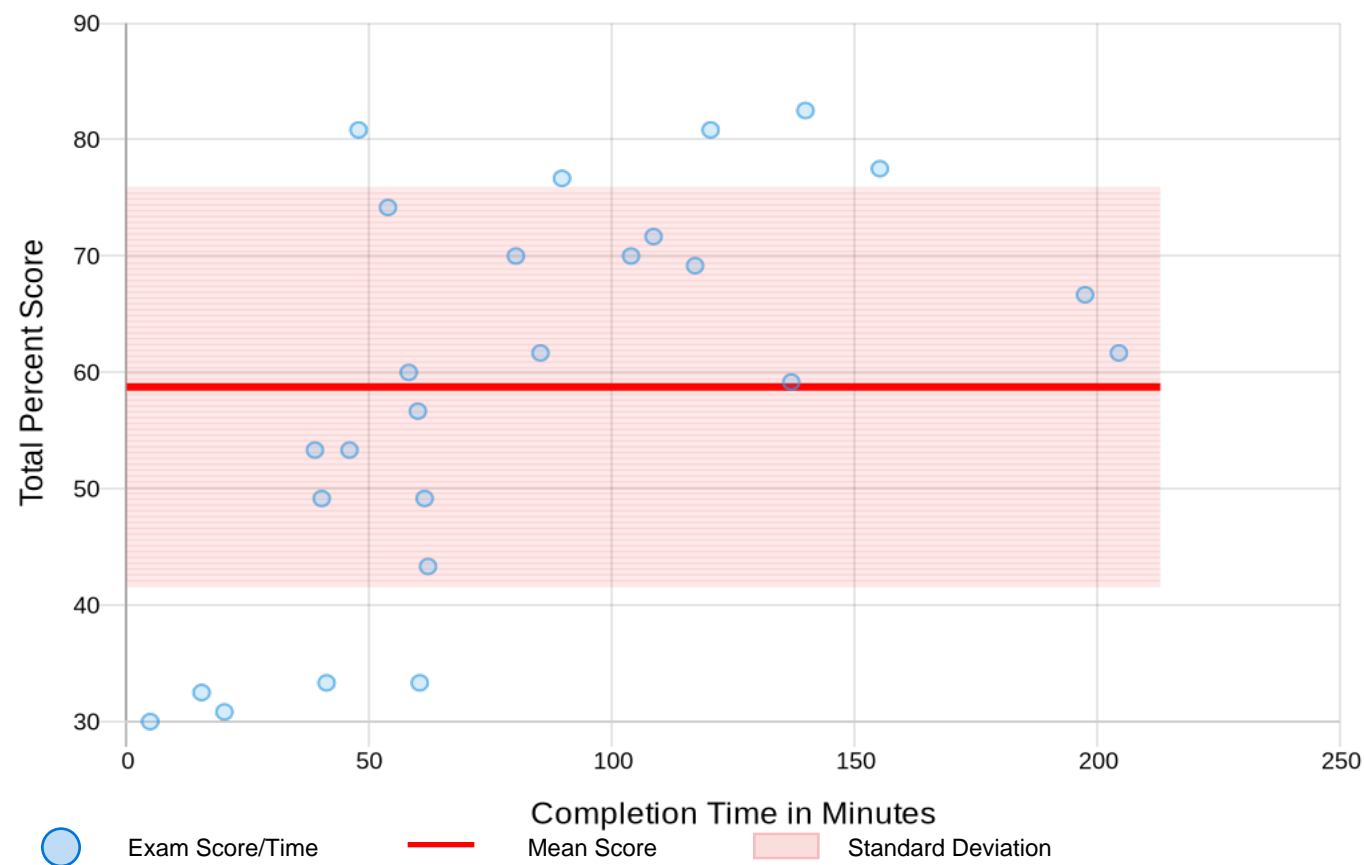
Total Score Comparison of Inbound with Outbound Results



University of the Incarnate Word		
	Inbound	Outbound
Sample Size	26	86
Total Score	58.75%	73.09%
Mean Completion Time	82.67 minutes	117.16 minutes
Percentile Rank	96	85
Selected Aggregate	Faith-based Institution	

Internal Analysis Executive Summary Report  
— University of the Incarnate Word  
Bachelors Business Administration

Inbound Exam Completion Time and Total Result Summary



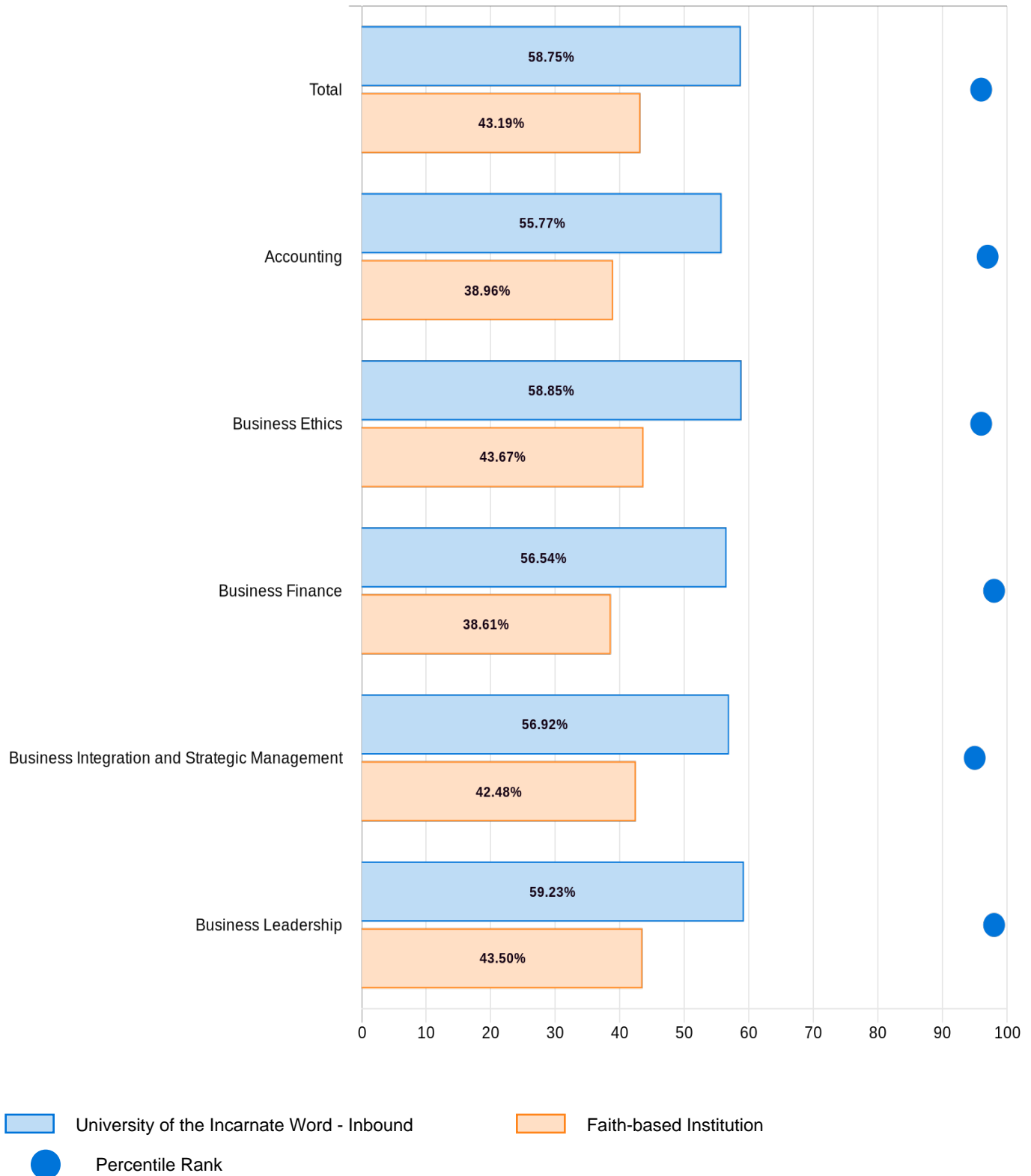
	University of the Incarnate Word - Inbound	Faith-based Institution
Sample Size	26	15,330
Mean Completion Time	82.67 minutes	52.27 minutes
Mean Score	58.75%	43.19%
Max Score	82.50%	N/A
Min Score	30.00%	N/A
Standard Deviation	16.89	7.97
* Results are sorted by number of minutes taken to complete the exam.		

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### Bachelors Business Administration

#### Comparison of Topic-level Inbound Results to Selected Aggregate Results

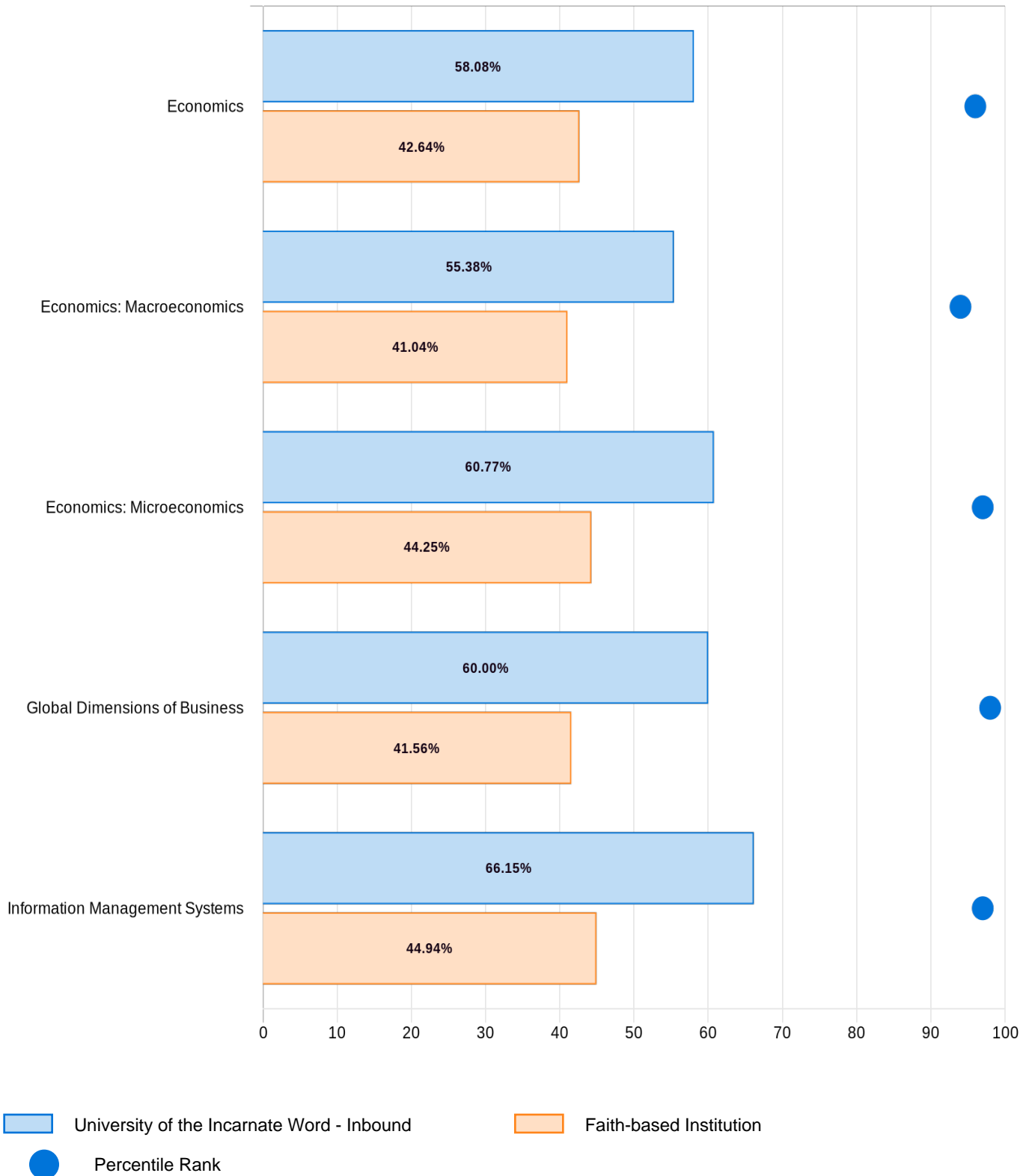


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### Bachelors Business Administration

#### Comparison of Topic-level Inbound Results to Selected Aggregate Results

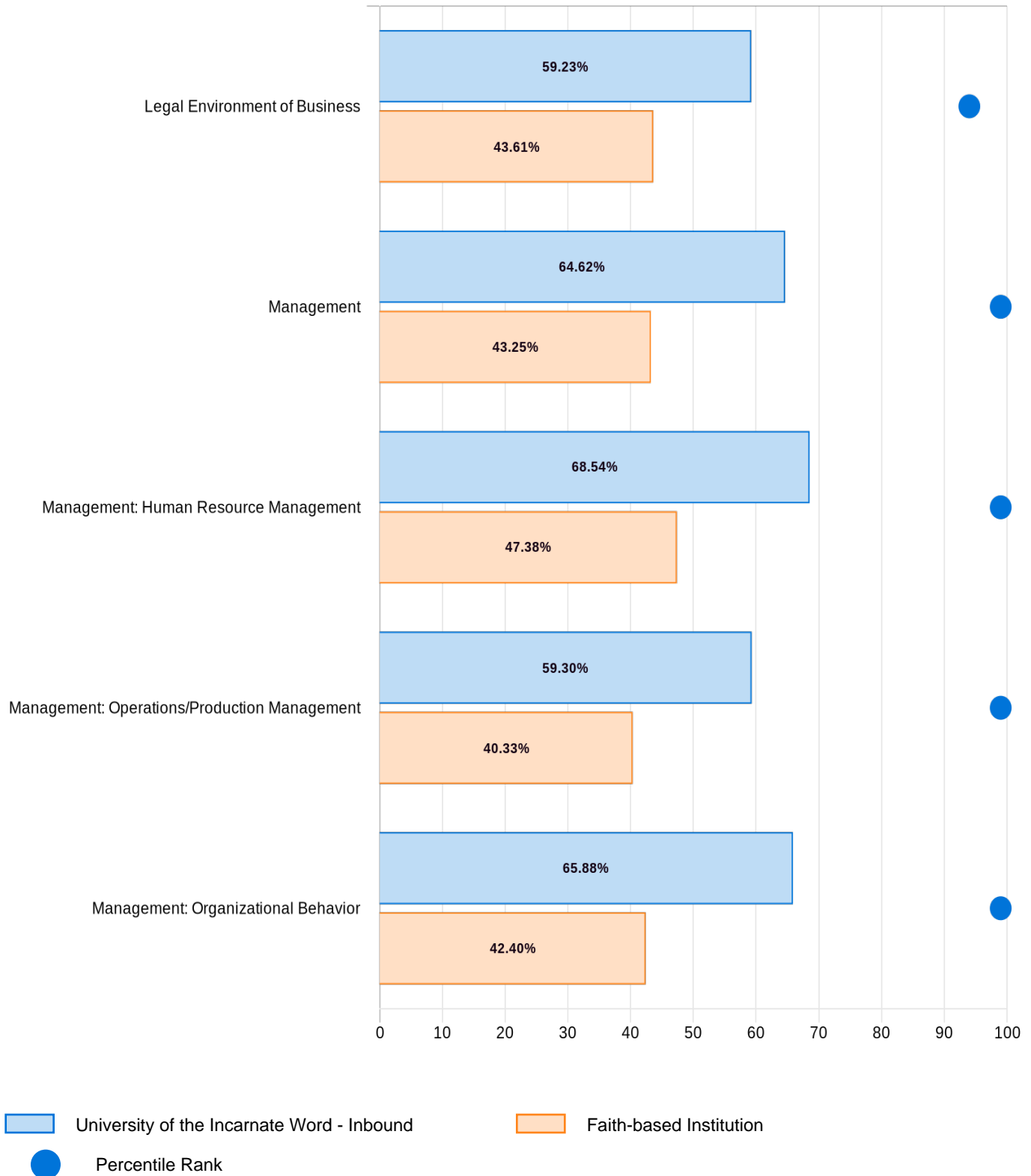


# Internal Analysis Executive Summary Report

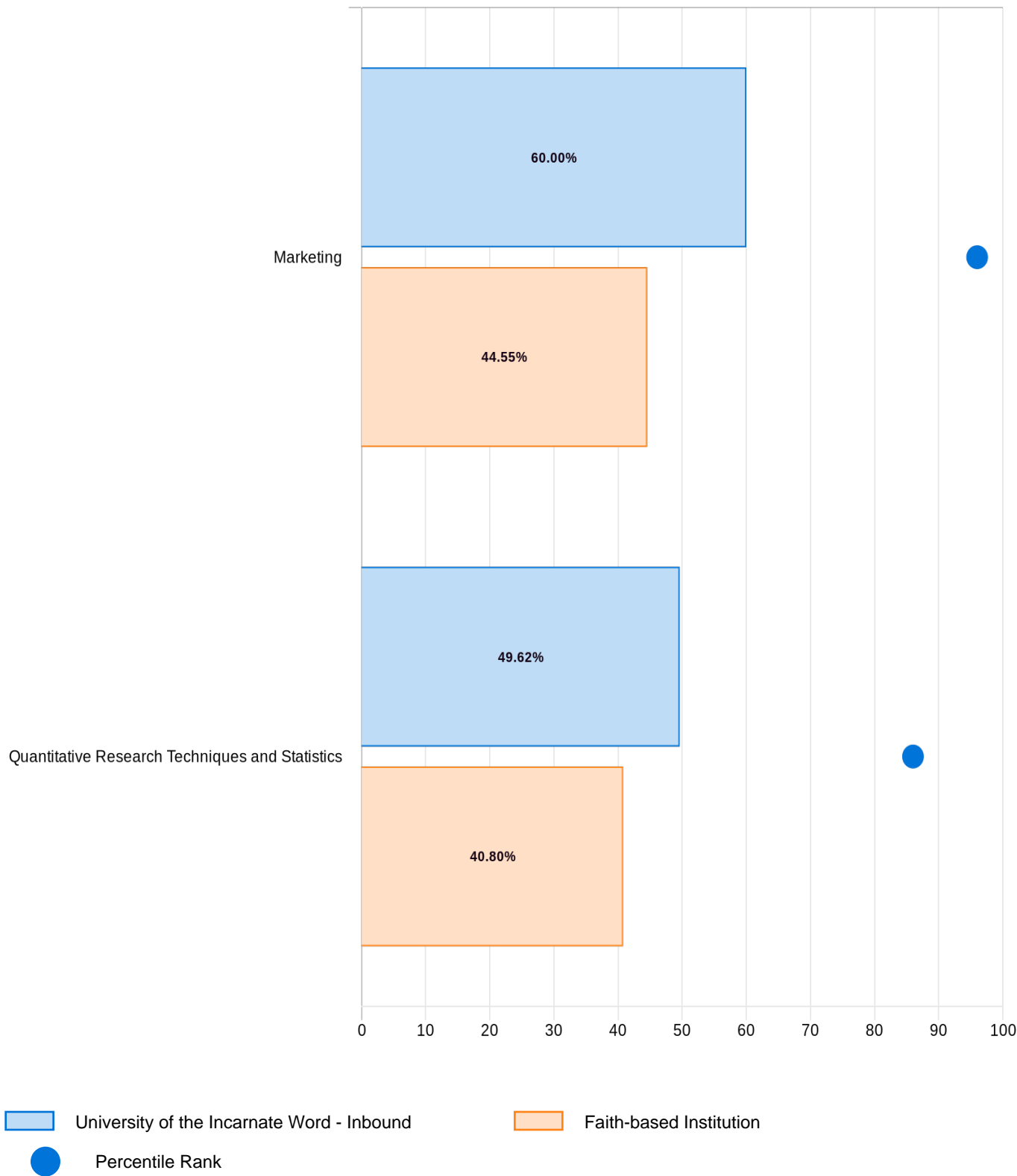
## — University of the Incarnate Word

### Bachelors Business Administration

#### Comparison of Topic-level Inbound Results to Selected Aggregate Results



Comparison of Topic-level Inbound Results to Selected Aggregate Results



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### Bachelors Business Administration

#### Inbound Exam Summary

Topic	University of the Incarnate Word		Faith-based Institution		Percentile Rank for this Report's Dataset	Required Scores for Identified Percentiles Based on the Selected Aggregate Pool			
	No. Questions Offered	Frequency Correct	No. Questions Offered	Frequency Correct		25th	45th	65th	85th
Accounting	260	55.77%	146,100	38.96%	*97	33.33%	37.00%	40.67%	46.67%
Business Ethics	260	58.85%	146,700	43.67%	*96	37.67%	41.33%	46.33%	52.33%
Business Finance	260	56.54%	140,400	38.61%	*98	34.00%	36.67%	40.00%	45.33%
Business Integration and Strategic Management	260	56.92%	143,700	42.48%	*95	36.50%	40.00%	44.33%	51.67%
Business Leadership	260	59.23%	127,800	43.50%	*98	38.33%	41.33%	45.33%	51.67%
Economics	260	58.08%	142,800	42.64%	*96	37.33%	40.67%	44.00%	50.00%
Economics: Macroeconomics	130	55.38%	71,400	41.04%	*94	35.33%	38.67%	43.33%	49.33%
Economics: Microeconomics	130	60.77%	71,400	44.25%	*97	38.67%	42.50%	46.67%	52.00%
Global Dimensions of Business	260	60.00%	141,000	41.56%	*98	36.00%	39.00%	43.62%	49.67%
Information Management Systems	260	66.15%	118,200	44.94%	*97	38.00%	41.33%	47.33%	53.69%
Legal Environment of Business	260	59.23%	149,400	43.61%	*94	37.00%	40.33%	46.00%	52.48%
Management	260	64.62%	139,500	43.25%	*99	38.33%	41.18%	45.33%	50.72%
Management: Human Resource Management	89	68.54%	45,583	47.38%	*99	41.46%	45.45%	50.00%	57.14%
Management: Operations/Production Management	86	59.30%	44,575	40.33%	*99	34.83%	38.61%	42.86%	48.50%
Management: Organizational Behavior	85	65.88%	49,342	42.40%	*99	37.22%	40.63%	45.00%	50.00%
Marketing	260	60.00%	144,900	44.55%	*96	39.00%	42.33%	46.43%	52.33%
Quantitative Research Techniques and Statistics	260	49.62%	140,700	40.80%	*86	35.33%	38.00%	42.33%	48.67%
Summary	3120	58.75%	1,681,200	43.19%	96	37.11%	39.94%	45.69%	51.00%

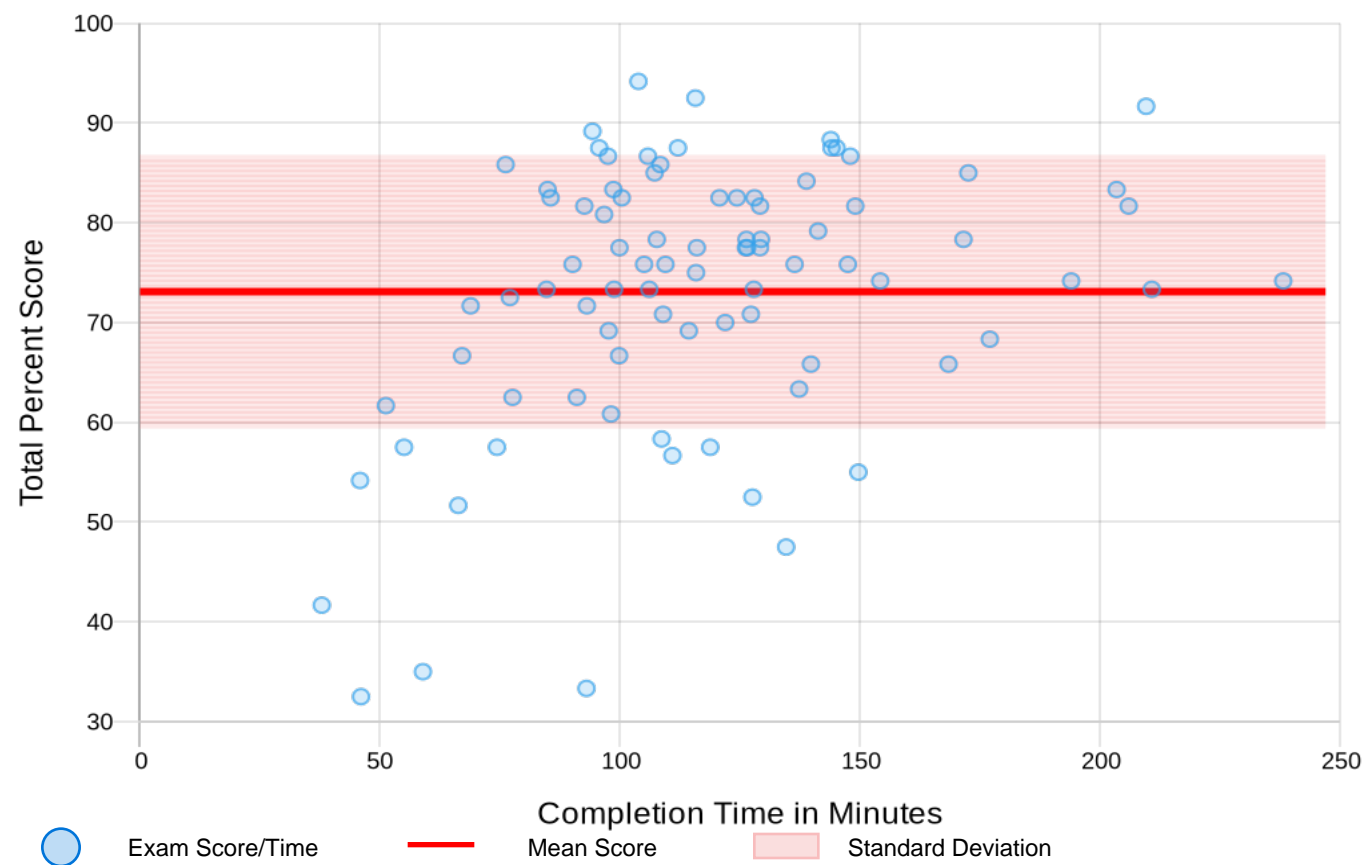
Frequency correct values in this table are rounded for easier display. To see the raw values, please select the Excel version of this report.

\*Please note that either the aggregate pool sample and/or school sample for this data set is relatively low for the Percentile Rank Calculation.

Selected Aggregate Pool: Faith-based Institution

Internal Analysis Executive Summary Report  
— University of the Incarnate Word  
Bachelors Business Administration

Outbound Exam Completion Time and Total Result Summary



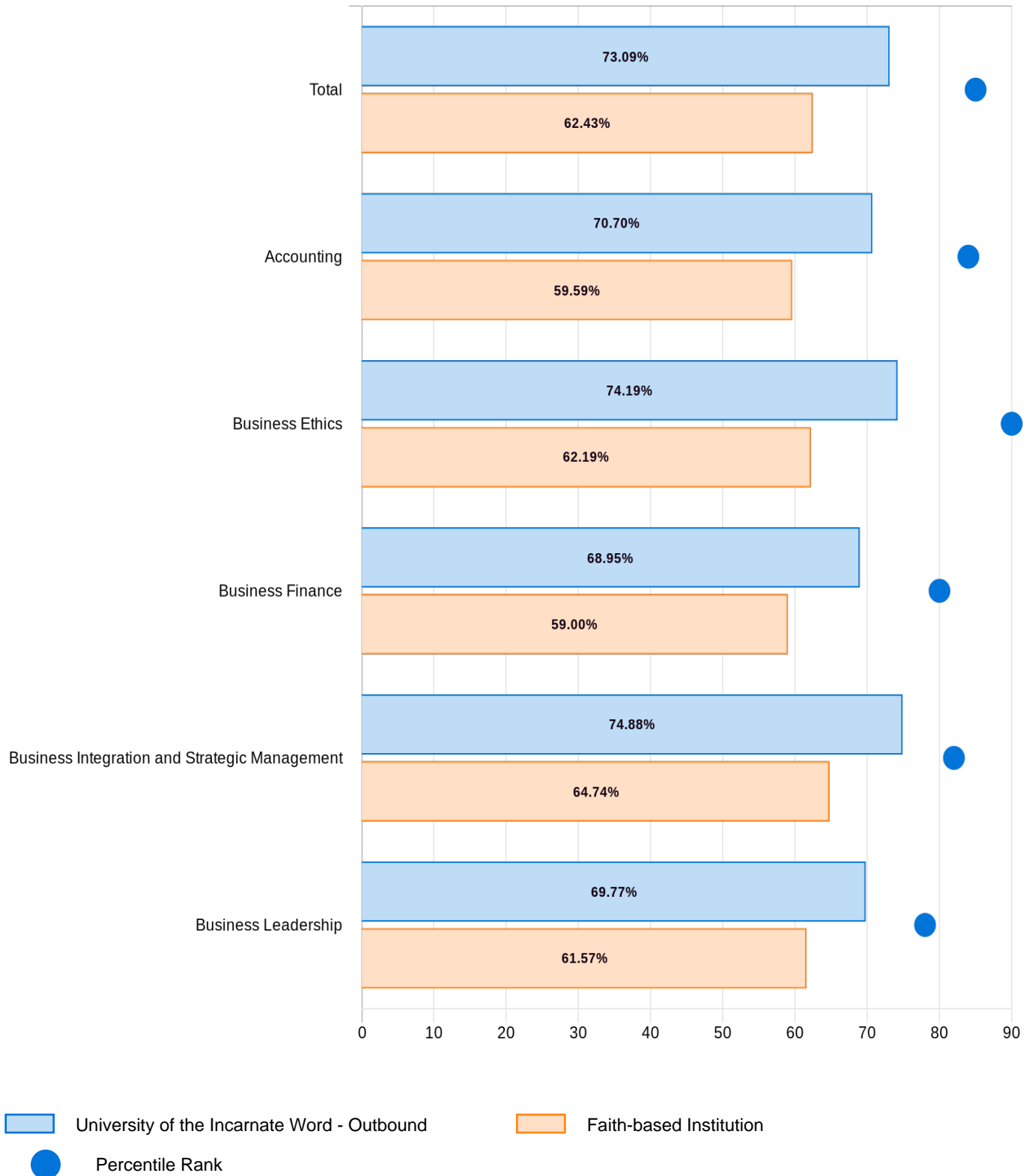
	University of the Incarnate Word - Outbound	Faith-based Institution
Sample Size	86	33,780
Mean Completion Time	117.16 minutes	80.26 minutes
Mean Score	73.09%	62.43%
Max Score	94.17%	N/A
Min Score	32.50%	N/A
Standard Deviation	13.35	9.9
* Results are sorted by number of minutes taken to complete the exam.		

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

### Bachelors Business Administration

#### Comparison of Topic-level Outbound Results to Selected Aggregate Results

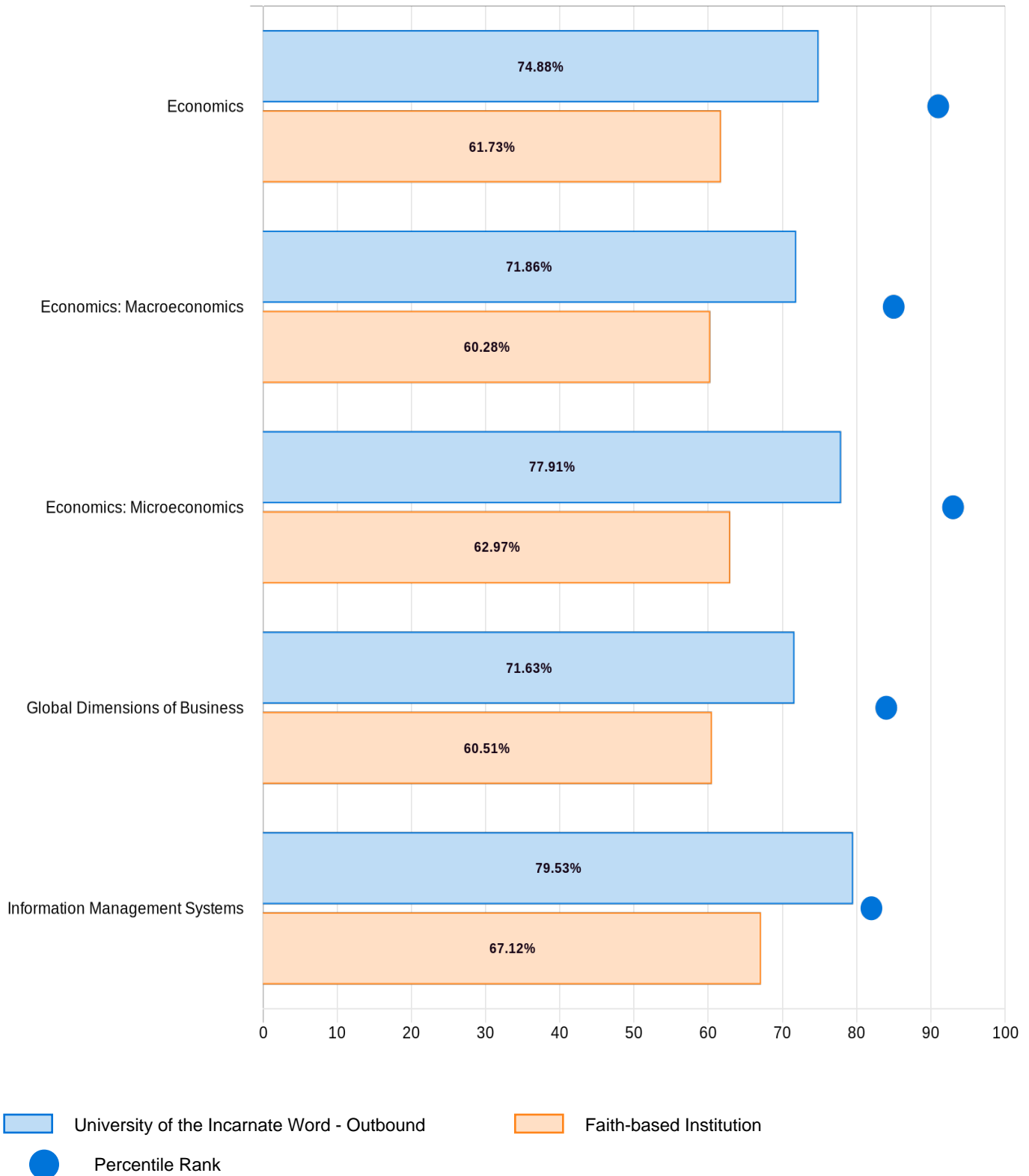


# Internal Analysis Executive Summary Report

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### Bachelors Business Administration

#### Comparison of Topic-level Outbound Results to Selected Aggregate Results

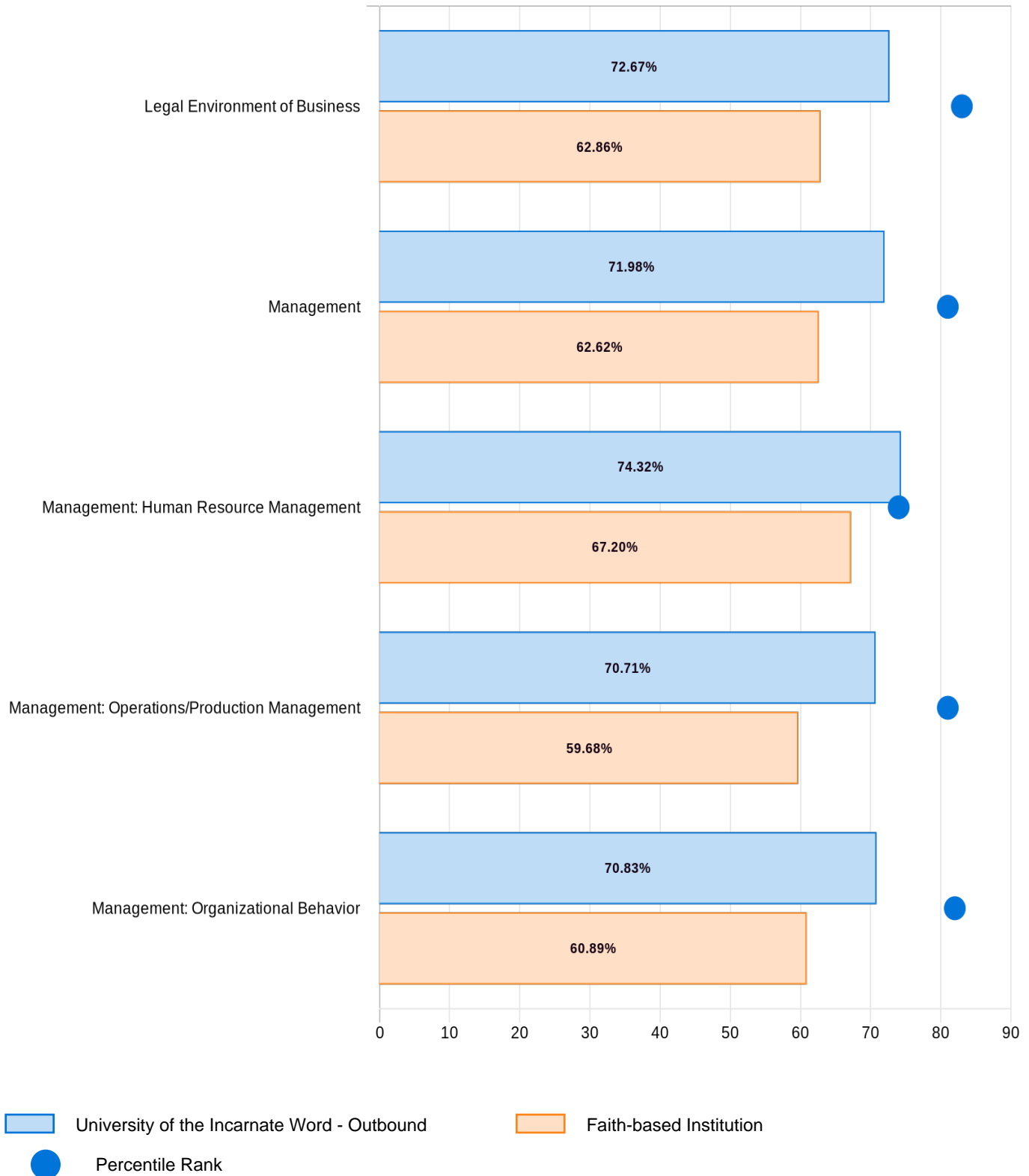


# Internal Analysis Executive Summary Report

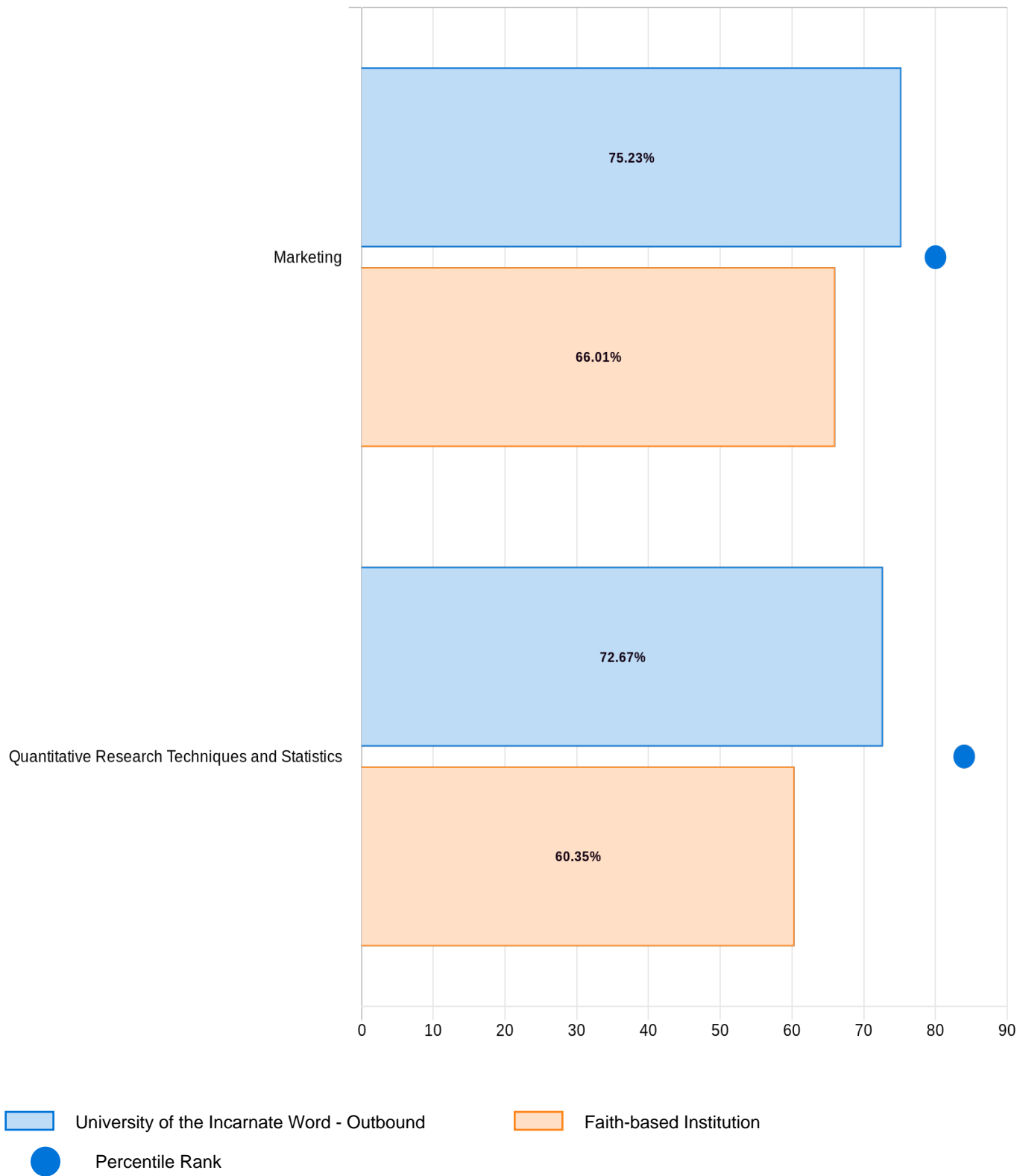
## — University of the Incarnate Word

### Bachelors Business Administration

#### Comparison of Topic-level Outbound Results to Selected Aggregate Results



Comparison of Topic-level Outbound Results to Selected Aggregate Results



# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

### Bachelors Business Administration

#### Outbound Exam Summary

Topic	University of the Incarnate Word		Faith-based Institution		Percentile Rank for this Report's Dataset	Required Scores for Identified Percentiles Based on the Selected Aggregate Pool			
	No. Questions Offered	Frequency Correct	No. Questions Offered	Frequency Correct		25th	45th	65th	85th
Accounting	860	70.70%	323,857	59.59%	84	51.00%	59.00%	64.67%	71.00%
Business Ethics	860	74.19%	316,657	62.19%	90	54.67%	61.00%	67.33%	72.33%
Business Finance	860	68.95%	318,567	59.00%	80	50.33%	58.30%	64.67%	70.33%
Business Integration and Strategic Management	860	74.88%	309,755	64.74%	82	56.75%	64.00%	70.00%	75.67%
Business Leadership	860	69.77%	283,356	61.57%	78	54.33%	60.33%	67.00%	71.33%
Economics	860	74.88%	322,525	61.73%	91	54.00%	60.33%	66.00%	72.33%
Economics: Macroeconomics	430	71.86%	158,943	60.28%	85	52.00%	59.33%	65.33%	71.33%
Economics: Microeconomics	430	77.91%	163,792	62.97%	93	56.00%	61.33%	66.67%	73.33%
Global Dimensions of Business	860	71.63%	301,657	60.51%	84	52.67%	59.67%	65.33%	72.00%
Information Management Systems	860	79.53%	275,525	67.12%	82	57.33%	66.67%	74.00%	80.00%
Legal Environment of Business	860	72.67%	320,555	62.86%	83	55.00%	62.33%	68.00%	73.33%
Management	860	71.98%	321,994	62.62%	81	55.00%	62.00%	67.67%	72.33%
Management: Human Resource Management	292	74.32%	106,878	67.20%	74	60.61%	66.35%	71.72%	77.08%
Management: Operations/Producti on Management	280	70.71%	101,395	59.68%	81	51.43%	58.44%	65.66%	72.00%
Management: Organizational Behavior	288	70.83%	113,263	60.89%	82	53.06%	60.60%	66.34%	71.88%
Marketing	860	75.23%	325,357	66.01%	80	58.67%	65.33%	71.00%	76.42%
Quantitative Research Techniques and Statistics	860	72.67%	300,759	60.35%	84	51.00%	59.00%	66.00%	73.00%
Summary	10320	73.09%	3,720,564	62.43%	85	53.84%	61.60%	68.37%	72.91%

Frequency correct values in this table are rounded for easier display. To see the raw values, please select the Excel version of this report.

Selected Aggregate Pool: Faith-based Institution

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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### How to Read and Understand the Internal Analysis Executive Summary Report

#### Purpose of the exam

The purpose of the exam is to provide direct assessment of student learning. The exam results are used to assess the strengths and opportunities for improvement of academic programs. The exam measures the knowledge levels of students related to the learning outcomes of the program.

The Internal Analysis report provides results of the Inbound and Outbound Exams (and Mid-point Exams, when available). The report provides an analysis of means, percentiles, and of frequencies based on the percent of questions students answered correctly. The report results are used for programmatic evaluation and identifying gaps and strengths of a program.

#### Who uses the reports

- Program administrators
- Program directors
- Academic program managers
- Accreditation coordinators
- Assessment coordinators
- Course managers
- Anyone involved with programmatic evaluation

#### Exam Construct: Inbound and Outbound Approach

An Inbound or Outbound Exam construct provides data for both internal and external benchmarking. The Inbound Exam evaluates the student's knowledge level at the beginning of the student's program of study. The Outbound Exam assesses the student's knowledge level at the end of the student's program of study. The difference in results between the Inbound and Outbound Exams is the direct measure of learning most often used for internal benchmarking.

Additional subject-level comparison to specific aggregate pools allows for both internal and external benchmarking. The assessment results are compared at the topic and subject levels based on percent scores and percentile rankings to determine if student performance is below, at, or above desired thresholds established by the program or school.

The number of questions offered, and the frequency correct value of the aggregates, is based on the sampling of the data at each level (subject, topic, total), independent of each summary level. Thus, the sum of the number of questions offered for a set of subjects may not equal the number of questions offered for the topic.

#### How to use the Internal Analysis Report

The Inbound Exam provides the baseline measurement of student knowledge level as they start the academic program. Outbound Exam results are relative to the Inbound Exam results and in comparison, with the selected aggregate pool. Outbound Exam relevancy is understood in terms of the change in knowledge level from the time a student enters the program compared to when they graduate from the program. The results are presented at the topic, subtopic, and subject levels.

External comparisons of Outbound Exam scores with the various aggregate pools are used as a relative index of how the assessed program compares with other programs. There is a high degree of variability between schools with respect to specific curriculums and areas of emphasis or concentrations. Comparisons include other schools with relatively similar student populations and educational delivery means, not necessarily based on the exact curriculum of the program (which would be nearly impossible and most likely unrealistic). There are multiple pools to select from for the comparisons. Only one comparison can be made for the Internal Analysis Report.

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

### Analyses used in the Internal Analysis Report

The report presents the results of three types of data analyses: Means of Scores Analysis, Percentile Analysis, and Analysis of Percent Correct.

- a) Means of Scores Analysis.** This is a simple mean where we take the total scores and divide by the number of scores. The sample then is either the school's number of exams included in the report or the total number of completed exams in the aggregate pools.
- b) Percentile Analysis.** The exam results within the aggregate pools are converted into percentiles for each exam topic. These percentile scores are shown in the report to help school officials set specific benchmarks by comparing percentile rankings to the exam results included within the aggregate pool. The percentile rank analyses are the percentage of scores that fall at or below a given score at the topic and subject areas for comparison with the program's exam results where available at each corresponding topic and subject area.
- c) Analysis of Percent Correct.** This is a total figure used where we take the total number of questions answered correctly (either at the Subject, Subtopic, or Topic levels) and divide by the total number of questions offered, expressed as a percentage. A set of exam results is treated as one set of data/sample. These results are then compared to the aggregate pool results, which are similarly calculated.

### Average Total Score Percentile

Because not all exams include the same set of topics, a percentile value based on the Exam Total scores cannot be calculated with statistical precision. Most client schools customize the exams using topic selection and some include an internally developed topic. Therefore, the Average Total Score Percentile values are calculated as a simple mean of the topic percentile values. The Average Total Score Percentile values are shown only to provide a relative comparison of the Total Score.

For percentile ranking calculations and percentile benchmarks shown for the selected aggregate pool, results are subject to sample size limitations. In general, percentile ranking, and percentile benchmarks should be used with caution relative to making programmatic changes, especially, if the sample of Questions Offered for the aggregate pool is less than 300 for a specific topic.

### How the data are organized and presented

The Executive Summary page includes an overview of the data presented in the Internal Analysis Report. The first four charts are a side-by-side overview of the exam comparisons' results. If Inbound or Mid-point exams are included, this graph displays Inbound, Mid-point, and Outbound exam averages and the percentage change from the Inbound and Outbound Exams for the available data. Chart #1 illustrates the comparison of the Inbound and Outbound Scores, Chart #2 illustrates the comparison of the completion time in minutes, Charts #3 and #4 Display the comparisons of the Inbound and Outbound Exams with the Selected Aggregate. The Top 3 and Bottom 3 Topic Scores are outlined for quick analysis.

The scatter plot is sorted by Exam Completion Time (low to high) and plotted with the scores of the shorter completion time shown to the left and the scores with the longer completion time shown towards the right. The Y axis plots the exam score and the X axis the completion time.

The comparison of Inbound Exam results with Outbound Exam results are illustrated for each exam topic and subject. For each topic, the Total Score Comparison Summary Tables separate the data for the program and selected aggregate into two tables summarizing the Inbound and Outbound Exams sample size, total score, mean completion time, percentile rank for the aggregate, max and min scores, and the standard deviation. The Comparisons to Selected Aggregate is an overview of each topic or subtopic data charted with the percent correct, a comparison with the aggregate data, followed by a summary table for both the topics Inbound and Outbound exams. The summary table organizes the results for the report's dataset by subject to include the frequency correct for the program and selected aggregate, a percentile rank, and the percentile benchmarks used for learning outcomes evaluation. [Similar charts and tables are shown for each topic, with similar subject-level data.]

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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For each topic or subtopic for both Inbound and Outbound exams, the reported data include:

1. Inbound and Outbound Program Results and Exam Data Comparison.
2. Bar Graph of the Subjects within the Topic or Subtopic compared to the selected aggregate pool used with the report. Percentile rank is illustrated by the circles on the bar graph and the color key below.
3. An Exam Summary Table of the questions offered on the exam. This table shows the percentile rank and the percentile benchmarks based on the selected aggregate pool.

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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### Best Practices

#### Reviewing Individual Results

It is important that students give their best effort in completing the assessment, especially for the Outbound Exam. An essential component of administering the assessment is to explain the purpose of the exam to the students so that the schools can collect actionable and accurate data on student performance for programmatic evaluation and continuous improvement efforts.

- To encourage students to do their best with the Outbound Exam, an incentive is usually needed. Exam incentives include a direct grade, points, or extra credit. Another option is to assign an additional assignment when students do not meet a specific threshold. Typically, simply grading the exam is the best approach to properly incentivize the exam (see the Interpreting & Evaluating Exam Scores section).
- Individual student completion times provided in the Individual Results Report are helpful when evaluating student effort, particularly with Outbound Exam results. Typically, a 100-question exam should take the student about 60-90 minutes to complete. If exam completion times are below 30 minutes, academic officials may consider further efforts to incentivize the exam in order to get the students to take the exam seriously and thus improve results. Note: Mean completion times are provided in the Internal Analysis report. All reports can be filtered to remove results where the completion time is below a desired threshold.
- Another way to evaluate students' readiness for assessment, and their commitment to academic integrity, is to review the time students spent away from the exam window. This information is provided in the Individual Results Report.

#### Reviewing Cumulative Results

Topic-level scores tend to be more meaningful in terms of analysis value than the total score. Although most exams include all available topics, not all exams will include all available topics. Therefore, the total score comparisons are shown for relative benchmarking, whereas the topic and subtopic level score comparisons will tend to be more meaningful in terms of understanding relevancy of the scores.

- If there are topics included on the exam that do not appear to be directly related to your curriculum and/or learning outcomes, consider removing these topics from future testing. It is generally best not to test on topics that are not included in the program's curriculum.
- Consider the sample size for the exam period before making changes in the program based on the exam results. Lower sample sizes tend to have higher standard deviations. In general, it is best to have a sample of at least 100 exams before the results can be used for programmatic changes. Since the report period is a variable, the past exam results could be included for future reporting in order to get the sample size high enough for meaningful analysis.
- It is important not to make too many changes in a program at once based on the results of one or two exam periods. Instead, make small incremental changes to the program based on the results and then monitor the results to assess the consequences of the change effort.

#### Learning Outcomes Analysis

To evaluate the institution's learning outcomes, please review the Exam Summary table shown for each topic. These data are most useful when considering learning outcomes.

- Not every subject included on the exam will directly correspond to a program's learning outcome because this is a standardized test meant to apply to the widest diversity of programs. Therefore, the score for the topic or subtopic must be taken in the context of the subject-level analysis. For example, a relatively low topic/subtopic score may be acceptable provided that the subject-level scores are high for those subjects that are directly related to learning outcomes. Conversely, a high topic/subtopic score may be unacceptable if the questions missed on the exam were high for key learning outcomes.
- An Aggregate Extraction report is available and includes the aggregate pool statistical summary data that are used for comparison analysis purposes. This report is available in the Client Admin site under the menu item Reports.

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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### Interpreting and Using Exam Scores

Inbound Exam results are obtained from incoming learners who have just started their academic program. Cumulative Inbound Exam results are typically used relative to the cumulative Outbound Exam results to directly measure academic learning. Individual learner results from Inbound Exam (Individual Results Report) can be used to help guide, advise, and place a learner within a program of study.

Outbound Exam results are a direct measure of academic learning since the learners taking the Outbound Exam have completed, or nearly completed, the academic degree program.

Outbound Exam results, both cumulatively and individually, DO NOT correspond directly to a traditional academic grading scale. This is a normed exam with an average degree of difficulty of questions approximately 55%-60%. The exam is relative to the Inbound Exam results, as well as the external aggregate comparisons.

NOTE: There is not a “passing” or “acceptable” score based on the results of this normed exam, nor do accreditation organizations expect to see a passing or acceptable level. Rather, school officials determine what is passing/acceptable based on associated benchmarks. Abandoned exams receive a zero and are not included in cumulative results.

There is a distinct difference between evaluating results versus grading individual exams. Individual learner grading of the Outbound Exam could be conducted using the figure and table on the following page. Typically, the Outbound Exam should be incentivized to encourage learners to do their best. Inbound Exams are usually not incentivized since the learner is just starting the academic degree program and most likely has limited knowledge of the instructional topics.

If specific academic credits (e. g., grade, points, or extra credit) are to be awarded to learners based on their exam results, the Interpretation of Assessment Scores Based on Cumulative Results figure and the Relative Interpretation of Learner Competency table show a relationship between the percentile score's exam results and relative student performance based upon competency level.

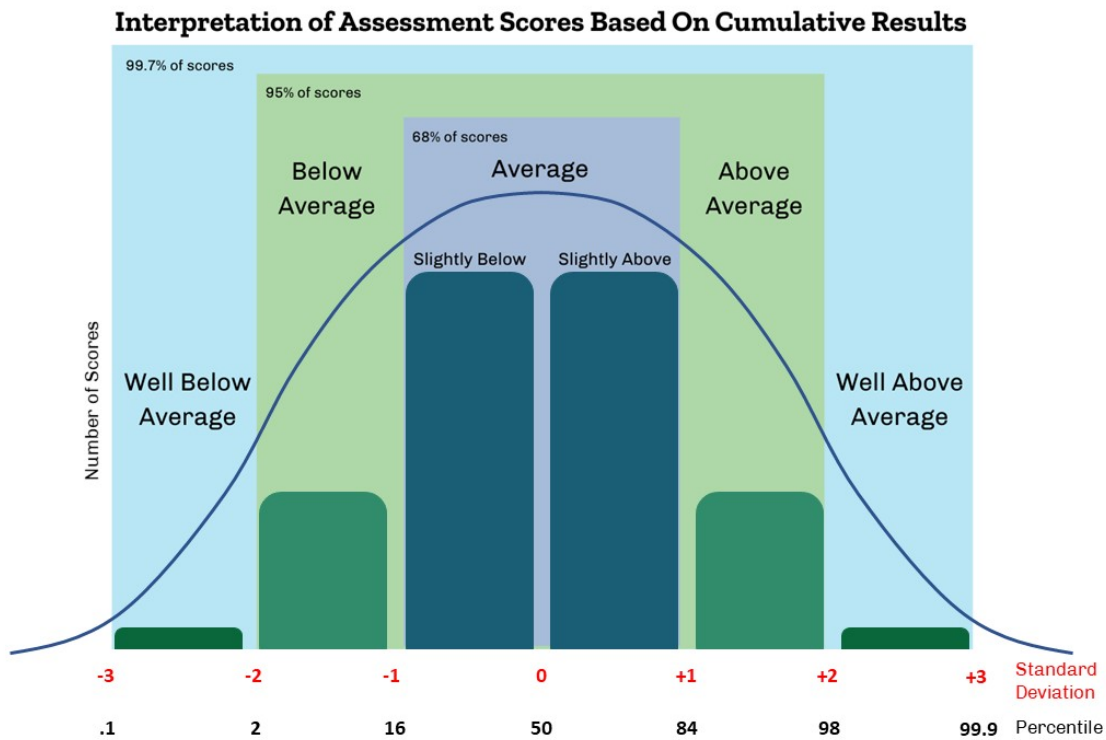
Percentiles are used rather than percent scores so that the learner's results can be understood relative to the cumulative results of all learners who have completed the exam. Peregrine Global Services maintains 4-year rolling aggregate comparison pools that include percentiles. The individual learner scores and the cumulative assessment results are shown in both percentages and percentiles.

As illustrated in the Interpretation of Assessment Scores Based on Cumulative Results figure, the percentile distribution is based on the standard deviations (SD) of the sample:

- Average is the 50th percentile.
- Exam scores that are one SD above the mean are Slightly Above Average (50.1st – 84th percentile).
- Exam scores that are two SDs above the mean are Above Average (84.1st – 97.9th percentile).
- Exam scores that are three SDs above the mean are Well Above Average (98th – 99.9th percentile).
- Exam scores that are one SD below the mean are Slightly Below Average (16th – 49.9th percentile).
- Exam scores that are two SDs below the mean are Below Average (2.1st – 15.9th percentile).
- Exam scores that are three SDs below the mean are Well Below Average (0.1st – 2.0th percentile).

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Percentiles	Relative Interpretation of Learner Competency
98.0-99.9	Well Above Average
84.1-97.9	Above Average
50.1-84	Slightly Above Average
50	Average
16-49.9	Slightly Below Average
2.1-15.9	Below Average
0.1-2.0	Well Below Average

Once the academic institution has data from at least 50 exams from the same assessment service, the Grade Scale Report can be generated to provide a grading curve based on the learner results from the institution. Alternatively, academic officials can grade an exam using the percentiles calculated from the aggregate pools. Both methods are appropriate so long as the exam is evaluated based on a curve of the distribution of scores.

# Internal Analysis Executive Summary Report

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### Validity and Reliability

#### Assessment Services Test Bank Validity and Reliability

The programmatic assessment services provided by Peregrine Global Services are used to assess retained knowledge of students at the academic program level. School officials deploy these services to evaluate the effectiveness of their academic programs, identify areas for improvement, and demonstrate program outcomes to external stakeholders. Ensuring the ongoing validity and reliability of the assessment services is of utmost importance for our assessment services. These practices begin at the design stage, continue during the piloting phase, and are ongoing with the conducting of comprehensive quality reviews.

Validity refers to the extent to which the exam results are relevant and meaningful for the purpose of the exam, that is, to assess a student's retained knowledge of the program topics being assessed. Reliability refers to the extent to which the exam results are repeatable across different sets of participants, and therefore data sets can be compared over time.

#### Ensuring Validity and Reliability

Peregrine's assessment services incorporate the following design features that enhance both validity and reliability.

1. Exam scoring is 100% objective, using automated marking.
2. Each exam viewed by a student is unique using a random selection of questions from the test bank in random topic order.
3. Each response to a question is timed. Student activity is monitored: when the user navigates away from the exam screen, the screen fades and a [warning] message is shown.
4. Students are unable to copy/paste from the exam window.
5. Abandoned exams are excluded from summary reports.

In addition, the following specific practices are adopted. The exam services meet AICPA, Trust Services Criteria set forth in DC 200, 2018 Description Criteria for a Description of a Service Organization's System in a SOC 2® Report. This third-party auditing and reporting process is designed to provide reasonable assurance that Peregrine Global Services Corporation's service commitments and system requirements achieve the criteria relevant to security and availability set forth in TSP 100, 2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy (AICPA, Trust Services Criteria).

#### Ensuring Validity

The following measures are adopted when test banks are created:

- Topics and Subjects are selected to align with pertinent accreditation and/or certification requirements and related learning outcomes.
- The exam services are designed in consultation with accreditation agency officials.
- Test questions are created (and revised) by academic professionals with expertise in the relevant discipline.
- In order to ensure appropriate breadth of coverage and to enable specific learning outcomes measurement and reporting, questions are created to align with typically 4-8 Subjects for each Topic.

Once a new test bank is created, the service is piloted with clients to obtain feedback and confirm the design construct will meet the needs specific to the discipline of interest.

Client feedback is also continuously gathered and incorporated into the test bank quality review program.

# Internal Analysis Executive Summary Report

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### Ensuring Reliability

Traditional methods for determining exam reliability are not applicable when a test bank is used to randomly generate unique tests for exam participants. In consultation with an external expert, Peregrine Global Services developed a methodology that relies upon multiple measures that collectively determines the reliability of the test bank and identifies specific questions for remediation. The measures are Item Difficulty, Item Discrimination, and Item Interchangeability. If a test bank question fails any one of the tests, the question is flagged for replacement or modification. Academic professionals are employed to revise questions and/or create replacements.

**Item Difficulty** refers to percentage of students who answer questions correctly. Data are generated by topic and for each individual question. The target Item Difficulty is 60 percent correct with an acceptable range of 35 – 80 percent. Questions which fall outside of this range are modified to make them less or more difficult as indicated by the data.

**Item Discrimination** refers to how well a question distinguishes between those students with more knowledge (higher overall exam scores) from those with less knowledge. Two measures are used: Discrimination Index and Point-Biserial Correlation.

For a given question, the Discrimination Index compares the scores of students with high overall test scores with students with low overall test scores. The scale is -1 to +1, with higher values indicating that a given question better distinguishes between high and low performing students. A value of  $\geq 0.20$  is considered acceptable.

Point-Biserial Correlation is equal to the Pearson's Correlation Coefficient between the scores on the entire exam and the scores on a specific question. A score of  $\geq 0.10$  is considered acceptable. Questions that fail either of the discrimination criteria are replaced.

**Question Interchangeability** refers to the ability to substitute a question in the test bank with another without significantly affecting the total score that an individual would receive on the exam. This is determined using Cohen's Effect Size  $d$ , calculated based on a two-tailed t-test comparing the total score for all students who had that question in their exam versus the total score of the students who did not have that question in their exam. The scale is 0-1.0 and a score of  $< 0.20$  is considered acceptable. Questions that fail the interchangeability criteria are replaced.

### Reference

Oedekoven, O. O., Napolitano, M., Lemmon, J., & Zaiontz, C. (2019). Determining test bank reliability. *Transactional Journal of Business*, 4 (Summer 2019), 63-74.

# Internal Analysis Executive Summary Report

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### Glossary of Terms

#### Exam Specific Terminology

**Abandoned Exam.** An exam that had the 48-hour time limit elapse or the 3 access attempts were exceeded. These exams are auto completed, giving the student a score of "0" for each unanswered question. These exams are only included in the school's individual results, not in the reporting or analysis.

**Cohort.** A group of students based upon a demographic factor such as specialization, campus location, program start date, etc.

**Content of the exam.** The Exam Summary document contains the list and descriptions of topics, subtopics, and subjects with a couple sample questions.

**Exam.** Includes all selected topics to assess a specific program. Each topic has 10 questions included within an exam, randomly selected from a validated test bank. Inbound and Outbound Exams are generated from the same test bank of questions.

**Inbound Exam.** A student exam administered early in the student's program, usually during their first or second core course, that measures the student's knowledge level at the beginning of their academic program.

**Mid-point Exam.** A student exam administered halfway in the student's program that measures the student's knowledge level at the middle of their academic program.

**Outbound Exam.** A student exam administered at the end of the student's academic program, usually in their last course, that measures the student's knowledge level at the end of their academic program.

**Program.** A program is comprised of core, required and elective courses that lead to awarding of a degree.

#### Statistical Terminology

**Coefficient of Determination ( $R^2$ ).** Coefficient of determination, R squared, is a statistical measure of how well the regression line approximates the real data points. An  $R^2$  of 1 indicates that the regression line perfectly fits the data.

**Frequency of Questions Correct.** For the Outbound Exam, the frequency of questions correct is calculated for each subject within a topic. The formula is: (Number of Questions Correct / Number of Questions Offered) \* 100. To provide a relative index for understanding these data, an average of questions correct is shown for the aggregate pool selected for the Internal Analysis Report. To see the comparisons for other pools, the Internal Analysis Report can be re-run with a different pool selected.

**Mean Completion Time.** The average time, in minutes, to complete the exam. Mean completion time is also shown for each topic.

**Percentage Change.** The percentage change between two scores. For Inbound and Outbound testing, the percentage change is calculated using the following formula: (Outbound Score / Inbound Score) - 1.

**Percentage Change Comparison.** The percent difference between the school's percentage change between Inbound and Outbound Exam results and the aggregate pool's percentage change between Inbound and Outbound Exam results. The percentage change comparison represents a relative learning difference between the specific school and demographically similar schools.

**Percentage Difference.** The percentage difference between a school's Outbound Exam results and the aggregate, calculated using the following formula: Aggregate Score – School Score.

# Internal Analysis Executive Summary Report

## — University of the Incarnate Word

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**Percentile.** Percentiles are shown within the topic and subject level analysis based upon the frequency of questions answered correctly. The measure is used to establish relevancy of the school's score with the selected aggregate pool used for the Internal Analysis Report. The percentile benchmarks indicate to what level an average score is needed in order to be at the 80th, 85th, 90th, or 95th percentile, which school officials can subsequently use for academic benchmarking and for setting performance targets.

A **percentile rank** is the percentage of scores that fall at or below a given score and is based on the following formula:  $((\text{NumValuesLessThanScore} + (0.5 * \text{NumValuesEqualScore})) / \text{TotalNumValues}) * 100$ . When shown, the percentile rank of the school's exam sample of the subject/subtopic/topic score to the aggregate pool is based on using exam results within the aggregate pool grouped by school and calculated using samples of 30 exams. The percentile rank is not a ranking based on the number of individual schools included within the aggregate pool; rather it is a percentile ranking compared to the exam results included within the aggregate pool.

The **percentile benchmark** values are calculated using the Empirical Distribution Function with Interpolation based upon the Excel Function of PERCENTILE.INC (array,k). This function uses the following formula:  $(n-1)p=i+f$ : the letter i is the integer part of  $(n-1)p$ , f is the fractional part of  $(n-1)p$ , n is the number of observations, and p is the percentile value divided by 100. The percentile benchmark is the required score of questions correct to be at a specific percentile value (80th, 85th, 90th, or 95th) and is based on interpolation.

**Summary Statistics.** Includes the mean completion time, sample size, average score, standard deviation, and the min/max/median/mode scores.

**Total Exam Score Significance.** If a student simply randomly selected responses to questions, the statistical mean of the total score of such a randomly responded to exam would be approximately 30% (+/- 2.5% depending upon the number of questions on the exam). Therefore, exam scores above 30% could be considered significant in terms of measuring actual knowledge levels.

## Assessment Terminology

**Academic Level.** The academic degree level of the program: associate, bachelors, masters, and doctoral.cables

**Aggregate Pools.** The aggregate pool is the data set used for external benchmarking and comparisons and is based on the results from institutions included in the selected pools. The various aggregate pools are defined as follows:

- **Pools Based on Program Delivery Modality:** Traditional, Online, and Blended.
- **Pools Based on Location:** Outside-US, Regional/Country, and Inside the US.
- **Pools Based on Institutional Characteristics:** Privately owned, Publicly owned, HBCU, Faith-based, and others.
- **Pools Based on Degree Type:** MBA, MA, MS, MHA, and MPA.
- **Pools Based on Accrediting Agency Affiliation:** AACSB, ACBSP, AMBA, IACBE, and others.

**Assessment Period.** The date range for the report, which includes all the exams completed within these dates. For synchronous schools, the assessment period is generally based upon the semester or quarter. For asynchronous schools, the assessment period is generally annual, semi-annual, or quarterly. School officials determine the assessment period.

**External Benchmarking.** Analyses performed by comparing the cumulative results from a school with a demographically similar aggregate data set.

**Internal Benchmarking.** Analyses performed by comparing the Inbound and Outbound Exam scores and/or by the analyses of the frequency of questions correct for each subject within a topic.