Item Analysis

Using ExamSoft Reports as Examples

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Overview

This handout provides a brief overview of the following concepts.

- Reliability
- Difficulty index
- Upper & lower 27% performers
- Point biserial
- Discrimination index
- Response frequencies

Reliability

- Reliability refers to the consistency or stability of the measure. It tells you the degree to which an assessment produces consistent and stable results.

- There are many methods to estimate the reliability of an assessment. **KR-20** (Kuder–Richardson Formula 20) is the one that ExamSoft provides.
    - Values of KR-20 range from 0.0 to 1.0.
    - Rule-of-thumb: 0.7 is an acceptable value. The higher the better.

Reliability

- The K-20 value of this exam is 0.77.

ASSESSMENT PERFORMANCE

74%
Average Score
(36.9/50)

38%
Low Score
(19/50)

100%
High Score
(50/50)

Assessment Score Reliability (KR-20)

0.0   0.77   1.0

POOR   SATISFACTORY   GOOD

Likelihood of students repeating the same performance.

Total Student Performance Histogram

Exam Takers (y-axis: 0 to 50)

Percent Correct (x-axis): <40, 40-49, 50-59, 60-69, 70-79, 80-89, >90
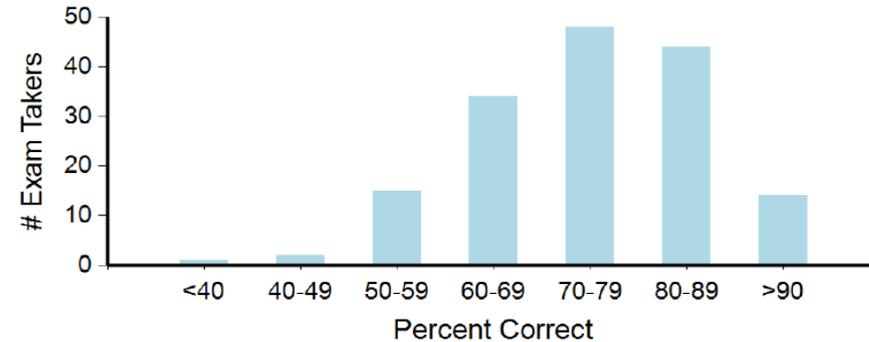
Difficulty Index

- It refers to the percentage of students in the class who get the question correct.
- **Take question #1 as an example:** 82% of the students got it correct.

QUESTION PERFORMANCE (Items; Shows Up to 5 Distractors/Choices per Question)

Seq #	Item ID	Item Stem	Correct	Upper 27%	Lower 27%	Point BiSerial	Disc Index	Response Frequencies A	B	C	D	E
1	42784	Aung is in Piaget's...	82%	100%	64%	0.45	0.36	*136	7	15	8	
2	42785	You decide that you...	90%	93%	82%	0.27	0.11	*150	7	6	0	3
3	42815	Administering 2 carp...	99%	100%	97%	0.15	0.03	0	*146	*18	2	
4	42816	You are planning to...	95%	96%	94%	0.07	0.02	4	*157	5	0	
5	42817	Which of the followi...	58%	84%	39%	0.42	0.45	*97	1	5	18	45
6	42818	You are preparing to...	75%	95%	57%	0.46	0.38	0	38	4	*124	0
7	42819	Based on your clinic...	81%	91%	75%	0.27	0.16	4	4	3	*135	20
8	42826	For restoration of A...	91%	95%	84%	0.27	0.11	1	2	*151	10	2

Difficulty Index

Note: If < 60% of the class get the question correct, the question needs further analysis.

Some possible reasons for students' low performance on a specific question:
1) The question is too difficult. You might need to review the content in the class.
2) The question is unclear. You might need to revise it so that it s more clearly written.
3) You have explained the concept thoroughly in the class, but students might have not studied the concept adequately. Reminder students to review the material.

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Upper & Lower 27% Performers

- They refers to "students whose exam score is among the top or bottom 27% of the class."
- **<u>Take question #1 as an example:</u>**
    - 100% of the "upper 27% performers " got this question correct.
    - 64% of the "lower 27% performers" got this question correct.

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Point Biserial

- It tells you whether getting the question correct correlates with performing well on the exam.
- **Take question #1 as an example:** Lisa got question #1 correct, and she earned a higher score on the exam than Ben who didn't get question #1 correct. In this case, performance on question #1 predicts students' performance on the whole exam. In the example below, the point biserial of question #1 is 0.45 (very high).
- **0.2 +:** Good association with overall exam performance. The higher the better.

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Discrimination Index

- It tells you how well the item discriminates between high and low performers.
- **How it is calculated:** Percentage of the "upper 27% performers" who got the item correct **–** the percentage of the "lower 27% performers" who got the item correct.
- **Take question #1 as an example**: Discrimination Index is 0.36= 100% - 64%.
- **0.2+:** Discriminating; 0.3+: Highly discriminating. The higher the better.

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Response Frequencies

Take question # 6 as an example:

- 0 student choose A
- 38 students chose B
- 4 students chose C
- 124 students chose D   [*Correct answer]
- 0 student chose E.

Question for you:
- Which is a good distractor?
- Which is not a good distractor?

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