

Confidence Based Testing/Assessment



What is confidence based testing/assessment?

Confidence based testing is a set of test questions in which a person's rating of his/her confidence in an answer is taken into account in marking the answer. (Gardner-Medwin, 2003) It measures a learner's knowledge quality by determining both the correctness of the learner's knowledge and confidence in that knowledge. It is designed to increase retention and minimize the effects of guessing which can skew the results of traditional, single-score assessments. This combination yields a profile of the individual's knowledge base and identifies the difference between what the individual thinks they know and what they actually know. (Wikipedia)



Where did the idea come from?

- ➔ It is a culmination of more than 70 years of academic, commercial and government research into the connection between confidence, correctness, retention and learning
- ➔ The first academic paper on the subject was written in 1932 and asserted that measuring confidence and knowledge was a better predictor of performance than measuring knowledge alone, which can be prone to guesswork (Journal of Social Psychology 1932)



Why should we use confidence based testing?

- ➔ To measure knowledge, we must measure a person's degree of belief. A person with different degrees of belief about a statement that is in fact true may be said to have one of the following:
 - ➔ Knowledge
 - ➔ Uncertainty
 - ➔ Ignorance
 - ➔ Misconception
 - ➔ Delusion
- ➔ It helps people think about and identify where they lie on the above scale, in relation to any and every issue that arises in their studies. (Medwin, 1995). Measurement of knowledge requires the eliciting of confidence (or a subjective probability) for the truth of correct statements. (Medwin)



How does it work?

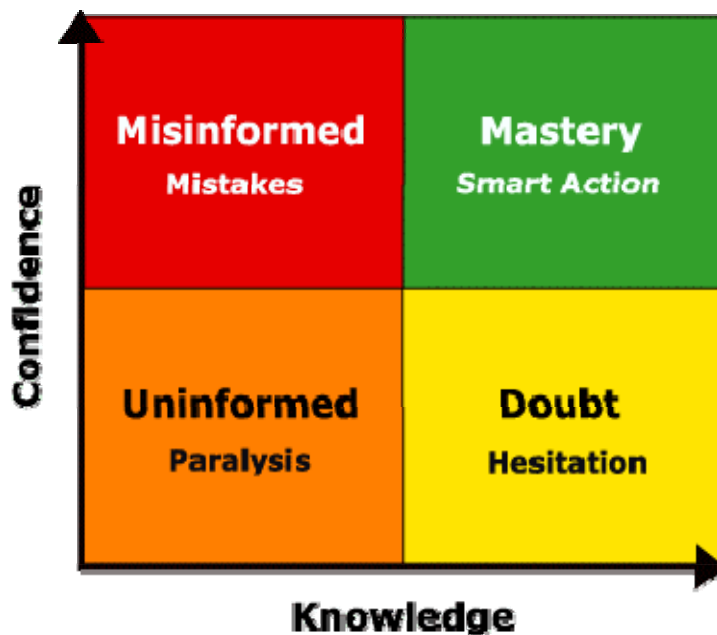
- ➔ Before we can begin learning something new, we first need to assess how much knowledge-base there is and how much information is present. Confidence based testing addresses
 - ➔ Correct answers that are answered with confidence, indicating competency
 - ➔ Correct answers that are answered with doubt
 - ➔ Correct answers that are total guesses, equivalent to no knowledge
 - ➔ Incorrect answers that are answered with confidence, indicating misinformation (Pytel 2007)



What does this mean in the way of performance?

http://en.wikipedia.org/wiki/Confidence-based_learning

The knowledge quadrants in the Learning Behavior Model and their associated learner behaviors are as follows:



Misinformation—knowledge a learner confidently believes to be correct, but which is actually incorrect. Those who have confidence in wrong information (*misinformation*) will very likely make mistakes on the job, which puts companies at the most risk.

Mastery—knowledge a learner **knows** confidently that is correct, and which will likely be applied correctly in practice. Learners who have correct knowledge and a high degree of confidence in their knowledge (*mastery*) are masters of that knowledge domain. These learners are likely to act and act correctly, resulting in higher performing and more productive learners who make fewer mistakes.

Doubt—knowledge a learner believes to be correct, but an element of doubt exists that may cause the learner not to act on that knowledge. Someone who harbors *doubt* may be correct on a certification, but is likely to act with hesitation or not act at all.

Uninformed—knowledge that a learner has not acquired yet. Someone who is uninformed is unlikely to act, which can result in a state of paralysis



What are some principles that learners understand?

- ➔ Both under- and over- confidence are impediments to learning

- Confident errors are far worse than acknowledged ignorance and are a wake-up call to pay attention to explanations
- Expressing uncertainty when you are uncertain is a good thing
- Thinking about the basis and reliability of answers can help tie bits of knowledge together (to form “understanding”)
- Checking an answer and rereading the question are worthwhile
- Sound confidence judgment is a valued intellectual skill in every context and one they can improve (Medwin)



Why is confidence-based scoring better than conventional scoring?

- Many answers are based on partial and uncertain knowledge
- These contribute relatively little to the credit but a lot to the variance
- Since we can identify the uncertain answers, we can assess the magnitude of the problem under exam conditions (Medwin)



How the scoring is determined?

- The student's knowledge and skills in the subject area
- The level of difficulty of the questions
- Chance factors in the way questions relate to details of the learner's knowledge
- Chance factors in the way uncertainties are resolved (luck) (Medwin)



What conclusions can we draw?

- Adjusted confidence scores seem the best scores to use
- Reliable discrimination of learner knowledge can be achieved with one third fewer questions, compared with conventional scoring
- Confidence scoring is not only fundamentally more fair but it is more efficient in measuring performance (Medwin)



How will confidence based testing be structured in our modules?

- There will be a pre and post confidence based test in the module
- Learners will be able to view their pre test results and read the explanations of the questions which will aid them in focusing on what they need to learn
- The post test will determine knowledge of the subject as well as their confidence level
- Learners should repeat the material until they can answer the question correctly and confidently. We can then be sure that actual learning has taken place.