Urgency Framework:

ITBS score reports do not give us the information we need to improve student achievement. On one hand, the *Classroom* and *Building Reports* give us information that is too vague. These score reports tell us, for example, that our students performed poorly on the Reading Comprehension test. The reports do not tell us if students performed poorly in all reading skills or if the poor performance was due to a few specific skills. On the other hand, the *Item Analysis* reports give us information that is too specific to be useful. We are able to identify specific items that many students answered incorrectly, but we are unable to determine if students performed poorly on the skill being measured or if students had trouble with specific characteristics of those items (the wording of the item, the distractors, etc.). If we were to use the vague information from the *Classroom Reports* to improve achievement, we would not be able to focus instructional resources on the skills that need the most improvement. If we were to use the overly specific information from the *Item Analysis* to improve achievement, we would risk teaching-to-the-test.

We need a report that will identify skills that provide the greatest opportunity for improving ITBS scores. On the surface, the *Performance Profile Report* provided by ITP seems to serve this purpose. Here is an example of the information provided by this report:

Classroom Report:

Reading NPR	37
Math NPR	64
Science NPR	58
Composite NPR	54

To identify areas of relative strength and weakness, we compare each test's NPR to the Composite NPR. Doing this, we see that Math is a relative strength of this group of students and Reading is a relative weakness. We are not, however, given any information as to what could be done to improve achievement on the Reading test. Our best guess to improve achievement would be to focus on every skill that is measured in the Reading Test.

Item Analysis:

Understand Stated Info

Skill A	70% correct
Skill A	14% correct
Skill A	61% correct
Skill B	24% correct
Skill B	49% correct

On the Item Analysis, we can see students performed poorly on items 2 and 4. Can we generalize from these two items and say that students need to improve in Skill A and Skill B or is the poor performance on these items due to the specific characteristics of these test items? Should we focus on improving achievement in Skill A or Skill B? Should we focus our attention on test-taking skills that will help students deal with specific item characteristics like those in items 2 and 4?

The *Performance Profile* lists every skill measured by the ITBS and shows the percent correct scores for each of those skills. For example, on the Punctuation Test, we see the following information:

```
Punctuation Test
      Skill: End Punctuation        12 items    75% correct
      Skill: Commas                  6 items    50% correct
      Skill: Apostrophe/Quotes/…     3 items    33% correct
      Skill: Correct Punctuation     3 items    67% correct
```

While this does identify skills in which students performed poorly, it doesn't identify skills that provide the greatest opportunity for score gains. Based on the above information about the Punctuation test, on what skills should we focus our instructional resources? At first glance, it might seem as though we should focus on the *Apostrophe/Quotes/Colon/Semi* skill -- students only answered 33% of those items correctly. But looking more closely, we see that only three items on the entire ITBS measure that skill. Maybe we should focus on the *End Punctuation* skill. Even though students answered 75% of those items correctly, a huge amount (50%) of the Punctuation test score is due to student performance on *End Punctuation*. Which skill, if focused on, would provide us the greatest opportunity to improve student performance on the Punctuation test?

You can see that this report can raise more questions than it answers. Here are some additional questions raised by this report:

1) Should we focus on Punctuation or would the Spelling, Capitalization, and Usage tests provide the greatest opportunity for improving the Language Total score?
2) Do we need to focus on Language more than Reading or Math?
3) Is the *End Punctuation* skill on the Punctuation test more important than the *Algebra* skill on the Math Concepts test?
4) What specific skills provide the greatest opportunity for score gains? What skills do we most **urgently** need to improve?

In order to answer these questions, especially the last question, we must develop a new score report. This new score report should tell us, in order, which skills provide the greatest opportunity for increasing ITBS scores. In other words, it should list the skills that most **urgently** need improvement. This report will be called an *ITBS Urgency Report.*

Urgency:

1. Compelling immediate action or attention; pressing.
2. Insistent or importunate: the urgent words "Hurry! Hurry!"
3. Conveying a sense of pressing importance: *an urgent message*

Urgent often implies that a matter takes precedence over others: "My business is too urgent to waste time on apologies" (John Buchan)

Synonyms:
burning, called-for, capital, chief, clamant, clamorous, compelling, compelling, critical, crucial, crying, demanded, demanding, driving, essential, exigent, foremost, heavy, hurry-up, immediate, impelling, imperative, important, importunate, indispensable, insistent, instant, leading, momentous, necessary, paramount, persuasive, pressing, primary, principal, required, salient, serious, top-priority, touchy, vital, wanted, weighty

Urgent quotes:

"When toddlers are unable to speak about *urgent* matters, they must resort to crying or screaming. This happens even with adults." (Alicia F. Lieberman)

"I am most drawn to writing when I have something else *urgent* to do." (Mason Cooley)

"Transfer not to futurity a work of *urgent* need." (William Wordsworth)

A skill is considered to be *urgent* if it meets the following two criteria:

1) The skill is important, and
2) Students performed poorly on the items measuring this skill.

We will now examine each of these criteria in a little more detail.

Urgency:
Importance x Poor Performance

Importance:

Consider the following set of Punctuation skills taken from the *Performance Profile* on the first page of this report.

```
Punctuation Test                24 total items
  Skill: End Punctuation        12 items
  Skill: Commas                  6 items
  Skill: Apostrophe/Quotes/…     3 items
  Skill: Correct Punctuation     3 items
```

Which of the four skills has the highest importance (according to the developers of the ITBS)? It should be obvious that *End Punctuation* is more important than the other three skills, since it has the highest number of ITBS items. The last two skills are the least important, since those skills are each measured by only 3 items.

In calculating an *Urgency Score* for each skill, we will need to quantify the importance of each skill. A good way to quantify importance is to calculate the percentage of test items that measure each skill. In the *Punctuation* example:

```
Punctuation Test               24 items   1.0 of total
  Skill: End Punctuation       12 items   0.50 of total
  Skill: Commas                 6 items   0.25 of total
  Skill: Apostrophe/Quotes/…    3 items   0.125 of total
  Skill: Correct Punctuation    3 items   0.125 of total
```

The final column represents each skill's *importance* (the percentage of the test covered by that skill). Importance ranges from a minimum of 0.0 (no items measure the skill) to 1.0 (100% of the test items measure that skill). In our example, *End Punctuation* has an importance of 0.5. Compared to the *Commas* skill, *End Punctuation* is twice as important as *Commas* (which makes sense, since it has twice as many items).

Our calculation of importance doesn't stop here. We must realize that the Punctuation test is just a fraction of the Language Total score. Therefore, we need to calculate the importance of each punctuation skill in reference to the total number of items on the Language Total tests.

```
Language Total Score           106 total items
  Punctuation Test             24 items
  Spelling Test                28 items
  Capitalization Test          24 items
  Usage/Expression Test        30 items
```

The Language Total score has 106 ITBS items. Therefore, the *End Punctuation* skill (with 12 items) has an importance of: `12 / 106 = 0.11`. In other words, *End Punctuation* accounts for 11.3% of the Language Total score on the ITBS. The *Commas* skill has an importance of: `6 / 106 = 0.06`, which is still equal to half the importance of *End Punctuation.*

Importance:
A skill is important if a high percentage of ITBS items measure that skill. A skill is not important if a low percentage of the test measures that skill.

Calculation:
(# of skill items) / (# of test items)

Assumptions:
All subject areas are equal in importance.

Properties:

1) All items are equal in importance.
2) Each subject area has an importance of 1.0
3) If a skill is not measured by any ITBS items, that skill has an importance of 0.0
4) Skills that comprise a higher percentage of a subject area test have higher importance.

If students performed equally well on all skills, the more important skills would have higher urgency.

Poor Performance:

Consider the following set of Punctuation skills taken from the *Performance Profile* on the first page of this report.

```
Punctuation Test
  Skill: End Punctuation        75% correct
  Skill: Commas                 50% correct
  Skill: Apostrophe/Quotes/…    33% correct
  Skill: Correct Punctuation    67% correct
```

In which of these four skills did students perform most poorly? The answer is obvious – students only earned a percent correct score of 33% on the *Apostrophe/Quotes/Colon/Semi* skill. Students earned the highest scores on the *End Punctuation* skill (75% correct).

In calculating the *Urgency Score* for each skill, we need to incorporate some measure of student performance. The easiest way to calculate this Performance variable is to use the percent correct scores (taken from the *Performance Profile* or *Item Analysis* reports).

Since we want higher scores to correspond to skills that provide the greatest opportunity for improvement, we need to use the percent *incorrect* scores. In the Punctuation example, we want the *Apostrophes/Quotes/…* skill to have a higher *Poor Performance* score than the other Punctuation skills. If we calculate a percent incorrect score, we get the following results:

```
Punctuation Test
  Skill: End Punctuation        25% incorrect (.25)
  Skill: Commas                 50% incorrect (.50)
  Skill: Apostrophe/Quotes/…    67% incorrect (.67)
  Skill: Correct Punctuation    33% incorrect (.33)
```

Urgency:
Importance x Poor Performance

Poor Performance:
Students performed poorly on a skill if they earn low percent correct scores on the items measuring that skill.

Calculation:
(100% – Percent Correct)

Assumptions:
The average percent correct score for a skill represents student performance on that skill.

Properties:
1) Minimum = 0 (100% of students answered all the items correctly in that skill)
2) Maximum = 1 (0% of students answered the items correctly in that skill)
3) A higher score in Poor Performance represents poorer performance in that skill.

If all skills are equal in importance, the skills with poorer performance will be more urgent.

This calculation of a percent incorrect score yields the results we desire. The highest score went to the *Apostrophe/Quotes/…* skill (which does indeed provide us the greatest opportunity to increase ITBS scores).

Summing up the two criteria:

Importance = % of ITBS items measuring each skill = (# of skill items) / (# of test items)

Poor Performance = Percent of skill items answered incorrectly = (1 – (% correct for skill))

A higher score in each of the two criteria corresponds to a greater opportunity for improving scores. Therefore, when we combine the two criteria into an Urgency Score, we will be given a measure that has the following property:

Higher Urgency = Greater Opportunity to Increase ITBS Scores

Calculating Urgency:

When we combine Importance with Performance to create an Urgency score formula, we want that formula to have the following properties:

1) More important skills yield higher urgency scores
2) Skills with lower percent correct (or higher percent incorrect) scores yield higher urgency scores
3) Importance and Performance are allowed to interact.
4) The formula should not require complicated calculation

Here are two possible formulas that have the above 4 properties. The values in the table represent Urgency Scores for various values of importance and performance.

Formula #1: Importance x Percent Incorrect

Importance	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
1.0	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
0.9	0.00	0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90
0.8	0.00	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	0.80
0.7	0.00	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70
0.6	0.00	0.06	0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.54	0.60
0.5	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
0.4	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40
0.3	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30
0.2	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20
0.1	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0% % Correct

Positives with formula #1: It ranges from 0.0 to 1.0.
It can be calculated for the full range of importance & performance values

Negatives with formula #1: When percent correct = 100%, importance does not increase the urgency
We are required to use a percent incorrect score

Formula #2: Importance / Percent Correct

Importance	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
1.0	1.00	1.11	1.25	1.43	1.67	2.00	2.50	3.33	5.00	10.00	Undef
0.9	0.90	1.00	1.13	1.29	1.50	1.80	2.25	3.00	4.50	9.00	Undef
0.8	0.80	0.89	1.00	1.14	1.33	1.60	2.00	2.67	4.00	8.00	Undef
0.7	0.70	0.78	0.88	1.00	1.17	1.40	1.75	2.33	3.50	7.00	Undef
0.6	0.60	0.67	0.75	0.86	1.00	1.20	1.50	2.00	3.00	6.00	Undef
0.5	0.50	0.56	0.63	0.71	0.83	1.00	1.25	1.67	2.50	5.00	Undef
0.4	0.40	0.44	0.50	0.57	0.67	0.80	1.00	1.33	2.00	4.00	Undef
0.3	0.30	0.33	0.38	0.43	0.50	0.60	0.75	1.00	1.50	3.00	Undef
0.2	0.20	0.22	0.25	0.29	0.33	0.40	0.50	0.67	1.00	2.00	Undef
0.1	0.10	0.11	0.13	0.14	0.17	0.20	0.25	0.33	0.50	1.00	Undef
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Undef
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0% % Correct

Positives with formula #1: It ranges from 0.0 to infinity (0-100 practical range)
We can use the percent correct scores.
When percent correct = 100%, importance increases urgency

Negatives with formula #1: When percent correct = 0%, the formula is undefined