

How to Develop, Produce and Use SAFMEDS in Education and Training

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History and Historical Precedents of SAFMEDS

Introduction SAFMEDS represent an approach to learning that departs from the traditional techniques that emphasize accurate performance. Such techniques either pay no attention to **speed** of the performance or specifically downplay its significance. SAFMEDS, by contrast, emphasize *fluent* performance—speed and accuracy. The closest approximations to SAFMEDS previously in use include flashcards and especially basic math fact flashcards.

Flashcards Typical flashcards or study cards provide a useful way to separate independent chunks of information. The following features characterize these cards:

- Cards can be sorted into different orders and studied independently, avoiding some of the serial-learning effects characteristic of lists

SAFMEDS-Flashcard Differences SAFMEDS differ from so-called “flashcards” or “study cards” in the following ways:

Feature	SAFMEDS	Flashcards
Generated by	instructor or trainer	learner
Entire set	available at start of course or training	available only at end of course
Work on	all cards from start	only ones covered
Front of card	more detailed	less detail than back
Back of card	short, easy to say	lots of details
Pace	timed, vital	leisurely
Emphasis	speed & accuracy	accuracy only

Basic Math Fact Flashcards These represent the closest historical approximation to SAFMEDS. They featured:

- Basic addition, subtraction, multiplication or division fact on front, answer on back
- Emphasis on speed as well as accuracy, although the speed aims tended to be low or conservative by SAFMEDS standards
- Commercial availability, although some publishers put fact on both sides with answer in small type in corner

Origin of SAFMEDS In 1978, Ogden Lindsley told me over the phone about using “flashcards”. He soon realized significant differences and coined the term “SAFMEDS.” He originally pronounced it “safe-meds” but people tended to include the ‘e’ in the spelling so he changed the pronunciation to rhyme with “calf.” Following Lindsley’s lead, I started trying them also. By 1984, the use of SAFMEDS in upper division courses had convinced me to use them in my large (200 student) sections of general psychology as well.

Characterisitics

**Structure:
SAFMEDS**

- SAFMEDS represent decks of cards printed front and back.
- The front contains information with a long dash to indicate something missing.
 - That missing word or phrase constitutes the back of the card.
 - Usually the back will also have some type of distinctive feature which signals it as a "back" rather than a "front".
 - The missing word or phrase on back may be in a different font.
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**Definition:
Learning
Channel**

"Learning Channels" represent the input and output mode for a particular behavior. Example: *Hear/Write* would be the generic description for those behaviors involving hearing something and then writing something. A more specific description would be: *Hear spelling word/Write spelling word*. Eric Haughton coined and developed the concept some 25 years ago.

**SAFMEDS
Learning
Channel**

SAFMEDS involve a *See/Say* Learning Channel. *See front/Say back* means you see the front of the card and try to say the appropriate word or words from the back of the card (without looking).

**SAFMED
Example**

- The example below shows the front and back of a single SAFMED.
- the left-right layout provides a way to see both front and back; front and back would usually be on opposite sides of a sheet or card
 - the long dash (5 underline characters) identifies the part on the left as a front
 - the up-down line extending part-way down the card identifies the part on the right as a back

<p>Concept: identify Thoughts, feelings, and urges: examples of _____ behavior</p>	<p>inner</p> <p>Love & Fear, Clay Starlin</p>
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A SAFMEDS Classification System

Table of possibilities

The following table shows many of the possibilities for generating SAFMEDS that conform to the guidelines that will be described later. The list should not be construed as exhaustive of all possibilities.

SAFMEDS Type	What you see	What you say
Fact: who said it	quotation	person who said it
Fact: contribution	contribution(s)	person credited
Fact: quote	name (and topic)(part of quote)	quotation (or part of quote)
Fact: say acronym	words replaced	acronym
Fact: acronym	acronym	word(s) replaced
Fact: completion	starts fact	finishes fact
Process: label	describes process	names process
Process: definition	names process	describes process
Procedure: label	describes procedure	names procedure
Procedure: definition	names procedure	describes procedure
Concept: label	describes concept	names concept
Concept: definition	names concept	describes concept
Concept: feature	names concept & feature	names missing feature
Concept: identify	provides example	names concept
Concept: not	provides nonexample	names 'not' concept
Concept: generate example	names concept: Example?	provides example
Concept: generate nonexample	names concept: Nonexample?	provides nonexample
Principle: label	describes principle	names principle
Principle: definition	names principle	describes principle
Classification: label	describes classification	names classification
Classification: definition	names classification	describes classification
Structure: label	describes structure	names structure
Structure: definition	names structure	describes structure
Structure: identify	shows structure	names structure

Examples of SAFMEDS from Classification Table

SAFMEDS Type	What you see	What you say
Fact: who said it	quotation "Behavior grows by multiplying": _____	person who said it (Ogden) Lindsley
Fact: contribution	contribution(s) Developed SAFMEDS and Standard Celeration Chart: _____	person credited (Ogden) Lindsley
Fact: quote	name (and topic) Ogden Lindsley: "Behavior grows by _____"	quotation star slash (multiplying)
Fact: say acronym	words replaced Say All Fast Minute Every Day Shuffled: _____	acronym SAFMEDS
Fact: acronym	acronym Reasons to emphasize fluency: REAPS: _____	word(s) replaced performance aims
Fact: completion	starts fact Reinforce? _____	finishes fact Behavior not people
Process: label	describes process Rewarded faulty thinking continues: _____	names process rationalization trap
Process: definition	names process Reward: _____	describes process accelerates act when presented contingently
Procedure: label	describes procedure Invent explanation which itself becomes a fictitious thing	names procedure reification
Procedure: definition	names procedure Behavior Mod	describes procedure applies new contingency
Concept: label	describes concept Correct and error celerations combined produce a: _____	names concept learning picture
Concept: definition	names concept Learning picture: _____	describes concept celeration combos (correct and error celeration combinations)
Concept: feature	names concept & feature Learned results lose power if never: _____	names missing feature paired

Less than optimal examples of SAFMEDS

Answer too long

Front of card: A response becomes more likely to occur in the future, if the removal or reduction of an aversive condition has immediately followed it in the past: _____
Back of card: **Reinforcement by the removal of an aversive condition**

Blanks of different lengths

Front of card: Thomas Malthus, first to collect trends of world population and resources (1800), said: **"There will _____ _ _____."**
Back of card: never be enough (resources to go around)

Blanks positioned in middle or near front

Front of card: _____: "Behavior is a function of its consequences."
Back of card: (B.F.) Skinner

Cards too similar; no features highlighted

One card:
Front of card: Accelerates act when removed contingently: _____
Back of card: Relief

Another card:
Front of card: Accelerates act when presented contingently: _____
Back of card: Reward

One card with one word left out

Front of card: Love: the gift of behaving to enhance _____
Back of card: life

Extensive wording

Front of card: Events of procedures which influence the body's sensitivity to reinforcers and aversive conditions. Traditional psychologists often speak vaguely about "motivation." This concept helps avoid reification and represents a more parsimonious approach: _____
Back of card: E-O (establishing operation)

Guidelines for Developing SAFMEDS

Primary rule • Keep answers short. Abbreviate if needed.
You don't want to produce what Carl Binder has called "Fluency Blockers™."
Learners will have to slow their pace if you require them to say too much for a response.

Other rules The other rules represent guidelines which should generally be followed.

- Rules in Development of SAFMEDS
 - Make blanks same length (5 characters) regardless of answer length or number of words in answer.
 - Position blanks at end or nearly so.
 - Boldface, capitalize, underline or italicize particularly confusable features on fronts that are similar
 - Use multiple cards if you want learners to be able to say a definition. One card usually won't produce recall of entire definition. Construct cards by leaving out different key words on each.
 - Keep the fronts as simple as possible. If an explanation seems warranted, put it inside parentheses in smaller font size on the back of the card.

Size of Deck Deck sizes can differ, but generally run between 80-150 total cards per deck.
If the content area contains fewer items:

- can combine with other content areas within same course or training
- can duplicate key cards or all cards to provide enough that learner doesn't finish all in less than a minute

General notes Development of SAFMEDS:

- Similar to setting up a multiple-choice test except you do it before the quarter, semester or training begins—not after you've covered the material
- Allows wide range of types of information usable as seen by the SAFMEDS Classification System

General Rules and Tips

Rules

General Rules for Use of SAFMEDS:

- Everyone use a standard deck
 - Keep one or two for “official” timings
 - Learners may “lose” difficult cards
 - Don’t allow students to mark card fronts
 - Disrupts performance when they use your unmarked deck
 - Seems to promote control by irrelevant features
 - Turn card over after saying back
 - Allows counter to judge correct/incorrect
 - Say back before turning card over
 - Discourages “reading”
 - Promotes “anticipating”
 - Turn own cards
 - Almost twice as fast as when someone else holds them
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Tips for Learners

Other information that some learners will find useful:

- Spend more and more of time doing timings
 - after a point, casual “studying” doesn’t help speed
 - Say out loud when practicing; don’t see/think
 - rather drastic decrements in performance usually result
 - behaviors seem very specific
 - After becoming accurate on the deck, don’t look at card to see accuracy
 - slows speed
 - If accurate but slow, run through deck to pull out “slows”
 - practice slows as “slice back”
 - set one per second aim before reshuffling into rest of deck
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Tips for Instructor

The following actions seem warranted from experience:

- Encourage learners to try “understanding” card when studying it
 - emphasize understanding can often come after learning
 - Allow questions on cards that need elaboration
 - separate content questions from procedural questions
 - Teach what learners request; not necessary to go over all cards
 - Relate relationships; comprehensive patterns
 - aided by classification on front if you use it
 - Have learners timed turning cards for physical limits
 - will help individuals discover own best manipulation techniques
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Provide Daily Practice Opportunities

Avoid inertia Many learners, left to their own devices for so much of their educational career, lack appropriate self-discipline skills needed for SAFMEDS success. Providing supervised timings within a class session can be useful, particularly if the class meets one or four times a week. “Gbur Points”—occur when a student achieves fluency and operate as a bonus towards other parts of the course. The amount decreases each day of the quarter.

Use 5 min of class time After walking through a timing session once, learners quickly acclimate to what needs to occur and do it. We average (median) 3 or 4 minutes for the entire activity. 58 timings used 270 minutes (across 3 classes this quarter), a mean of 4.6 minutes per day.

Script for Classroom Timings This procedure works well within a classroom of up to 185 students:

- “SAFMEDS Timings”
- “Pair up with someone new”
- “Move to another seat or place if you need to”
- “Who doesn’t have a partner?”
- “Decide who’s going first”
- “Remember to shuffle the cards”
- “Who is not yet ready?”
- “All set? Engage” (Please begin)
 - All behaviors say answers out loud; Counters count hits and misses
 - Timing device signals end. If not loud enough, “Please stop”
- “Counters count up. Report out”
- “Put that score on your scoresheet and chart it”(unless doing other timings outside of class)
- “Counters become behaviors and behaviors become counters”
- “Get ready for the second timing”
 - Recycle from “Who is not yet ready?”

Class Size of 10-50 We use the two timings in class to have one or two students do a timing with me, in classes of up to 50.

- Students volunteer when they think they’re ready or want the experience
- We haven’t set a limit on the number of timings an individual can try
 - Exception: 10 tries maximum per student on the Final Exam
- Before and after class we usually squeeze in several timings if requested

Class Size of 50-200 We do the two practice timings as in smaller classes with same script, but I walk around watching and observing, rather than counting a learner’s performance. This seems to be needed to keep some people from ignoring the task.

- Students volunteer when they think they’re ready or want the experience
- We set a limit of 9 tries per learner over the course
- Deadline dates impose a “Use ‘em or lose ‘em” situation. This prevents people from saving all 9 tries until the end of the course.
- Special SAFMEDS days occur devoted exclusively to timings
 - These days spell relief for those who have completed ‘A’
 - We cycle through a designated row or group during class time

Performance Standards

**Grading
SAFMEDS
performance:
Speed**

- Over wide ranges of material, when development of SAFMEDS conforms reasonably to optimal examples:
- Speeds of 60+ hits (corrects) per minute will be achieved by some learners
 - Speeds of 50-59 hits per minute provide a reasonable "A" level for speed
 - Speeds of 40-49 hits per minute provide a reasonable "B" level for speed
 - Speeds of 30-39 hits per minute provide a reasonable "C" level for speed
 - Speeds of 20-29 hits per minute provide a reasonable "D" level for speed
 - Speeds of less than 20 hits per minute indicate early stages of learning
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**Grading
SAFMEDS
performance:
Accuracy**

- Over wide ranges of material, when development of SAFMEDS conforms reasonably to optimal examples:
- Reasonable accuracy equals 5 hits for every miss or skip
 - Less than 5 hits for every miss or skip doesn't pass accuracy criterion
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**Grading
SAFMEDS for
Fluency**

- Fluent performance on SAFMEDS consists of:
- Combination of accuracy and speed
 - Accuracy of times 5 or greater
 - Speed of 50 per minute or greater
 - Speed alone if 60 per minute or greater
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Comments

- Fluent performance comes more easily for some than for others. Most everyone succeeds with "sufficient practice."
 - Learner's "Best" counts, regardless of subsequent attempts if less than 'A'
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**Record
SAFMEDS
Performance**

- General Psychology SAFMEDS:
- Counts: 97 hits, 0 misses
 - Time: 57 seconds (finished entire deck)
 - Frequency = 101 hits per minute
 - Record holder: Ken Etzold, Fall 1984
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