

Faster New Product Learning Cycles



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Agenda

- **Key areas that impact new product learning cycles**
- **Project Risk**
 - Design and Process risks are too narrow and too late
- **Marketing Test**
 - A/B testing does not tell enough of the story
- **Strategic Testing**
 - One factor at a time testing approach is limited technical understanding

Project Risk

- **Anything with Uncertainty is a risk for execution**
 - Things that have not happened yet
 - Unless we have done the exact same thing successfully before, uncertainty exists
- **We tend to only focus on Product or Technical risks**
- **Cost and schedule risks also exist**

Project Risk Areas

- **Requirements**
 - **Stability, complete, clear, valid, feasible, precedence, scale**
- **Design**
 - **Function, difficulty, interfaces, performance, testability, constraints, non-developed items**
- **Integration and test**
 - **Environment, product, system**
- **Engineering specialties**
 - **Maintainable, reliable, safety, security, human factors, specs**

<https://resources.sei.cmu.edu/library/asset-view.cfm?assetid=11847>

Risk Areas (cont.)

- **Development process**
 - **Formality, suitability, process control, familiarity, product control**
- **Development system**
 - **Capacity, suitability, usable, familiar, reliable, support, deliverable**
- **Management**
 - **Planning, project organization, experience, program interfaces**
- **Management methods**
 - **Monitoring, personnel management, quality assurance, configuration management**

Risk Areas (cont.)

- **Work environment**
 - **Quality attitude, cooperation, communication, morale**
- **Resources**
 - **Schedule, staff, budget, facilities**
 - **Type of contract, restrictions, dependencies**
- **Program interfaces**
 - **Customer, other suppliers, vendors, politics**

Marketing Tests

- **Do we already know the best approach?**
 - Context matters – behavioral science
- **Important to explore and understand combinations**

A/B Testing

- **What is it?**
 - A method for comparison testing
- **When to use it?**
 - Pick the winner
 - Similar to a t-test (or proportion test)
- **What do we measure?**
 - Typically clicks
 - Ideal is cash

A/B Testing

- **Weaknesses**
 - **Can burn thru potential clients with a less effective approach**
 - **Limited learning**
 - **What about dependencies?**
 - **Or combinations**

A/B Testing

- **Which is better – email A or email B (mailing? Website?)**
 - Colors, pictures, content, titles, etc.
 - Lots could be understood
- **What else might matter?**
 - Geography – East or West coast?
 - Time of day
 - Day of the week

A/B Testing Execution

- **Need to have several “arms” to the study to create balance and ensure learning**
 - **With 400 to get good response rate, we need a target window of time which is neutral**
 - 400 of A
 - 400 of B
 - **Then, repeat on the West Coast**

A/B Testing

- **Next – exploit the learning with the balance of your contact list**
 - **How many? I know a successful consultant with 4000. Thus, only 2400 remain in this case (assuming East and West coast done)**
 - **My guess – few have a list of 4000.**
- **For future campaigns, use a different set of people to learn from**

Thompson Sampling

- **What is it?**
 - **An adaptive method of testing to decide on next test condition based on the likelihood of success**
- **When to use it?**
 - **Move quickly to exploiting potentially better methods**

Thompson Sampling

- **Weaknesses**

- **Balance**
- **Confidence**
- **Giving up on a better solution too early**
- **How do you optimize multiple outcomes?**
- **Not accepted by FDA**
 - **Example, could not use in a clinical study**

Thompson Sampling - Examples

- **One arm bandit – Slot machine**
 - **Do I get a coin (entertainment?)**
 - **What about total payout**
 - **What about big payout**
- **Restaurant**
 - **Satisfaction**
 - **But what about time? Cost?**
- **Website/ Emails/ Social Media**
 - **Clicks is common**
 - **Engagement? Like, comment, click, call**
 - **What about meeting booked**
 - **What about revenue generated**

Testing Ideas

- **Explore**
- **Exploit**
- **Epsilon Greedy**
 - **An algorithm balancing both**
- **Are surrogate measures appropriate?**

Marketing DOE - Example

- **Include focused layout options**
 - Color – red and blue
- **Include content**
 - Short versus long
- **Include day of the week**
 - T and Th, or E/W coast...
- **Can find direct impacts, as well as interactions**
 - Is red and long better than everything else?
- **I have done 32 total, with strategic surrogate measures but even if we do a full 800, we still have lots of contact list yet to exploit**
 - **But also learned about depth of our message impact**

Strategic Product Testing

- **Decisions**
 - Impact on project and others
- **Priorities**
- **Challenges early (instead of late)**
 - We often avoid hard things
- **Root Cause Analysis**
 - Field or Yield issues

Combine tests when it makes sense

Impact on Validation Strategy

- **Explore to learn and understand – high risks – early**
- **With a baseline, we have expected results to confirm**
 - **Versus hoping to pass the specification, without confidence or expectation**

Impact on Validation Strategy

- **Validation plans depend on levels of risk**
- **Low risk areas can be evaluated at a higher level**
 - A sanity check
- **High risk areas deserve deeper level of testing to confirm robust performance**
 - More attention to the development effort is expected
 - Validation simultaneously confirms our technical understanding
 - May need more input or review at vendors
 - Still need high level verification as a sanity check at the end
- **Resolve the areas of uncertainty**
 - What questions do we need to answer

Related Videos

- **FMEA - <https://bit.ly/2y0F6XS>**
- **Valuable Risk Management – <https://bit.ly/17q0y7g>**
- **Requirements - <https://bit.ly/1ciEAGP>**
- **DOE – <https://bit.ly/14HgKSz>**
- **DOE White Paper - <https://bit.ly/18rGYZD>**

Conclusion

- **Think about decisions to be made**
- **Think about the information you would like to know**
- **How quick can we determine this?**
 - **Early learning increases performance and confidence**

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