

Iterative Product-Oriented Learning Process

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Introduction

In Yong Zhao's book "World Class Learners," he discusses product-oriented learning, which might be thought of as project-based learning but using an entrepreneurial mindset and product-focused goals. As a software entrepreneur, I co-lead workshops that help teens get started with entrepreneurial ventures, and as you might expect, we focus on creating products and services. This paper discusses the form of product-oriented learning that we use, which has iteration the core of it's process.

Although much of learning occurs in the process, the core object being created by students in product-oriented learning in an entrepreneurial context is the product (or service) for use by authentic customers.

The Iterative Process

A common model for creating products is the linear one that I grew familiar with in my early years in product development:

- identify needs/requirements
- create a plan
- sell management on the plan
- create the product
- market/sell the product
- maintain the product

This linear model of product creation (in software development we call this the "waterfall" model) can be used, but many startups and entrepreneurs today use a more dynamic, iterative approach (often referred to as "lean" or "agile"). The primary difference between these models is that the linear model is more heavily front-loaded on planning while the iterative model focuses rapid and continual act-test-modify cycles. When approaching problems that do not have well-known solutions (the interesting problems), an iterative approach enables rapid learning by evaluating the product in the real world while at the same allowing the inevitable failures to have relatively minor consequences.

In workshops I co-lead with high school students our product-oriented projects put iteration at the center of the process. We start with:

- Inventory Personal Strengths, Weaknesses, and Interests
- Find Long-Term and Short-Term Goals

and then students enter into this loop, which repeats for the entire project:

1. Use Goals To Find the Most Important Problem To Solve
2. Use Research, Resources, and Creativity to Determine Smallest Meaningful Action to Address the Problem
3. Do It!
4. Test the Product With Real (Prospective) Customers
5. Reflect on What Worked, and What Didn't
6. Given What's Been Learned and the Goals, Start the Loop Again

At any step the most important problem varies. It might be marketing (if the problem is people not knowing about it), raising money (if the problem is financial), learning (if a skill is needed), building a final version of the product (if the problem is finally selling something) or something else entirely, but it's the process that's critical. The iterative process means students are continually involved in creating the product for real customers, and the product therefore evolves to be what customers want.

The iterative model is possible because the capability to reach real customers and build products has increased markedly over the last decade, while the cost for those same capabilities has plummeted in terms of both time and money. The linear model is better suited when the outcomes are reasonably known and the environment is stable, both situations that are becoming less common.

The iterative approach is an extremely effective match with educational goals:

- frequent action means frequent learning-by-doing and constantly moving forward (no excuses for not making progress)
- forms of the product are produced on each iteration
- assessment of effectiveness is in the world (actual customers) and not artificial (by teachers)
- risk-taking and failure become an integral part of the learning process, because failure is no longer costly
- student choice/passion drive motivation

The Iterative Process In Detail

The detailed descriptions of these steps below may make them seem involved and time-consuming. Like any other skill, the first few times they may take longer, but in practice, we've found that once they have become integral to the process of creating products, the time is reduced markedly as many thought processes become intuitive.

Secondly, the overarching theme of any aspect of this process is becoming comfortable with what is “good enough” (the “80/20 rule”) and avoiding getting stuck in a quest for perfection. Action and movement through iterative cycles is more important than doing any of these steps perfectly. Rapid cycling means that small details that might get missed on one pass will probably get picked up on a subsequent iteration.

Inventory of Personal Strengths, Weaknesses, and Interests

Before starting into the iterative process, students list an inventory of what they feel their strengths and weaknesses are. We find that students almost invariably undervalue their greatest talents, because those skills come easy to them, so coaching can help them with a valuable external viewpoint. Weaknesses can indicate where collaboration with others might prove valuable. There are also traits that are weaknesses in one context, but may be strengths in another (e.g. breaking rules is a negative in the classroom, but a strength for entrepreneurs). Lastly, students should reflect on what they really care about: what they love doing, how they want to change the world, and what drives them. Without some level of intrinsic motivation behind the project, it can be very difficult to continue forward when the invariable roadblocks are encountered.

Find Long-Term and Short-Term Product Goals

Students next define two sets of goals. First, the long-term goals (which could be end goals) are what this product or service would be like if everything went exactly as imagined. This goal should be a stretch and challenge to the student’s current abilities and circumstances. These are goals where entrepreneurs envision how they will change the world. We’ve found that students often need coaching to get them to “think big” because their ideas often represent minor evolutions of the current world. They underestimate what they can do with time, effort, and an efficient process. Team brainstorming can help with expanding the vision of what is possible.

A critical part of envisioning a product or service is defining who it is being created for - figuring out who the customer is. We define a customer as someone who is willing to sacrifice something (money, time, or attention) to use the product for no other reason than that it is useful to them. Knowing the customer is central because during the iterative process, the product will evolve to fit the customer, and not vice-versa.

Short term goals are the first steps along the path to realizing the big vision. These are goals that can be accomplished given their current skills or resources, augmented by what they could learn or obtain in the next month or two. These are goals that will drive the action, but they are also subject to change as more is learned about the feasibility of various solutions.

If the long term goal is opening a restaurant with a cutting-edge menu, the short term goal might be catering a party with a few dishes. If the long term goal is publishing a cosmic new

video game of their own design, the short term goal might be programming a simple version of an existing game. If the long term goal is for the entire city to be recycling their plastic, the short term goal might be a process for the school to recycle cafeteria plastic.

At this point students start into the first cycle of an iterative loop as they work towards completion of their short term goals and eventually (if they have the time and motivation) to realize their long term vision.

1. Use Goals To Find the Most Important Problem To Solve

Given their goals, students are faced with a set of problems or barriers to get past to reach them. They might need to learn to do something, or to obtain a resource, or to test an assumption. Despite the instinct to choose the most fun problem, or to try to do a bit of everything, if they examine the set of problems they need to solve, they will find that there is a small set (or a single one) that will stop everything else if they aren't solved (similar to the "critical path" in a project plan).

Part of our human nature to avoid situations where we are not comfortable. When they are choosing their next problem to solve, they often need coaching to help them rationally examine what needs to be done and to make the choice of the most critical problems, and not necessarily the easiest or most enjoyable activities. Having students working with partners or teams can be extremely effective, because with multiple viewpoints on what is important, the critical problems are usually identified more accurately.

2. Use Research, Resources, and Creativity to Determine the Smallest Meaningful Action to Address the Problem

After they've chosen which problem they need to solve, it's time for them to find a best attempt to solve it. This is the stage when they can apply research, creativity, and collaboration to find an action that may address that problem. The action might be straightforward (research the availability of certain parts), it might be new (try a untested recipe), it might be risky (experiment with the limits of a device), or somewhere in between.

Whatever action they choose to take, it should be doable in a short amount of time: minutes, hours, or maybe a day. If it is larger than that, then it can be broken down into smaller steps that fit into those times. **Taking these small steps is critical.** It means that students can afford for any particular step to fail because their investment of time, energy and emotion is relatively minor. This lets them become comfortable with failure and managing risk while still taking chances. When they can get a small step done in one work session, this leads to more efficiency and less anxiety than leaving loose ends from day to day.

If they keep track of the small steps they've taken they will feel a sense of accomplishment as they see all the work they are getting done, even when sometimes that work leads down a blind alley or doesn't work.

3. Do It!

Entrepreneurs distinguish themselves from "idea-people" in that they make things happen. Taking action is the defining characteristic of an entrepreneurial mindset. This is the step where the bulk of the work gets done. For example, it might be building the next prototype of the product, creating marketing materials, learning a new aspect of programming, researching existing solutions, experimenting with a new process for manufacturing, or coordinating getting work done by a third-party group. The activity in this step is the actualization of the plans made in the previous step.

As much as it seems that this is the most exciting part of the project, students often hesitate in the "do it" step. This can be because this is where most of the effort needs to happen, because this is where the possibility (and fear) of failure becomes real, or because this is when they actually encounter the limits of their skills or resources. "Teachable moments" often occur during this phase, but like experiential learning in other contexts, it's important that the impetus for seeking assistance or teaching is with the student and not externally imposed.

4. Test It With Real (or Prospective) Customers

In traditional learning environments, the assessment of student work is done by teachers based on the learning goals of the curriculum. However, in a product-oriented learning project the world, in the form of customers, provides the assessment. Coaching can help students assimilate the learning from this feedback, but in the end it's the dispassionate utility of the product for the customer that determines how successful the product is. Customers are the bedrock of product feedback because they care only about the value provided by the product. It used to be that talking to customers was an expensive and involved process, but today with networked communication contacting real customers to get feedback is cheap and easy.

There are a number of ways to do get customer feedback, including interviews, web site analytics, surveys, and observation. Students need to learn how to get specific, actionable comments and suggestions. The skills to do this can be taught, but they need to be experienced and practiced.

Entrepreneurs are often depicted as gamblers taking high risks for big rewards. However, the entrepreneurial mindset is much more about risk management. Anytime someone is doing something entirely new (or new for them) there is risk, but the point of risk-management is to make the inevitable failures relatively small, easy to learn from and not overly costly. Small steps and constant customer feedback keep risk under control. Rather

than trying to guess what people will want (and taking the chance on missing the mark), talking to customers and asking them is a much more direct route to understanding their needs and their goals.

5. Reflect: What Worked, and What Didn't

Finally, after every iteration students stop to self-reflect on what parts of that action worked, and what didn't work. We usually have them draw up a two column chart for this. Feedback for this step comes both from the students and from other team members or customers that were involved. The purpose is to make every iteration a learning step, no matter how successful the outcome was towards the short and long term goals.

Some of the greatest instances of learning occur when the action seems like a complete failure. As long as the reasons are examined and captured (so they don't happen again), there can be tremendous value in learning what doesn't work. Of course, when the action taken was largely successful, this provides a solid basis to iterate forward on expanding the product. Creating products for customers is challenging, and the iterative process should provide lots of opportunities for the "little wins" that stoke motivation on the way to overall success. If a student's attempts often end in failure, they may be trying to take too ambitious a step given their current skills, and they might want to either collaborate or choose more reachable goals.

However, if a student's iterations are always complete successes, this is probably an indication that they aren't challenging themselves or taking any risks, and a push outside of their comfort zone may be in order. Remember that a core assumption of this product-oriented learning process is that because of the scope of the project or the uncertainty of the environment, some failure is inevitable. Experiencing setbacks and roadblocks and being able to move past and learn from them makes for resiliency in the face of adversity. For some students, even small failures can be deeply personal, so they need coaching and encouragement to use the intellectual tools at hand to learn and to try again.

Entrepreneurs don't fail, they iterate.

6. Given What They've Learned and Their Goals, Start the Loop Again

Iterate again, and again, and again...

Conclusion

One question to ask is: "when is this process done?" The answer is that it varies. It could be done when the long-term goals are reached, but if those are really stretches and/or they are redefined periodically, they may never be reached. The project might be done after a

certain amount of time, such as the end of a semester or a number of months. The project might morph (or “pivot”) and continue in a different direction as the student’s long term goals change given what they learn. Or, it might end when the student reaches a point where the effort is not worth the progress anymore, either because of the difficulty of the goal or their personal interest.

In any of these cases, the power of the iterative model is that it creates versions of the product continually, so that whenever the project ends, something of value has been created. The fast, small cycles are adaptable to a variety of student environments and projects. Most importantly, the student gains experiences operating in an ill-defined or constantly changing environment. Given the rate of progress and change in our world, this ability may be the most important skill of all.

Contact

If you have questions, or would like to discuss further, I’d enjoy talking with you.

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Suggested reading

“World Class Learners: Educating Creative and Entrepreneurial Students” by Yong Zhao

“Little Bets: How Breakthrough Ideas Emerge from Small Discoveries” by Peter Sims

“The Start-up of You: Adapt to the Future, Invest in Yourself, and Transform Your Career” by Reid Hoffman

“Anything You Want” by Derek Sivers

“The Lean Startup: How Today’s Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses” by Eric Ries

“Why School?: How Education Must Change When Learning and Information Are Everywhere” (Kindle Single) by Will Richardson

“A New Culture of Learning: Cultivating the Imagination for a World of Constant Change” by Douglas Thomas and John Seely Brown

“Creating Innovators: The Making of Young People Who Will Change the World” by Tony Wagner



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