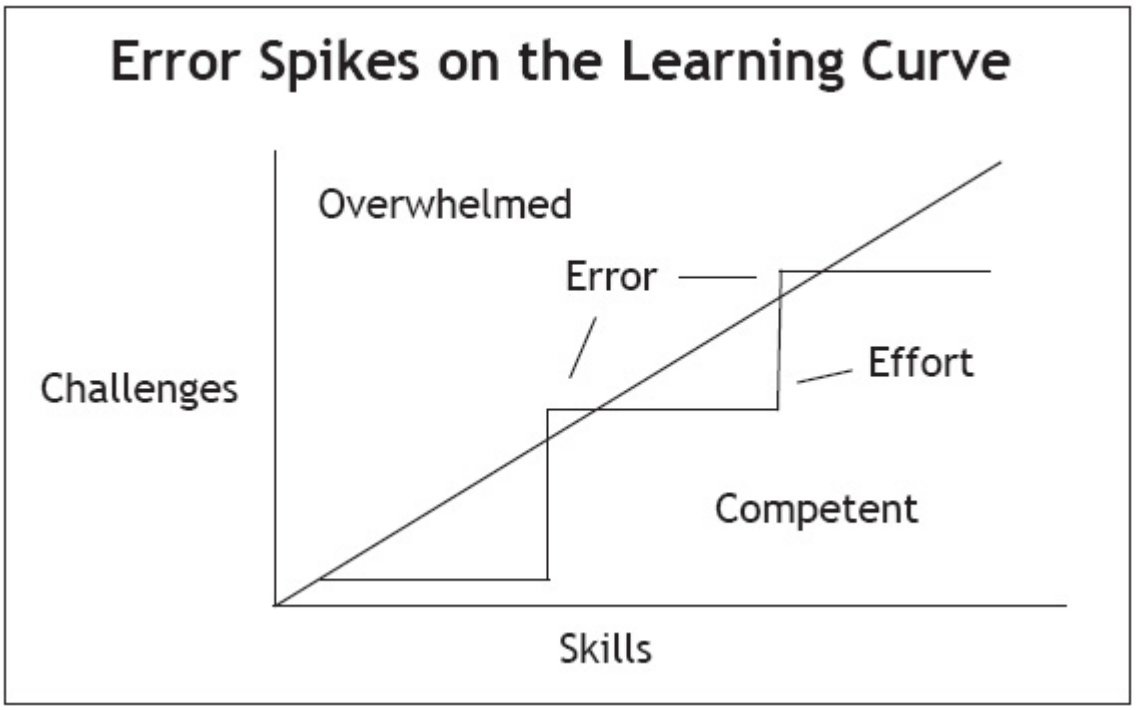
Mastering Flight
By John Matylonek

I have seen many people learn to fly since getting into the sport 14 years ago. Transforming oneself into a bird isn't trivial. It takes time, commitment, money and desire. Even when these are present, the uneven way in which some people progress in the sport has fascinated me. Pilots come in a large spectrum of skill and accomplishment. Some pilots have steady progress in the sport and seem to make it look easy. Some seem to crawl their way up the learning curve. Others have sporadic success, entering, leaving and re-entering the sport. Some have problems that restrict their versatility. Some seem to just stop learning and content themselves being at one skill level but do so reliably. Conversely, some burn bright as a rising star - till an accident snuffs them out. Others just lose interest and drop out. Some never really achieve self-reliance and independence, using others for their judgment and decision-making. So, why is this?

As a hang gliding instructor, I have used a general learning theory to help some student's progress more easily, steadily and further in the sport. I believe if students actually know how learning and mastery works then they will be better students and advance farther. Practically, masters in the sport tend to do more flying, in a safer fashion, more successfully and with greater accomplishment and fun than other less-skilled pilots. You can too. This article will describe how mastery works and can help you achieve levels of skill that enhance your flying career. Although the following emphasizes the beginner on the path to mastery it also applies to those of us at intermediate stages wanting to improve.

Structured Learning

All complex activities are built on well learned fundamental skills. Our bodies and brains regulate our behaviors and allow the development of these basic physical and mental skills. Learning involves the conditioning of web-like neural pathways so that the skills are performed reliably. Just like muscles, neural webs get strengthened when used and weakened when not used. By necessity, it takes focused attention during the trial and error learning process to physically change the brain and body. Neural connections need time to grow, consolidate and develop enough associations to perform a skill reliably. Focused attention and physical effort is sometimes hard work and the error that comes with learning is sometimes frustrating. The instructor, environment or the activity itself provides the feedback that allows one to modify responses until the standard of proficiency is reached. This process can be summarized in the following graph.



People are most comfortable doing what they do best. If motivation and interest exist, they will tend to want to improve skills so that they feel more comfortable. The straight line represents developed skills where the pilot's skills exactly match the challenges needed to accomplish a task. Below this "proficiency line", where skills exceed the available challenges, a student pilot may be competent and comfortable but also bored. Above the line, where challenges exceed the available skills, the student pilot may be excited but also incompetent and overwhelmed. As task challenges increase (the vertical lines), skills rise to meet the increased challenges to a point where skills no longer are able to handle the challenges. Anxiety or error begins and the pilot retreats back into the comfort zone (the horizontal lines). However, newly developed skills are honed to perfection along these plateaus hence the continuing upward slope of the proficiency line. Eventually, this efficiency leads to boredom and the student seeks more challenges along the vertical lines and develops more skills to meet them. Thus, as skills increase and become more complex, the pilot accepts challenges, to the point of increased error. At this point, the student retreats back into the comfort zone until they improve enough to seek slightly more challenge and develop further skills. This stair step develops the fundamental skills of any complex task.

How to Gauge Progress

A tool to measure ones progress is developing an awareness of competence. Your instructor, written material and other pilots are a treasure trove of information regarding techniques for flying. They are also indispensable for getting objective feedback. **Remember, there is no failure or criticism, just corrective feedback.** Getting objective feedback from instructors, other pilots or the results of your flying efforts is essential. However, ultimately, you must take learning into your hands. Developing an accurate subjective awareness of your skill is very important. Here are the stages that you must be aware of while learning.

Unconscious Incompetence	As someone not seriously considering learning how to fly, we don't even know we can't fly a glider. We have unconscious incompetence when it comes to the skill of flying. The statement from non-pilots, "I'd like to try that" is a good example of this mindset.
Conscious Incompetence	Once convinced instruction is needed, we are aware we cannot, as yet, fly a glider. We are conscious of our incompetence. This is the mark of the good student pilot.
Conscious Competence	After learning to fly a glider, and when we have earned a rating, we can certainly execute the various skills involved, but we do so consciously, acutely aware of weight shift, break usage, speed control, and personal limits and skill level. We have conscious competence.
Unconscious Competence	After awhile, we find we are flying at our particular skill level without conscious thought. A good analogy is driving home from work, pulling in the driveway and realizing that you don't remember any details of the trip.
Mastery	This is the level of skill where so much of our minor decision-making is done unconsciously, that creative actions are driven by intuition. It comes about when our unconscious competence has been building during real world experiences.

The important thing to note during this process is that mastery occurs at all skill levels. Unconscious competence of fundamentals must occur over a period time before mastery can be said to exist. Only when prerequisite fundamentals are mastered should a student go on to the next skill level. Otherwise, skill gaps will show up during flight. Also, unconscious incompetence can happen at any stage or skill-level due to denial, lack of proper information or feedback. If you start making major errors (or even having potential incidents) then it's time to retreat to the comfort zone below the learning curve.

The Instructors Role

The instructor's role is to set up the learning environment so that the time and magnitude of the challenges above and below the proficiency line (developed skills) is near the student's capabilities. The instructor creates a training environment that minimizes the variability and complexity in challenges (above the line) so the key components can be worked on - one at a time, in correct sequence so that complex skills are built on a solid foundation. These first fundamentals are far removed from the complete flight form. The frustration to success ratio is kept as low as possible to keep the student's motivation high. But, frustration is a necessary component of the learning process as it indicates challenges that slightly exceed the skill level. Sometimes the fundamental skills seem unglamorous and unnecessary due to the impulsivity and impatience of students.

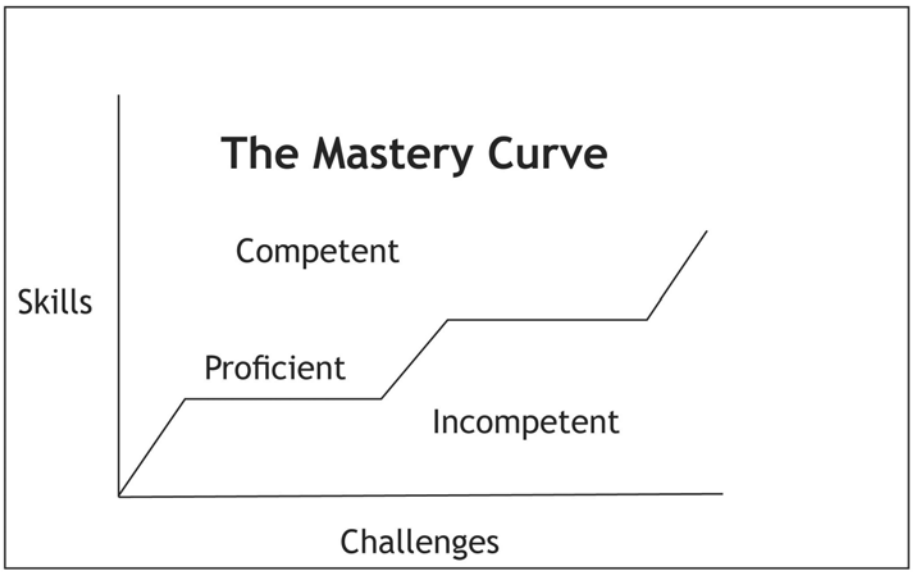
Students pay instructors because they are able to provide the proper information and standards of proficiency; encourage the learning process through structuring the tasks; and provide a safe but challenging environment. They also provide objective feedback, physical assistance and incentives to motivation to exactly meet the needs of the student. Objective feedback and coaching is what impels students forward and upward on the learning curve. The instructor holds back the overzealous student from over-reaching for challenges without the proper foundational skills. Since changing the brain's neural structure takes time (more time than the average ego or impulse for pleasure would like), the instructor enforces plateaus on the student's learning curve that allows the

student to consolidate freshly learned skills. On the other hand, some students are so unable to see their own skill level precisely or are not confident in them, that they become very tentative toward goals. They require incentives to motivation and assurances to have them perform the required tasks. Balancing critique and acknowledgement of improvement is very important to the motivation, safety, and progress of students. Students can short circuit this learning process by not understanding or appreciating the longer-term mastery curve that develops complex skills.

The Mastery Curve

There is no doubt that flying is complex. In fact, the complexity matches or exceeds that of many activities, including playing a musical instrument or learning a martial art. Our rating systems even parallel the latter art form. The learning curve controls the building of simple skills. Many advanced pilots cannot break down the components of their skills because they are in-grained as a seamless whole. **Complex skills built upon fundamentals that result from intuition and reflex may be termed mastery. Whereas the learning curve time scale is hours and days, the mastery curve time scale is months and years.**

Below is a graph describing mastery. To emphasize proficiency, or a basic skill set, the vertical axis has been labeled “Skills” and the horizontal “Challenges”, the reverse from the Learning Curve. Proficiency ratings are simply complex skill sets that can handle a particular spectrum of environmental challenges (the flat areas on the mastery curve)



As in the learning curve, the path to mastery is not a straight line with a regular upward progression but is a stair-step of learning curves punctuated by learning plateaus. These plateaus are a period when skill-sets seem to remain stagnant. This is a time when the student’s skill-set is being honed by the natural variability of the environment and the complexity of natural situations.

The brain is integrating gains made in prior learning spurts with new information offered by our learning environment - either Mother Nature or the instructor’s tasks. For instance, a new student must experience various slopes and wind conditions to say they have a solid launch and landing technique. These new experiences must be integrated into the basic information already learned in the ideal learning situation. Also, since the brain is being physically changed,

there are biological limits to how fast one can truly develop a reflexive reliable response.

With continued focus, persistence, and determination these flat areas are overcome and progress is once again seen. It just “clicks” and students suddenly improve. The plateaus are emotionally difficult because many students have the mistaken notion that every instance of practice or teaching must result in improvement. Some do not appreciate the level of variability in weather conditions they must experience for genuine proficiency - the very thing both student and teacher must surrender to.

Complicating the learning and mastery process in flying is there are three distinct systems being modified – physical motor, intellectual and emotional skills. Certain students may progress faster in any one of these aptitudes or come to training with particular talents in one or two. Very few of us come to flying with in-born talent in all three realms. However, the good news is that all of these aptitudes are subject to growth if given the chance. This explains the endless spectrum of ability and progress in pilots.

Retention of Skills

It takes time to grow a critical mass of neural connections supporting a skill. This, in turn, is dependent on the time it takes to experience environmental variability. Both of these is what gives rise to the plateaus on the learning and mastery curves.
There are a critical number of occurrences with the skill or experiences with a situation that a brain must deal with to develop a highly associative and reflexive state. Just as muscles atrophy with disuse, neural connections associated with a skill are lost without constant review. The versatility, reliability and longevity of the skill are increased with the experience of natural variability surrounding the skill. In the context of learning, a pilot who has a sporadic training schedule must constantly take time to review and reestablish previous levels of reliability. This wastes time, money and emotional energy. **Regular and consistent practice of fundamental and advanced skills is essential to mastery.**

Learning emphasis

The beginning stages of learning how to fly depend on physical-emotional skills. Visual and kinesthetic (bodily activity, awareness and touch) cues are very important at this stage. Later stages emphasize intellectual-emotional skills. This requires ability to absorb in-flight information, synthesize that information and make decisions. This change in emphasis is a pitfall, since most people depend on their strengths. They prefer one learning style over another because that’s where they have had past successes. Some people just need to get “the feel” of it. Others need to analyze the task completely before attempting it. Very athletic students excel at the beginning, but they may falter when attempting to deal with more complex mountain environments. On the other hand, intellectual students may have a hard time at the beginning, when just practicing the skills through action mimicry and physical commitment is required. **Switching learning styles is essential in the mastery of free flight because once the physical finesse is developed flying requires much more judgment and decision making**.

Emotional skills can especially be an obstacle to learning at all levels since they can effectively block progress on the other fronts. But, equally, lack of interest in technical aspects can lead to major mistakes that result in emotional setbacks. Despite the interdependency of these aptitudes, interest and motivation are two necessary driving forces behind learning that depend on emotional aptitudes. **The desire to fly countered by what is actually possible - physically, intellectually and emotionally - is the most important thing.** This brings up our next topic.

Character of a Beginner on the way to Mastery

Focused attention and persistence is the most important character trait in flying students. Because learning requires error, a certain amount of frustration must be expected. In fact, considering the complexity of the sport it may be the most challenging thing you have attempted. Of course, anything worthwhile takes some work and a helmet. Those needing more work in any one aptitude must expect more remedial work and frustration. Unbridled frustration is an unneeded emotional response. It is a distraction to focused attention. All distracters are mind-made which the student must manage. I will describe how to manage these gremlins in the next section. Yes, you are responsible for your own attitude toward learning.

True intention is an important character trait. Motivation and interest depend on true intention. Interest in the art and action of flying must exist. Looking for an instant thrill, going along with the crowd, having a vicarious interest in personal flight, enjoying the social scene, or indulging your mate in a bonding experience is not sufficient. Without sufficient motivation and interest in actually flying, learning is cut short because of the focused attention needed to stay on the mastery curve is not there.

Belief in the mastery curve and the three required aptitudes, whether consciously or not, is the single-most important predictor of higher levels of success in flying students. That's because this belief sustains the motivation and interest that will transform itself into focused attention and effort. It also forms a road map for life-long self learning once graduated from flying school. Acceptance of error and some frustration is inevitable but we must also minimize the magnitude of those errors for safety reasons.

Never being above fundamentals and a willingness to review is important for versatility and complete mastery. There is always some regression of skills as task emphasis changes from one learning environment to another. As pilots fly more in the mountains, actual launch and landing practices decreases as airtime increases. As pilots get used to their local sites, skills are biased toward the local conditions. This becomes very apparent when seasoned mountain pilots are presented a 20 foot dune to launch and land from - all within 7 seconds of flight time.

Management of distracters

Remember, focused attention and persistence is a requirement to attain the physical, intellectual and emotional goals of flying. Obstacles to learning include any distracting thoughts, attitudes, conditioned habits that do not contribute to actual training. Willingness to stay on the plateaus toward the next learning goal despite frustration assures success. In other words, steady faith and determination that mastery will occur manifests itself as focused attention, effort and action. That action results in steady progress along all these fronts.

Foot launched flight has many potential distractions. We cannot control the weather, yet we are deeply conditioned to plan and expect our activities on a rigid schedule. Sometimes, we are impatient with the mastery process and just would like to fly like the experts - right now, despite objective feedback to the contrary. Sometimes, we don't appreciate the value (and fee involved) of instruction. Other times, the imperfect nature of the instructor distracts the student. Attaching self-worth to flight is a recipe for disaster since we cannot make rational decisions in this state. Finding that our lifestyles will not support the time, flexibility, commitment and expense of flying can cause much internal conflict. All advanced pilots remember the feelings of inferiority

during learning, when everyone else was soaring, and he/she was down in the LZ. These distractions are as variable as the weather.

Distracted people have a harder time learning any one thing, even though they may excel at knowing many things less well. When a task is being learned well, there is none of this “extra” thought - just the effort of learning and development of fundamental and advanced skills. **Separating and disregarding minor internal and external frustrations from learning is essential in learning how to master free flight.** Being able to note frustrations without overreacting to them and realizing that next experience will be different is a very useful emotional skill. Many beginners are surprised at how flexible, tolerant, and patient they must be.

How to become a Master

Flying experiences are open to most everyone with the proper assistance and supervision. Our flight parks are expert at providing flying experiences to all. But to achieve ratings and self-reliance requires an amount of personal growth that develops or compensates for all three aptitudes – physical, intellectual and emotional. A student pilot must be willing to pay the cost of this growth. Here is what you must do:

1) Have a true desire and interest to fly.
2) Believe in the mastery curve.
3) Develop flying goals. Break them down to manageable skills that can be practiced safely. If you are under an instructor, insist on a definite plan with steady and attentive feedback.
4) Schedule regular time for practice, practice, practice. Change your lifestyle to accommodate free-flight.
5) Have a beginners mind, Resist skipping fundamental steps.
6) Eliminate distracters. Learn how to meditate.
7) Accept the variability of the air as your teacher
8) Accept feedback from people and the air without denial or ego posturing.
9) Adapt your preferred learning style with the challenges
10) Construct personal limits and safety margins for your present skill-level.

Surprisingly, the students that have the most fun and easiest time at learning to fly have average mental, physical and emotional aptitudes. For these students, not much remedial work or extra assistance in any one area is needed. This makes for a much more steady progression. Students having persistent handicaps in any one of these aptitudes can also achieve high levels of accomplishment and even excel over other “average types”. This is because a person who must work hard at developing a skill often learns the skill more deeply – to the bone as it were. The student on the path to mastery addresses all three aptitudes in their flying career and follows the mastery curve.

Conclusion

Learning to fly is one of the greatest adventures a human can attempt. Flying rarely gets boring because there are always new things to learn and nature always provides more and different challenges. When these skills exactly match the challenges, a total immersion results that sends worldly concerns away. The pilot feels confident and in control. This is superior and safer than feeling scared and lucky. To transform oneself into a bird should not be taken casually. Afterall, human beings have evolved to gaze over tall grasses overlooking some flat savannah. Learning how this transformation takes place in our lifetime can be very useful. It can direct our own training plans and lessen the surprise of learning. Hang gliding and paragliding are very complex sports, involving physical, emotional, and intellectual skills. Very few people have inherent talents in all these realms. Mastery of any complex skill requires

growth in all three areas. In part, that’s why pilots find so much joy and frustration in the sport. Constant challenges can surprise and frustrate the beginner, especially when encountering the inevitable plateaus, but at all stages they can create an endless fascination. Desire, persistence and goals are a requirement to mastery. Those with genuine desire to fly can get through the unglamorous parts of training, dodge the pitfalls of more difficult sites and circumstances, and discover a way to keep safely learning for a lifetime.

Biography

John has been an active USHGA certified instructor and private pilot since 1996. He currently is working on the fundamentals of paragliding. He has been flying since 1990, being a product of Kitty Hawk Kites and Lookout Mountain Hang Gliding Schools. John runs the Oregon Hang Gliding School with centers of operation on the Northern Oregon coast and the Willamette Valley. Contact John at john@oregonhanggliding.com