

# Practical Guide to Science Writing and Publishing



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A practical guide to the writing process:

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## Step one: Write the Methods

- Site description
- Experimental methods
- Data Analysis

The writing for this section can start during the proposal building process, while the project is taking place, or very early during data analysis.

A skeleton of the methods section can be drafted early in the process, and then be refined as the project develops.

Unless the project has a very specific experimental design with pre-determined procedures, the data analysis particulars are usually developed as the analyses themselves come together and are finalized...which takes us to step two....

A practical guide to the writing process:

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## Step two: Finalize analyses and associated figures/tables

Sometimes projects have a very definite experimental design with a pre-determined analytical procedure. If not, then the data analyses may develop organically, sometimes in response to surprises that pop up in the study, or for other reasons.

In any case, a key process in the manuscript prep process is **meeting with your advisor to look through figures and tables!** Once you have made a good leap into the data analysis process, and start to have some ideas, you need to start meeting with your advisor to go through figures.

It is outside the purview of this document, but what I call **Exploratory Data Analysis (EDA)** is a key process that is often overlooked by beginners. You need to begin by scanning your data set for structure by working quick and loose, graphing, throwing out some comparisons, etc. Don't worry at first about the particulars, scan through analyses and share what you find with your advisor. Sweep for outliers! Pose the data with various comparisons, planned for and unplanned for.

Then, work with your advisor to tighten down the data analysis, come up with a figure/table set that you think illustrates your study...then onto Step three...

## Step three: Draft a results text

With a set of figures and tables in hand, and a hardening idea of the precise analytical method you will need to employ you can begin writing the Results text.

A few pointers:

**-Lead with biology/ecology! Too often beginning science writers put together sentences like:**

“Our ANOVA was a significant.”

instead of something like

“The restoration treatments had a significant influence on tree seedling growth (ANOVA result)”

That simple step can massively improve your results, because a distracted reader (we all are) can lose track of what is going on in the former, but not in the latter.

**-Be deliberate in leading your author through your figures/tables.**

Keep the figures/tables in front of you as you write the results and try to imagine them as illustrations for your story. Then author text that is glued to the figures.

**-Use ecological topic sentences.**

Many good writers don't do this, and it isn't always needed; however, when you start out, having a topic sentence even in a results section can be a BIG help in keeping your text on track and helping your reader.

## **Student-Advisor Draft Ping Pong... ...the key process you need to commit to.**

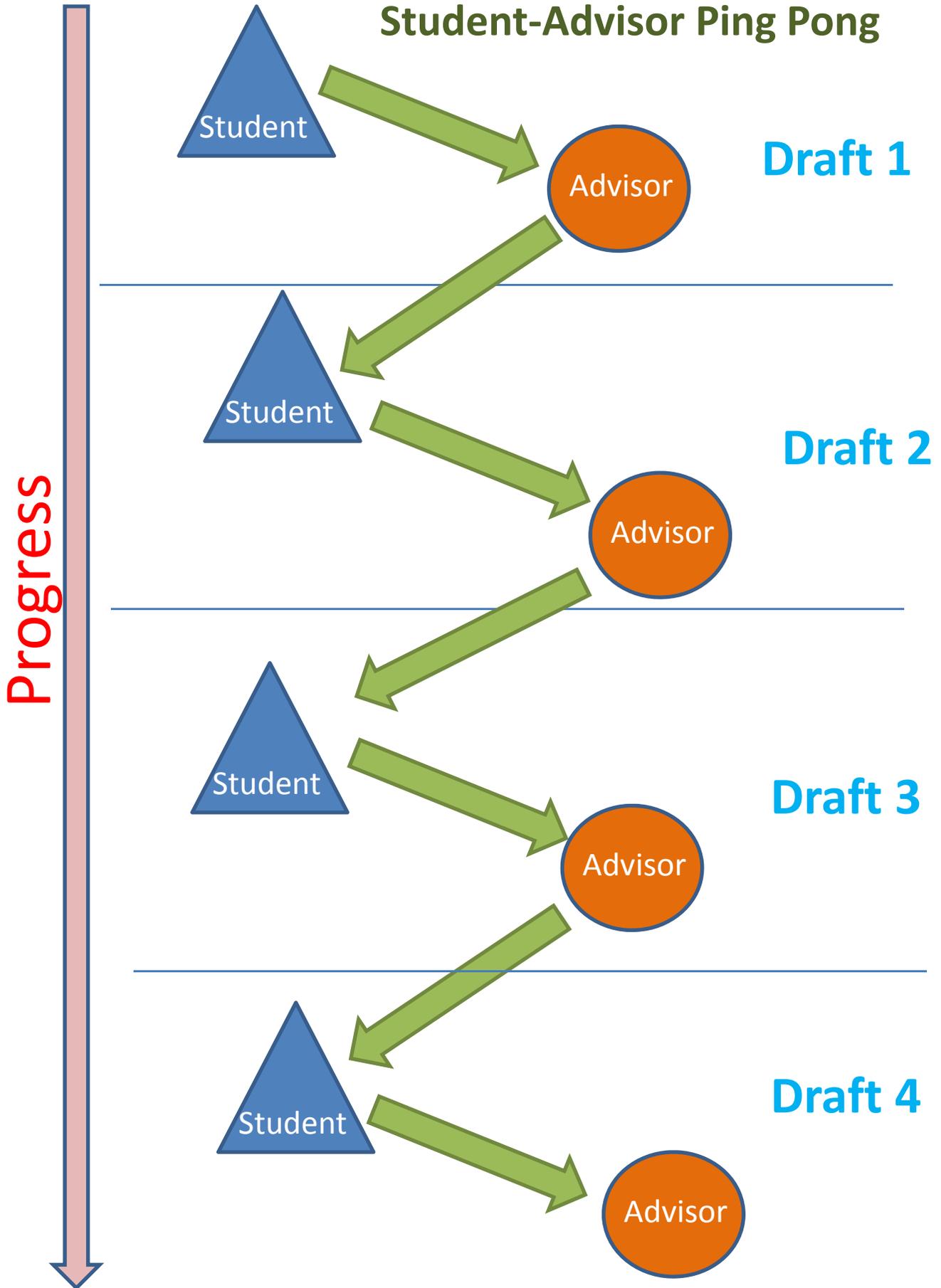
In my experience one of the key challenges for a student putting together a manuscript draft for the first time is getting them into the mode of releasing the draft for advisor comments.

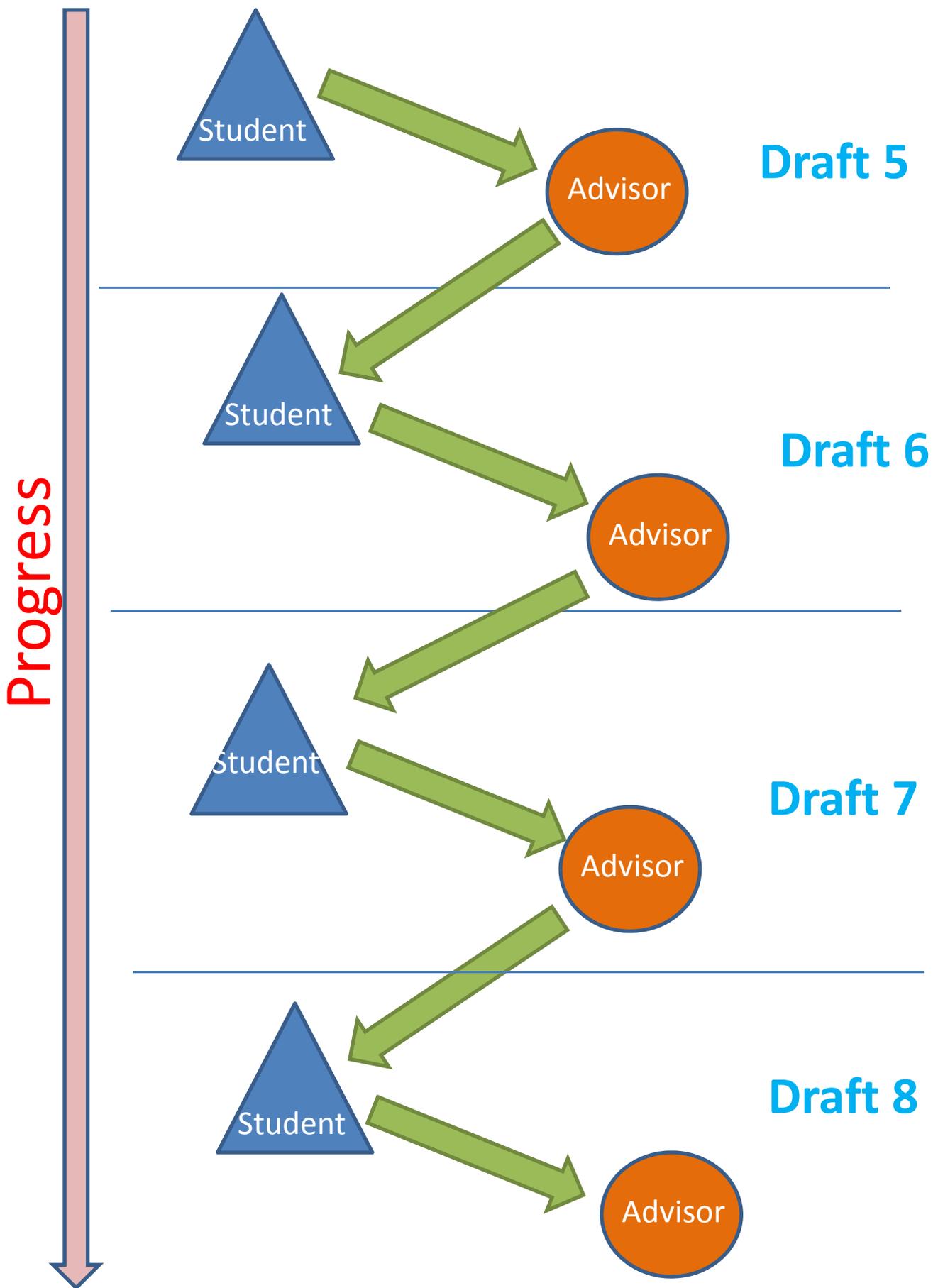
Other advisors might work differently than me, but my basic idea is that I don't want the student spending too much time spinning their wheels with the paper before they get comments. Generally, because of my experience with the process, I am able to easily see bad side tracks, etc, and thus can keep the paper on track. This allows the student's labor to be more effectively leveraged.

Writing a paper is hard! Getting better at science writing is a life-long pursuit for an academic. It is better if the student pushes the paper along, and then when they get stuck, ping the ball across the net. The advisor pongs it back, and the manuscript moves forward.

It looks like this....

# Student-Advisor Ping Pong

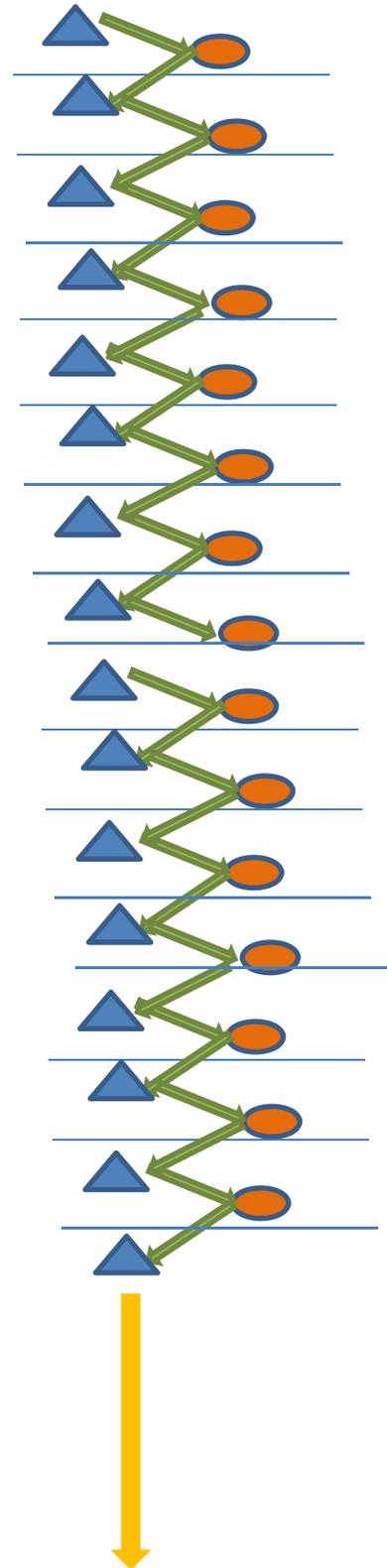




It is quite normal for a manuscript to pass through 15 drafts before it is submitted to a Journal!

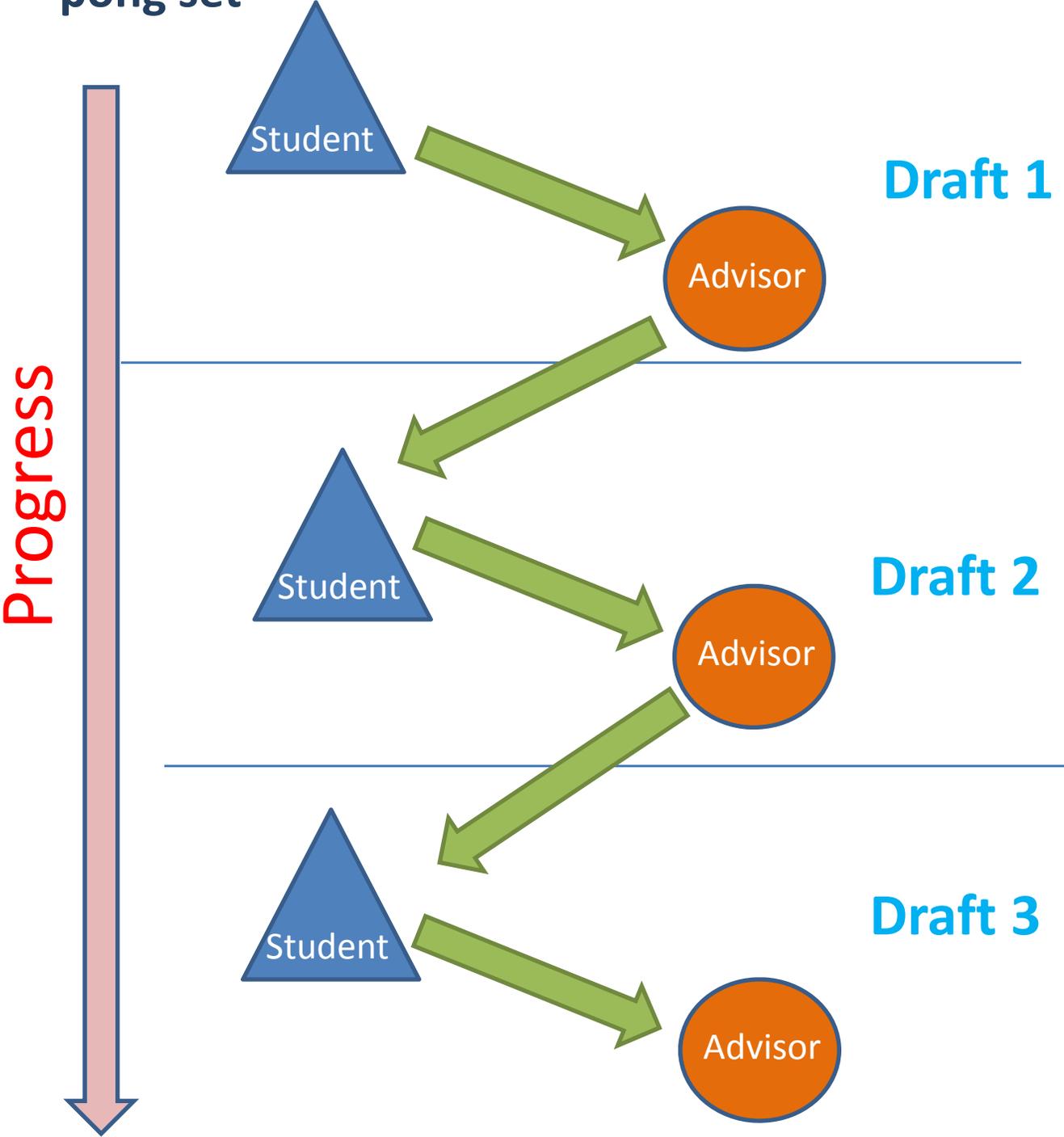
This process will take at least one week for each draft, so the timeline from first draft to submission can easily stretch to 4 months.

The number of drafts and timeline depend on the experience of the authors and the sophistication of the paper, but 15 drafts is a good minimum estimate.

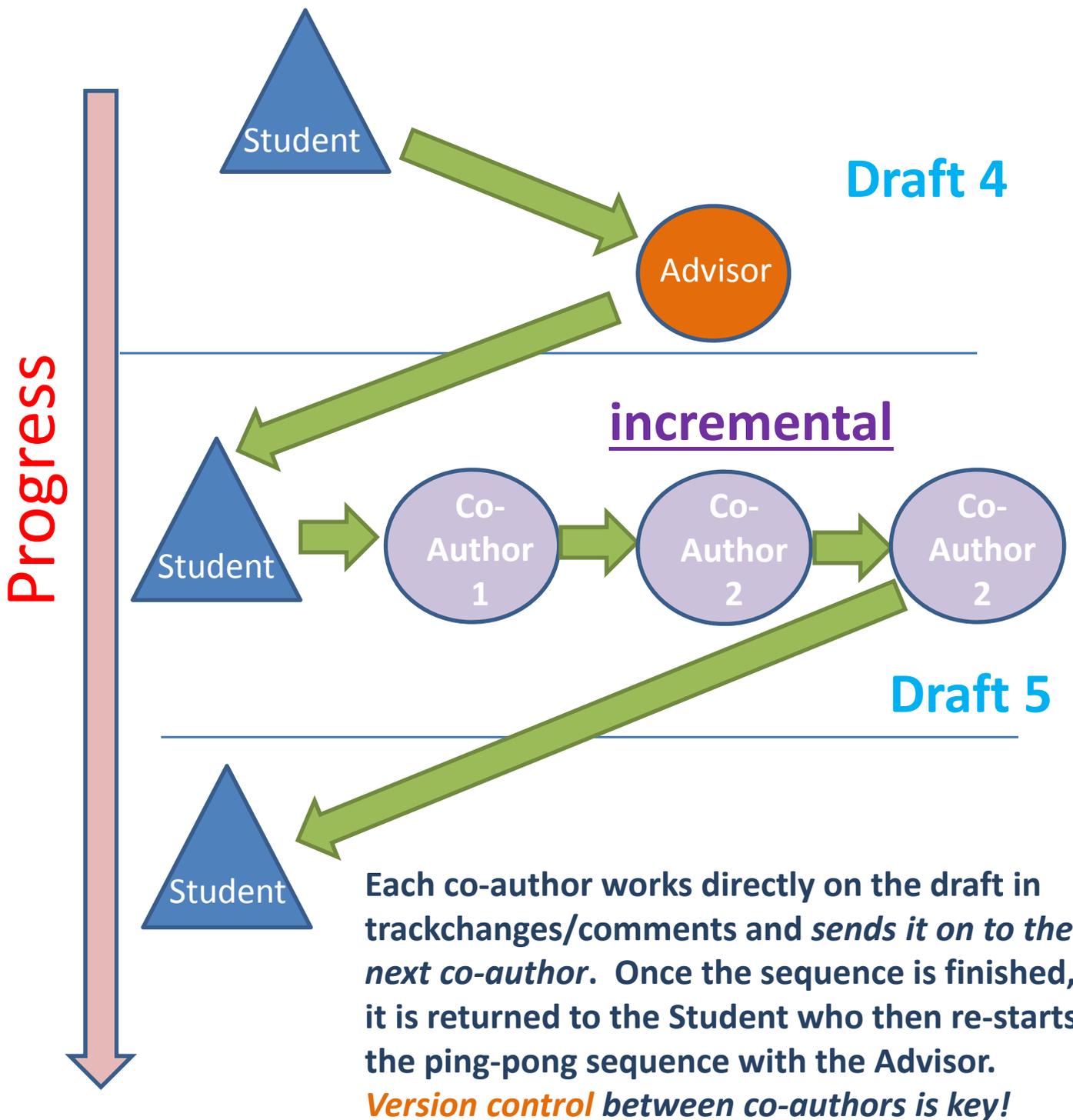


***Journal Submission!!***

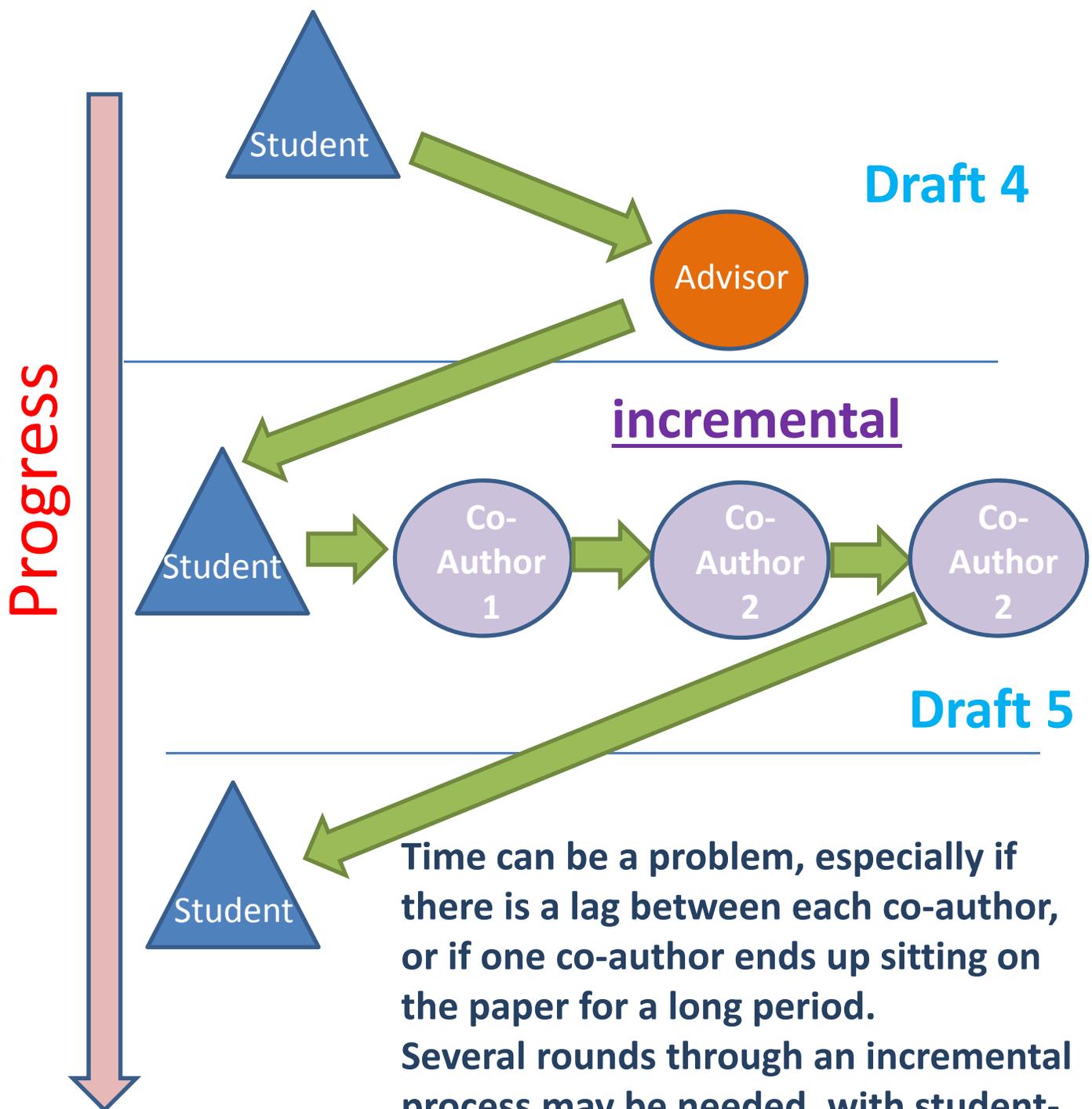
When there are other collaborators in the mix, or perhaps committee members who are actually interested and involved in the project (rare but not impossible), the approach is a little different. It starts out with a regular Student Advisor ping-pong set



For co-authored papers: other authors have to be brought into the mix. There are generally two approaches- incremental or blast. Let's assume the advisor and student are ready for input after Draft 4

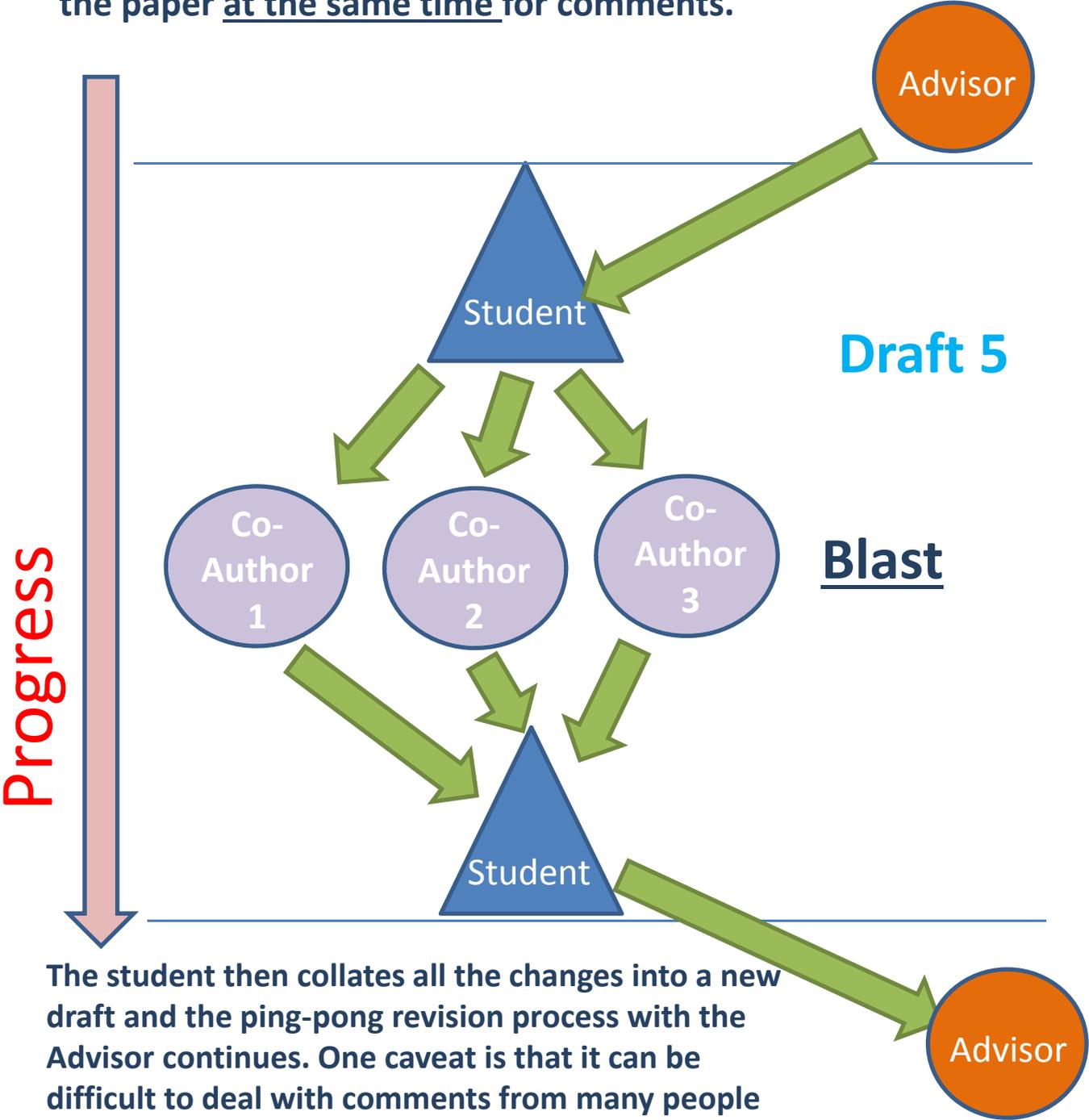


The advantage with the *incremental* approach is that each co-author's ideas are pushed on to the next co-author such that concepts do not get lost, and the chance for inefficiencies associated with two people taking text in the opposite direction are minimized.



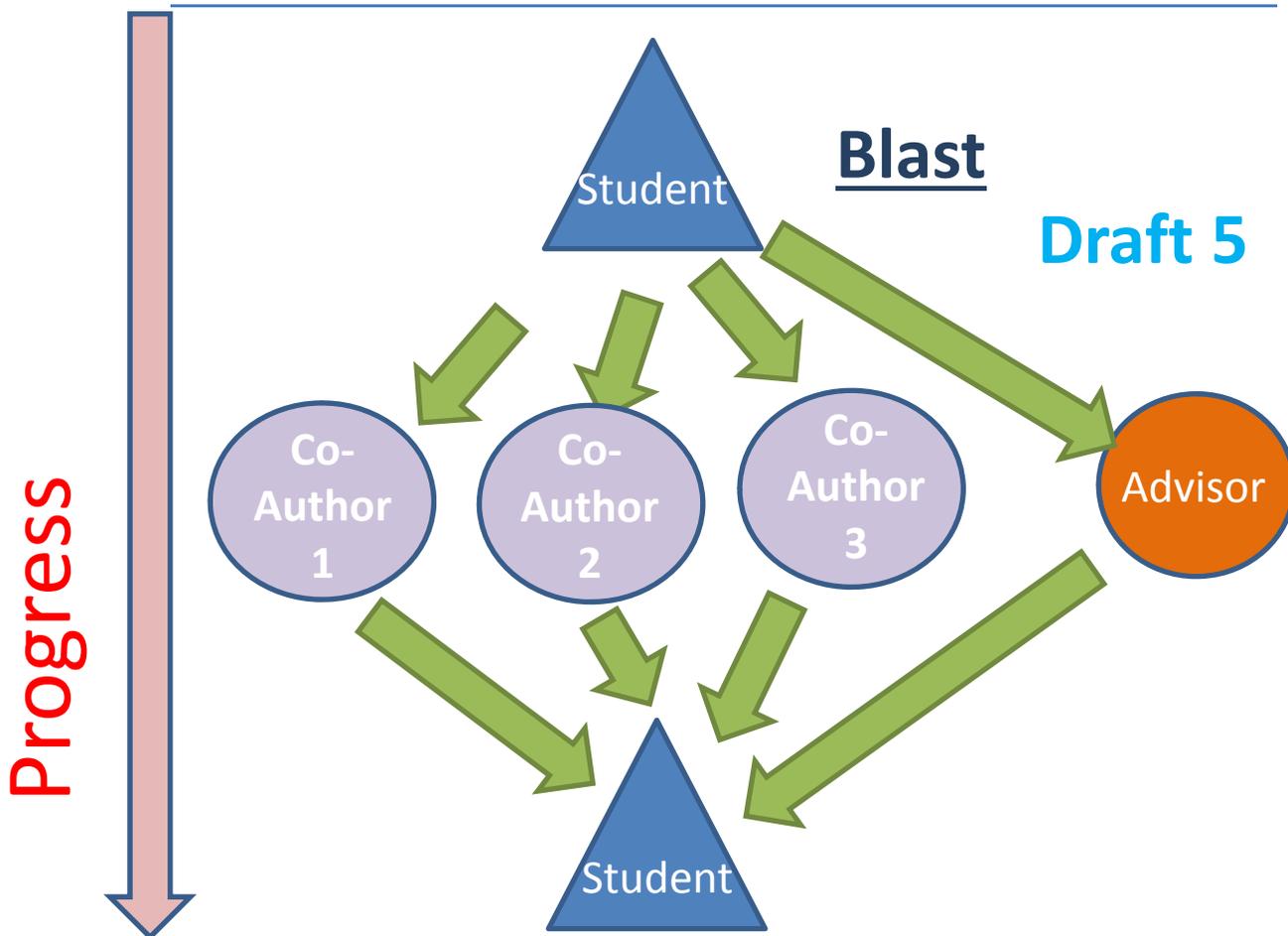
Time can be a problem, especially if there is a lag between each co-author, or if one co-author ends up sitting on the paper for a long period. Several rounds through an incremental process may be needed, with student-advisor ping-pong between rounds.

An alternative to the incremental approach is something I am calling the **blast**. In this case, once the advisor and student are ready to bring in co-authors, the students sends all the co-authors the paper at the same time for comments.



The student then collates all the changes into a new draft and the ping-pong revision process with the Advisor continues. One caveat is that it can be difficult to deal with comments from many people at the same time. There can be inefficiency if the co-authors don't agree, or edit sections in different ways. One advantage is that the author often gets through the co-author reviews more quickly, since each co-author does not have to wait on all others.

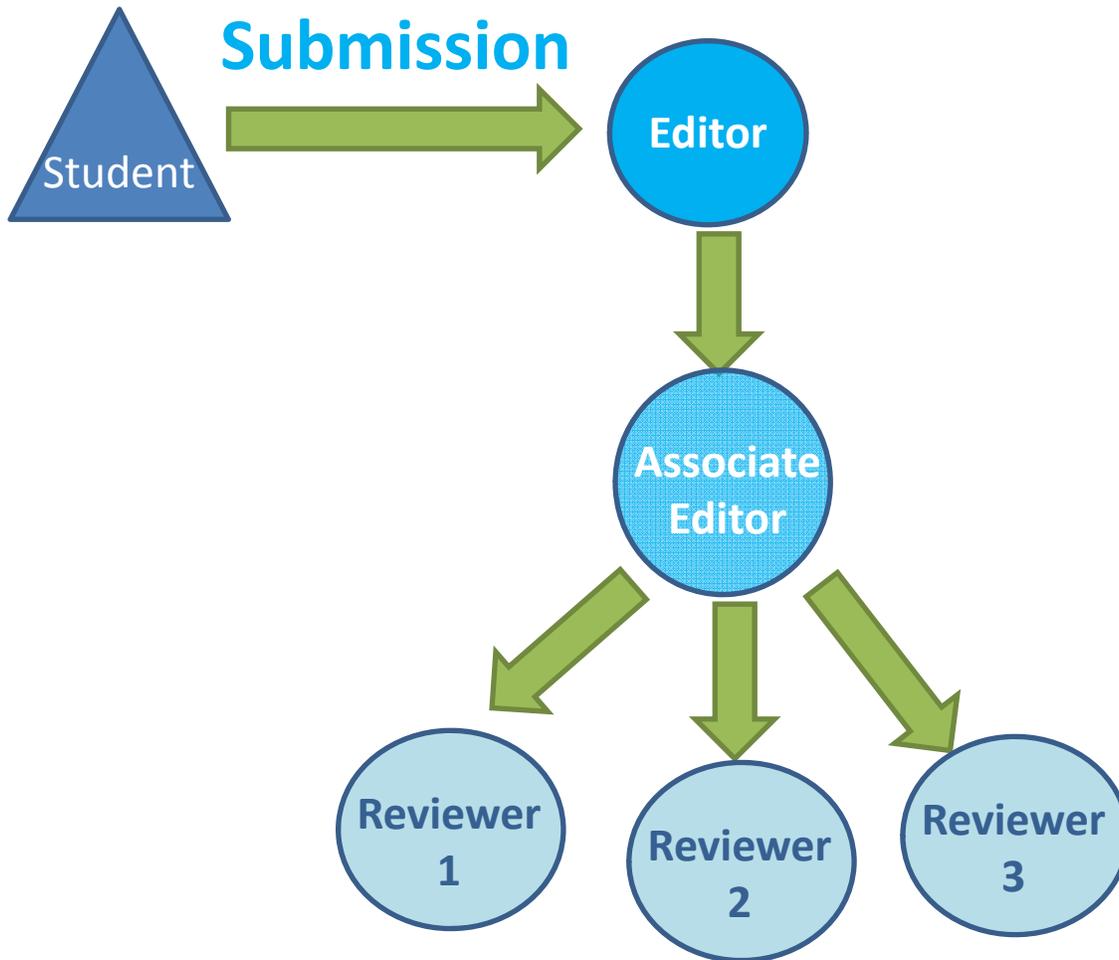
Sometimes an advisor will be one of the recipients of the blast:



*Point of Conversation:* One potentially controversial blast is what I call the **Journal-Committee Blast**, in which case a student who is early in their program and has a Dissertation chapter ready for submission, sends it off to a Journal for review, and at the same time, sends it to the committee. The goal is for the committee members to return comments at least by the time the Journal reviewers return their comments. Then the student can incorporate all suggested changes at once. In practice, many (sometimes all) committee members may never reply to this draft. If the paper ends up accepted, when it is time for the defense, the student can honestly say that the committee had the chance to review all chapters, those already published and also unpublished chapters. My recommendation is that students do a **Journal-Committee Blast** with each chapter.

## *the peer-review process*

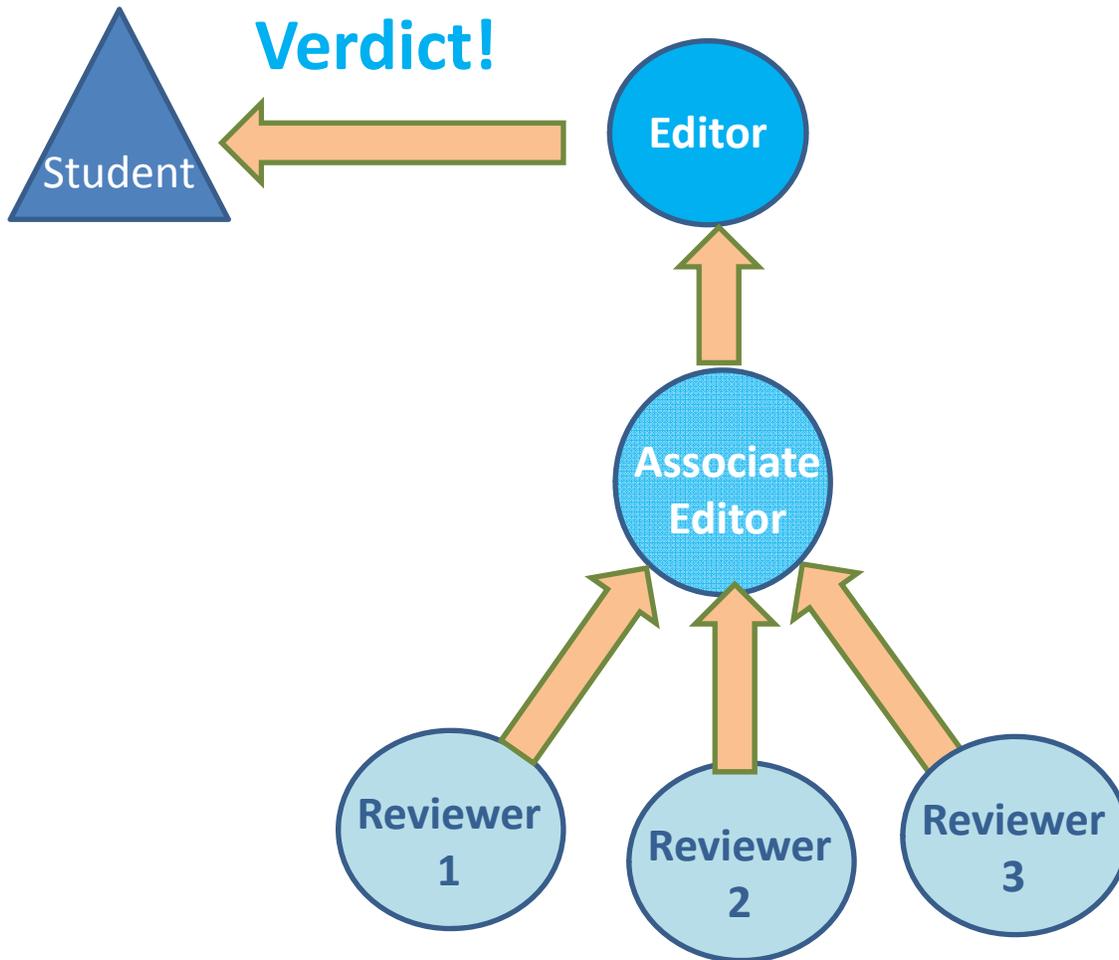
Once the student and advisor have decided the paper is ready for review they chose a journal and submit. There is a lot that goes into journal selection, and the advisor and the students should go through this together to select a good venue for the paper.



When the paper is submitted it goes to an Editor, who looks it over and decides which Associate Editor fits the paper. Sometimes the paper will be *rejected* by the Editor as inappropriate for the journal. At that point the student needs to find a new journal. If the paper pass the Editor and submitted to the Associate Editor, it is reviewed to select appropriate reviewers. The Associate Editor may also reject the paper prior to sending it for review. As journals are increasingly facing high volumes of submissions, even getting a paper reviewed is an important step!

## ***the peer-review process***

Once the reviewers have finished their review, they send the reviews to the Associate Editor. She (or he) is charged with processing the reviews, coming up with a recommendation, and submitting the recommendation to the Editor

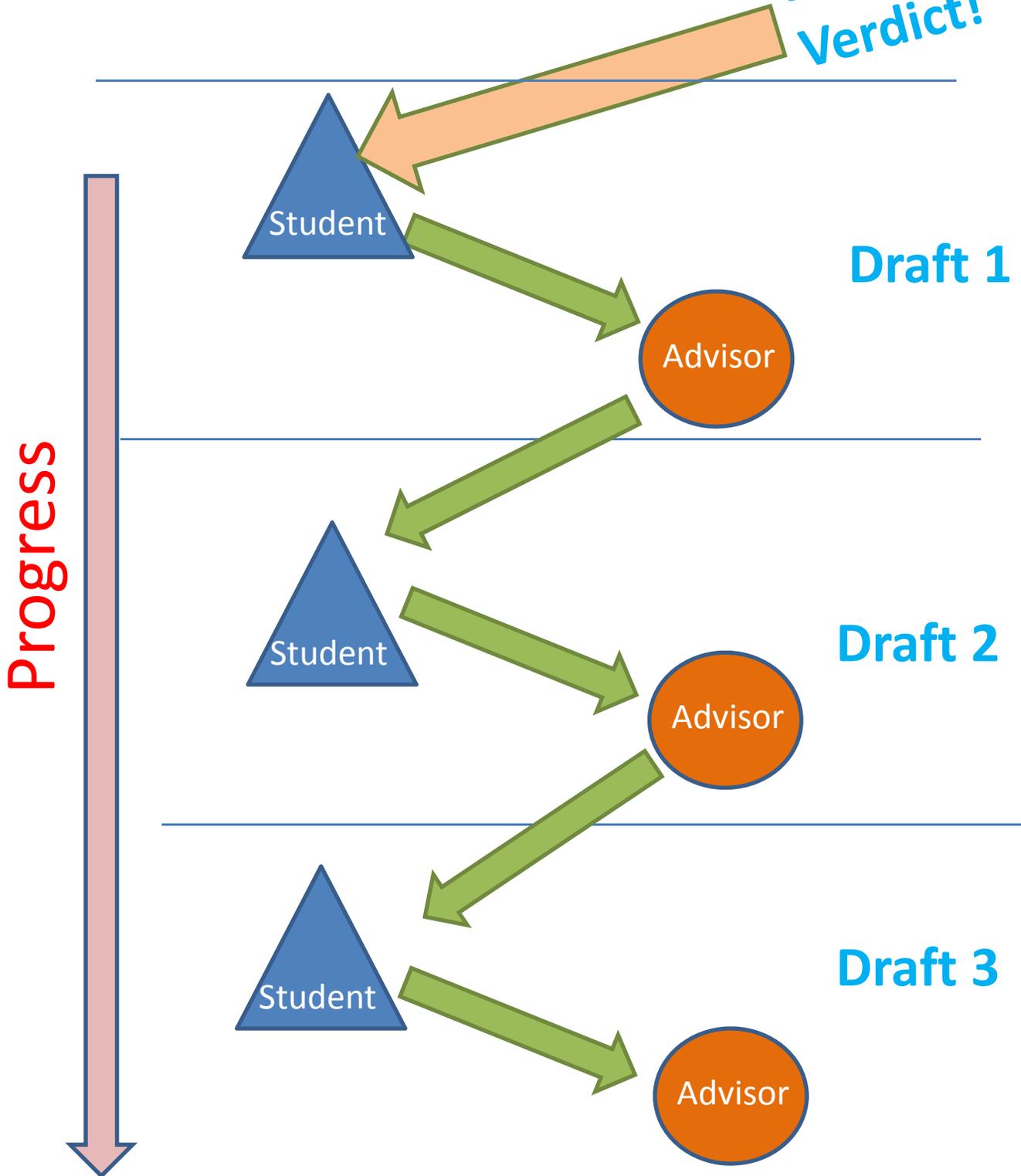


The editor then considers the reviews and the Associate Editors opinion and renders a decision that is sent to the author. The decision is generally in one of the following categories:

- Accept As Is (extremely rare)
- Minor Revisions Needed (good outcome, minor work needed)
- Major Revisions Needed (okay outcome, a lot of work left)
- Reject but Invited to Resubmit (resubmit or go elsewhere?)
- Reject (bummer, but don't get depressed! Rejected papers often find a new home, and I have had papers accepted at BETTER journals than ones that originally rejected a paper!)

Once the reviews come in from the journal, the ping-pong game re-starts. It is important for the student to plan on several revisions following the journal comments. It can take many months to get the paper ready for resubmission

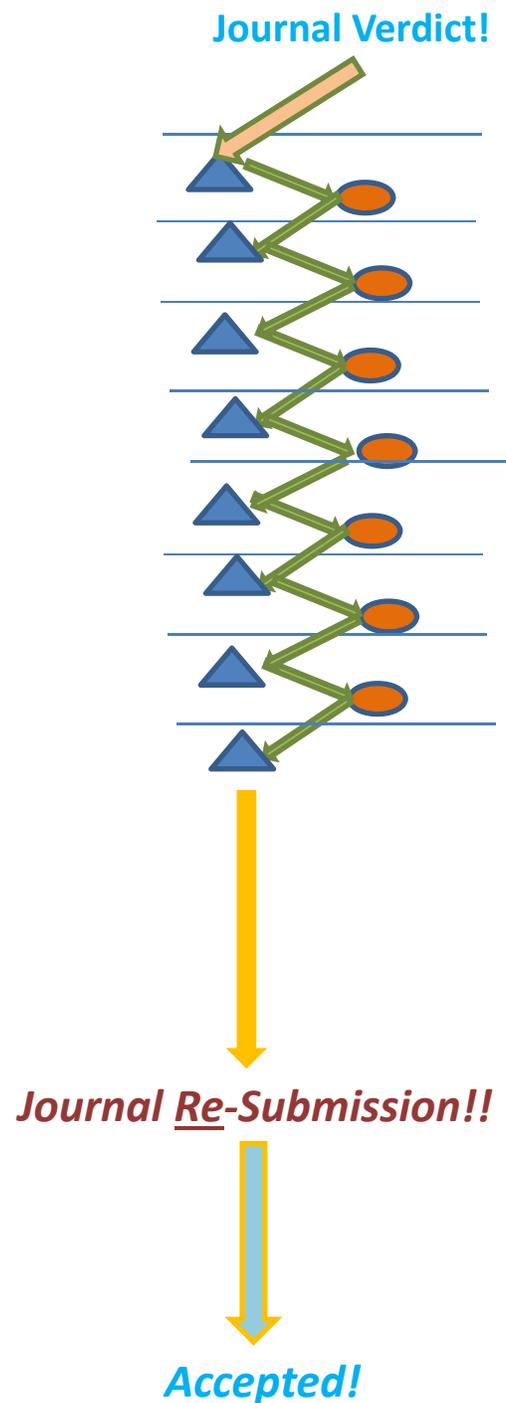
**Journal Verdict!**



It is quite normal for a manuscript to pass through a series of drafts before re-submission. 7+ drafts are certainly possible!

This process will take at least one week for each draft, so the timeline from first revision draft to re-submission can easily stretch to 2 months or more.

If the authors do a great job with the revision, it is possible at this point that the article may be accepted for publication! Whew...! Now there are a few more steps...



**Accepted!**



**Preprint**



**Galley Proofs**



**Online Publication**



**Final Publication!**

After the manuscript is accepted, some journals have a pre-print process. That simply means you can share what is basically the manuscript as you submitted it as an accepted paper.

Later you will get galley proofs. These have been copyedited and have a professional lay-out. It looks like the final paper. The authors need to very carefully read these for errors.

Next the paper is published online, then it is citable!

Finally, it is published in the journal, with a volume number and page numbers!

Congratulations!!...now time to get started on the next paper...

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