November 3, 2025
Memo on Communication
ETID Department
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Origins of This Memo

In summer of 2025 I was asked by the department head to create video descriptions of our MMET labs. In the preparation for this, I found the coordination difficult. The challenge was rooted in technical communication and reflects the same challenges that I faced since 2015 in the department. I have in fact been working on solving these challenges and I wish to describe them as well as improvements that are underway. The improvements won't be adopted unless I can show why it matters, why we should take time to learn a few small skills, and that these improvements are designed to make life easier for professors and students alike.

How We Communicate

This chapter describes the problems and opportunities with our present communication protocols that exist in our department. The impacts are seen daily and intensively at the level of a laboratory coordinator in our workplace but from many perspectives it is invisible.

Improvements are very possible, but we need to appreciate the depth of the challenge, which few people have time to reflect on. In many strong organizations the solutions for communicating are built into policies and they can even be taken for granted while they are helping immensely, just like the beams in your floor.
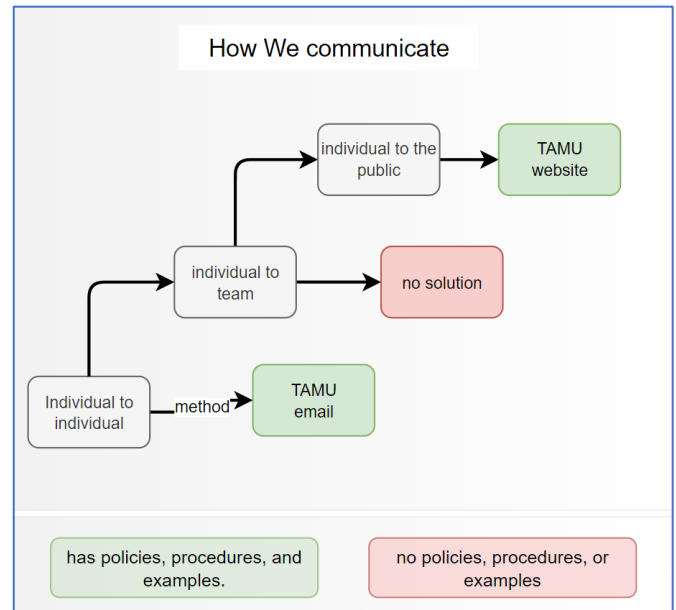

Figure 1

In our present-day situation the university provides us with solutions for communicating 1-v-1 and 1-v-public. Those paths are shown with green boxes while the red path might be the most critical need for knowledge exchange, but it is the most underdeveloped.

What is meant by individual-to-team communication? **This is when the author does not know the time or place when the reader needs information; only that the scope of the information matches the scope of the reader's needs.** Example: A researcher in 1990 wishes to share information with his team. He has examined the information for a solution. He found the best book in the library and he found the best chapter in the book and then he marked off the page with a short note about the chapter and the query, and how the text answers this query.

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Next, imagine that the researcher needs to make this available to his team. In one scenario he collects the book, adds a sticky note to the page with 2 sentences, and then he stands for the morning announcement and mentions "I've placed a key solution in the office, with an added slip inside the book. You can access it whenever you need." Of 20 people, four of them **relate to the topic** and make their own note of the solution they can collect later. One needs the information now, and three need the information next year. So, success equals moving info across time and space, storing it out of the way, but retaining discoverability when it is forgotten.

Now, advance to the digital age. What is the new method to approach this? Where does a team member author a small note that is available for the reader who can see the same information, with info residing in the same place for perpetuity? We have many options, but none of them are standard.
- Which drive?
- Which version?
- Which filename?
- How is it accessed 1 year later?
- When do the above answers expire?
- Who updates expired answers?
- Who shares information at onboarding?

Can we achieve the same communication digitally? Yes. Do we? No. The digital tools stack up in a thousand directions and new tools displace old tools, users lose access, the location of the source isn't known, new members cannot know of the existence of the information, nobody takes responsibility for team information archival, nobody discards excess information. Except sometimes they do, and nobody knows it.

Among 10,000 emails that I sent in the last decade at TAMU, I still repeat the same information when I send new emails. I still find my information outdated by the changes of lab locations, changes of personnel, and changed equipment and policies.

In our university, *I have never received instructions on sharing technical information* nor ever heard of anyone having a standard method of sharing technical information. And I believe our individual experts each develop their own methods to their best ability, sometimes with great results but never with shared methods.

Why isn't this problem obvious right now? The professors establish their own standards between professor and class. The research teams establish standards between peers. But the staff coordinating with peers & faculty have nothing. That is what I want to improve.

A Case Study (2016)

This section explains why my most impactful job function is distribution of information, and the same for any lab operators, and we do not have the tools we need, yet.

Around 2016 I operated one of our labs which requires a huge technical knowledgebase to run. There is one machine: a metal 3d printer. In all my interactions, 90 percent of my service to the students/staff/faculty were repetitive answers delivered again and again. It became clear the bottleneck of productivity, safety, efficiency, and improvement was communication of this key information.

As I gained knowledge, I accumulated answers that could save hundreds of thousands of dollars per year for the department and probably convert 50% of project failures into successes. That is a doubling of the speed of good research and learning outcomes, and decimation of waste.

In my job function, the most crucial action was to provide this information to people who needed it. Many of them did not know they needed the info. How do you locate a person who is about to waste $1000 in materials plus a week of time, discover which factoid they need and then provide it to them before the loss occurs? What if they are in multiple positions, in different buildings, and multiple teams? What if they have different first languages, different experience, and wide-ranging educational readiness?

Partial Solution: I must move the information to reside WHERE it is needed and WHEN it is needed. Where is the place a researcher learns the lab exists? At the door. Since the lab is not published anywhere, the doorway to the lab is the only place where information is written which maps the lab information to the lab. When do they need the answers? in the same place as the lab label. So I decided to include my contact information at the door label. I would start getting emails before people came to the lab. They thoughtfully paused their process to ask questions. Good.

Then I found myself repeatedly sending the same valuable information. (I could justify my whole salary just sitting and sending emails for the whole year.) There must be a better way.

Inventing a Communication Method

Well, we did not have a method established yet. I would need to invent one. At that stage I took a journey to find out how our website content gets made and worked through dozens of contacts and permissions to be able to share some key information on the website of our department. I combined at least a year worth of the most crucial information about the lab, materials, processes, and requirements to be able to make successful parts. I provided that link to my colleagues and everyone who inquired. The impact was immense.

A screen snip of the Additive Manufacturing Lab page

The next year I wanted to update the information and the person in charge of web publication had changed. They informed me of new rules. I rewrote the contents to conform to their requirements. I jumped through so many hoops without any support or advising, and certainly without any job training on how to get the information out. Just to be able to provide better help, I had to investigate, coordinate, and make a dozen copies of the same content in different formats on my computer to be able to send the information to our own internal people, and still half of the good data was not eligible to be posted.

I had found an institutional pathway but not an

institutional method of communicating technical information. It required an extreme level of organization on my part and peak personal motivation to help our organization make progress.

If we onboarded a new staff member, they would not have any chance of updating my work, repeating my process, or maintaining the good outcomes. I would have no way to train the next person because my own pathway was dependent on other teams decisions, and policies and changes. **Therefore, THE TAMU WEBSITE IS NOT A GOOD SOLUTION.**
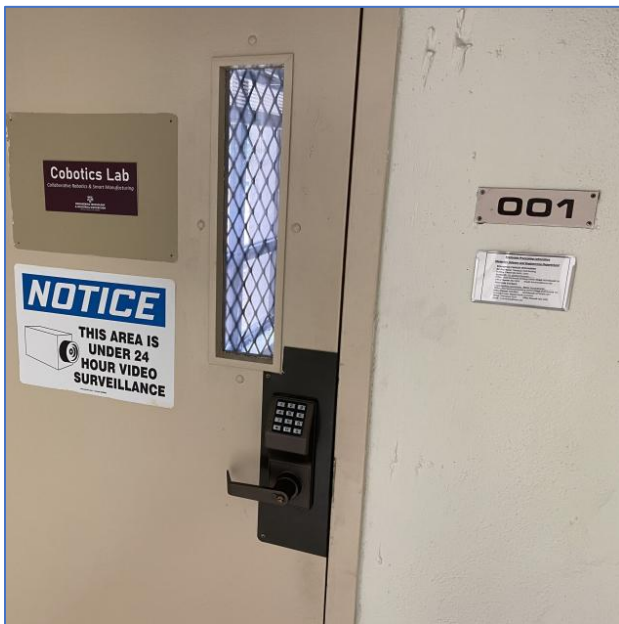
At this stage, an institution must recognize the details of the challenges of the bottom-rung staff members like myself and cater to us, otherwise we cannot advance. If I remained in charge of that lab I would gradually just become a librarian of that lab full time.

Next, the lab became so popular that more researchers came to use it, then they started performing experiments that won't work out, then I redirected them to several professors who enhanced some outcomes, but ultimately the professors had insufficient knowledge to prevent failures, then as I tried to publish information about preventing failures, I could not get the attention of the professors to read this information, because they are over capacity. Since professors are so busy, they need just the right information, when they need it, where they need it. If we could manage to make that happen, we could also do it for everyone. Everyone deserves the same knowledge.

Takeaway: professors need searchable information. Staff need searchable information. Students need searchable information. Do we have a way to make it happen?

Our State of the Art

Here is our best-coordinated lab information in the photo. This labeling looks insignificant but it deserves real praise because this work receives no support from the faculty. I cannot express how very important and impactful this communication is, despite it seeming insignificant.

In the above image we see the label at the doorway indicating contact persons and some basic information about the lab. It is where it is needed, when it is needed.

The level of effort to maintain these labels is incredibly high. The impact is good and powerful and this is why we still do it. I encounter lost students and visitors every single week at the university. Sometimes I get lost. Just to reduce lost people by 10% in our building surely is worth millions per year. However – consider that this is the most exhaustive information that someone can find reliably that is commonized and lab-focused. At any other level of technical depth (such as machine lists, manuals, etc) we have no standards. A hundred individuals independently take responsibility for maintaining the information and inventing methods to do so. It is a tower of Babel and there is no common language.

Communication Limits, TAMU

Given the present state of the art for our technical communication, let's break down the needs to look closer and identify gaps.

The diagram (see figure 1) shows in green that we have very well understood methods of communicating for only two types of channels:

- from the individual to another
- from the department to the whole world.

From 2015 to today, I had several tasks involving communicating. For example, if a student asks "can I access the band saw?" then my job is to provide answers. First, I would need to find the information. With a professional information system, I would be able to find the answer written somewhere and digitally stored, but after 10 years I still cannot.

We have had to invent, for every single action in every day, our own processes among lab staff, to be able to provide consistent answers. Personally, I collect some information in memory while some I keep in my own desk files. Over 10 years the information accumulates but it is manageable with a full-time effort. No matter how cleverly I create my own processes, they have no power to improve the institution due to two factors:

1) Forming an institutional method is a vastly larger undertaking. This truly requires support from the department and the College.
2) Forming personal methods must be followed up by describing them and sharing in order for anyone else to benefit. But we lack a nice place for me to transmit this information.
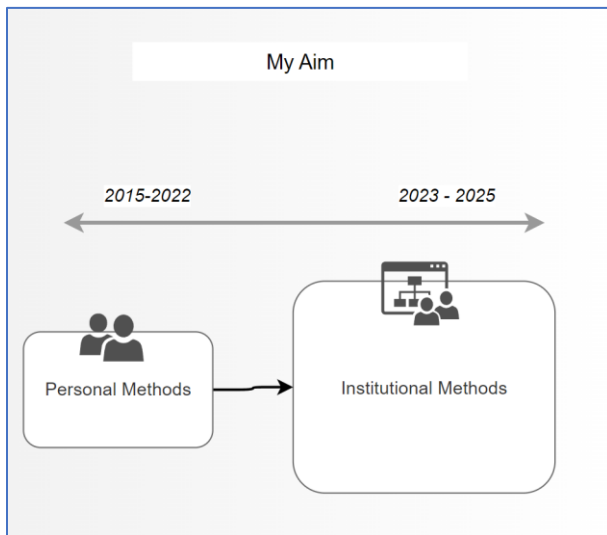
Our staff member Frank Cervantez is the longest staff member in service in our department and he is indispensable because he carries a vast amount of information about the labs. He tried to retire but the department would crumble so he had to stay. Presently he is being used as a repository of information that the department should be studying, recording, and digitizing. To gather the crucial information from Frank would require the IT team, the HR team, the facilities team, and nearly every faculty member in the department. For this reason, his whole job now is distributing information in meeting after meeting. He is living proof that we have not established a modern information system yet.

Building Personal Methods

Over all of the years of my job I've been developing methods to communicate and retain information at my job. I found that one email can advance a research team by multiple years and email only fits for 10% of technical communication needs. So, the goal is that we gain a fitting method as powerful as email, for every type of communication need where email is not fitting. We must recognize the limitations of email and adopt a solid method for each need.

A sampling of my study: I've been learning to manage a decade of information and that includes: to edit PDF documents, compress files as needed, make files searchable, locate photos by including tags, and all the other hundreds of processes needed to be ready to

communicate in the largest university in Texas. As I work with students, they face the same challenges. They recurringly demonstrate they have no formal instruction on technical communication. It is a massive hurdle to communicate about physical things, places, and methods without direct and formal training. Ideal training comes from methods made by experts who do the same kind of work and same type of interactions as you do individually.

During all of my research, I've tested whether my methods can map to other institutional work applications and they often can. I have been making instructions, documenting methods and testing the methods:

- Do they decay over time?
- are easy enough to learn?
- are compatible with our local softwares and assets?
- Are they compatible with our habits and our types of information? With our present-day methods?

To a large degree, they are but it still requires refinement. At this stage I may be able to get some help but direct help is exceedingly rare. As soon as we installed the metal 3D printer, I received critical manuals and software licenses and lists of users. That belongs in the responsibility of the IT team. So I made a whole project of transferring the information to the IT team leader. Then he left the job. Then the next IT leader left the job. Then I went back to recover my own versions of the information and supply it again to the latest IT manager. But this new manager had new ways of keeping the data, and he didn't know the people on my

lists. It was nearly futile and I watched thousands of dollars of software become wasted.

The challenge is complicated because our University-level decision makers have introduced forced changes to all of our digital systems without ceasing for a decade. The individual at-desk methods must constantly adapt to conform to the new systems, which were not designed for technical work. We must be extremely fluid and versatile to be then re-adapted at the whims of the university directors to then allow for upload or pasting or conversion into whatever file types and transmission methods have appeared that month.

But due to these extra challenges brought by TAMU, it compounded the testing and evaluating that I had to commit to my own systems and has driven my work to become more refined than otherwise. I have adopted several dozen new software changes but I have never been informed of why the change was made or how it will help me do my job. **That's because inside our department, our digital tools were not designed for our needs.**
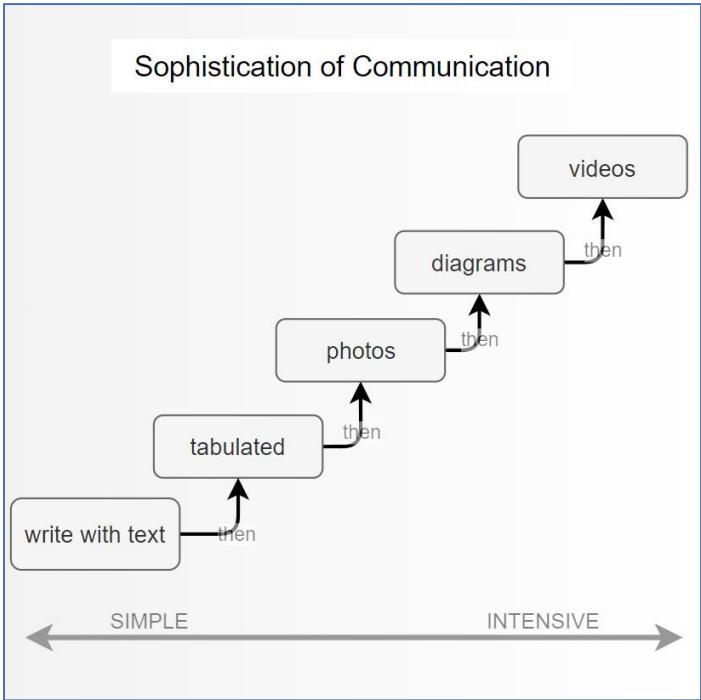
The Rewards Will Be Huge

In any case: the long term benefits for finishing and disseminating new methods of communication will be worth the years of development. *The results that I can bring back to my Texas A&M colleagues will be directly impactful for every single part of their work.*

Collaborating on research, sourcing parts and keeping lists of materials, verifying details about past works. There will be better retention of our costly knowledge, easier training of new TA's, and much greater time available for making engineering progress compared with sorting out administrative barriers. Adoption will be at-will and organic, not forced, and modular. One person adopts one improvement when they see an obvious advantage.
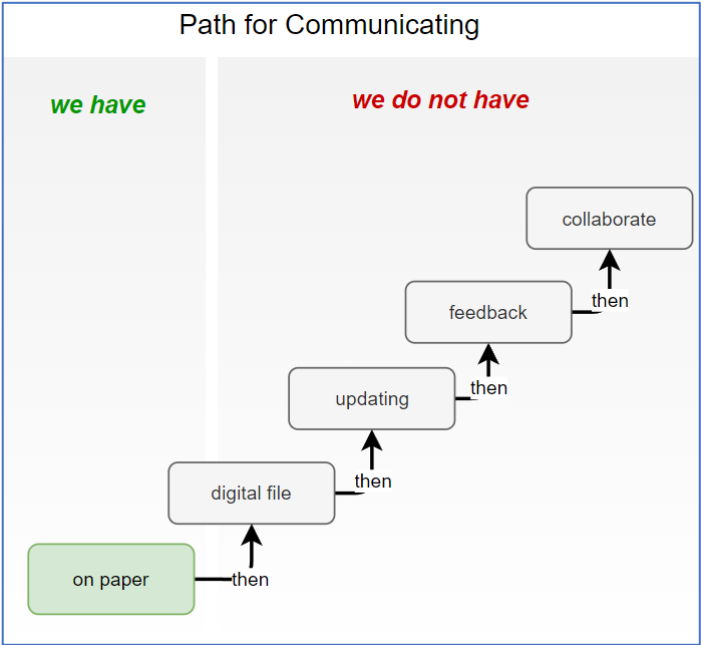
In any case if you can appreciate that we are looking at a whole institution's communication problems stacked on one individual part time worker, then it seems like an impossible challenge but the more I practice this work the more I find hope. I realize nobody has even made an effort beyond a few days and my effort is spanning over ten years. Some problems cannot be solved in a year no matter how much money is available, or how smart the researcher is. Our professors are spread too thin to be able to focus deeply and examine new communication

methods. It is a privilege for me to have a chance to help unburden many others.

During this time I came to appreciate that the challenge of communication expands exponentially with the material to be communicated. The figure below shows that we cannot solve knowledge retention for all media types at once and we need to respect the full value of every photo, table, diagram we make.

Sophistication of Communication

videos

then

diagrams

then

photos

then

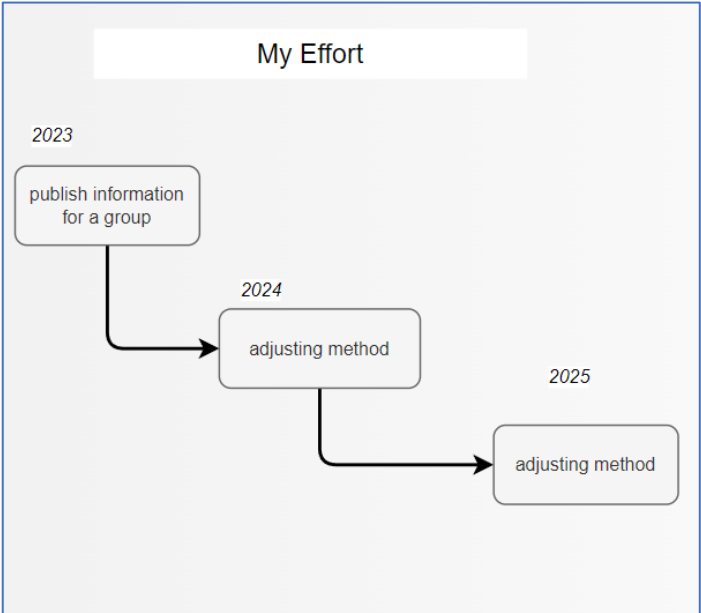tabulated

then

write with text

then

SIMPLE ⟷ INTENSIVE

This was my personal pathway to form repeatable methods that can be retained by one person, for one person. Each level requires a method to be created, attempted, corrected, and updated. If the information can be accessed and improved indefinitely, the stage is reached. I solved these stages and now have methods for the individual person, not yet for an institution. Doing this in an institution requires far more investment & development. Alternatively, a concerted team effort with our professors. This means that I need someone in the department to pay attention. If I can help one person update their communication, the benefits begin to compound and more individuals will arrive to learn.

Path for Communicating

we have | **we do not have**

collaborate

then

feedback

then

updating

then

digital file

then

on paper

then

For the diagram above, consider the first photo with the lab information printed on the door. This method fulfills the "on paper" stage for distributing information. Then the next step is "digital file" for our labs, and we do not have any standard protocol for making it happen.

Journeys & Learning

My work to create methods to communicate beyond individual-to-individual in the institution is still under development. I am still learning the authorship portion of the process. That is to be followed by yet sharing, feedback, verification of accuracy, etc

My Effort

2023

publish information for a group

2024

adjusting method

2025

adjusting method

My effort exchanging info with new methods

I made several attempts to offer communication using new methods.   There were misunderstandings and failures. I continue improving the methods.

As of 2024 I began a digital library of important information for students in ESET and MXET. I stored the hyperlink in my email signature and I called attention to my peer Chris Smith who did ongoing work with the senior design teams, and I regularly solicited his feedback as well as others' feedback.

As I was improving my set of knowledge, and expanding the contents, I was also starting to reach one on one with some faculty members to gain their feedback. The information remains centered on educating students in applied technology, but also I was hoping to keep it aligned with the professors' latest teaching situations. It is hard to get even two minutes of interaction from the faculty. The feedback has shown a lot of misunderstanding and shown that the whole purpose of my years of effort is fairly foreign to the professors. That is why I'm writing this memo, in part.

So, now that my supervisor has been suddenly changed at the start of 2015, and I've not received even one hour of faculty time dedicated to describe the key projects I was building, their purposes, and the needs they would meet: I am now writing this memo to initiate the describing of that work. Of course, there is no guarantee that the faculty will read this and understand. But it is important that I try.

Next Steps

In late 2024 I made a breakthrough in archiving and publishing lab-related information and much more. For the first time, it is worthwhile to unpack the decade of data on my own PC that has previously been manually handed out thousands of times by myself to the students, faculty and staff.   A million questions can be self-answered in our department. In my next communication I hope to describe what how I am unpacking this knowledge that came from thousands of interactions in our department and deserves to be published. The most valuable action would be for me to show the other colleagues several new tools, and start updating how we communicate. But I worry we are a long way off from the faculty giving me any sit-down discussions to describe their needs so I can describe the solutions in terms that make sense to them.

In such a situation, it seems useful for me to make a small demonstration of physical parts which are valuable for students learning design & Fabrication. Then, I intend to include new methods of communication inside of that demonstration display. And finally, when one professor finally takes time to open the information attached and linked and shared along with the display parts, then they may notice the value of this communication, and they will likely want to know more.

The information for the planned demonstration was initiated in a memo called "Demonstration Pre-proposal.pdf" and below is a sample image from that memo. Linked knowledge & data will be located at **qr.net/openlabproject** under "printegrate" section.