All of the programs in the sciences are targets for expansion and enhancement. Some can be enhanced with a simple infusion of additional tenure-track faculty lines. Others will require substantial capital outlays to replace aging equipment. Thus, the key point of this memo is identifying the low hanging fruit.

I approach degree programs much as a biologist approaches ecology. Just as every organism has a niche it fills particularly well, I look at ASU’s science offerings with an eye to where we can compete effectively in regional and global marketplaces. Where is our niche?

With the temporary exception of Computer Science, College of Sciences faculty are all operating at or over 100% of capacity in their respective programs. The list below is not ranked by importance, but by facility, economy, and timeliness of implementation.

**Three Easy Pieces:**
- Nursing
- Physical Therapy
- Mathematics

As you know, I have previously requested steps to expand and enhance our programs in the Health Sciences; partially because of their growth potential and partially because the legislature seems willing to foot part of the bill. So Nursing and PT head the list as critical enhancement priorities. Mathematics teacher certification runs a very close third place and makes it into the top of the list for the same reasons. Mathematical Modeling (discussed later) is a pathfinder discipline for the 21st century. In addition, any increase in overall ASU enrollment implies a concomitant increase in the generic mathematics service load. Regardless of how one looks at it, these programs must grow. Enhancing our remaining science programs is only a little bit more complex.

**Bubbling Over:**
- Agriculture
- Physics / Applied Physics

Agriculture, at both the undergraduate and graduate levels, is a cash cow requiring only minimal investment to yield substantial net growth. The faculty are prepared to add Ag Economics, GIS and Rangeland Management options which will tap regional and international markets. Both faculty lines and staff support are needed in Agriculture.

In its current configuration as a primarily pre-professional program, Physics is close to saturation. Relatively minimal inputs will solidify their pre-engineering agreements with Texas Tech-Lubbock. An increased emphasis on physical science teacher certification will also address our strategic goals for Closing the Gaps and attaining HSI status. The
earth science option within Physics has huge potential for initiating an Environmental Science program – one of the hottest interdisciplinary undergraduate degrees in the world.

**Works in Progress:**
- Computer Science
- Biology
- Chemistry

The common theme of these 3 programs is that all will require some reinvention and capital outlay to increase their 21st Century market relevance.

As discussed previously, the CS program is in the process of revisioning itself into gaming and GIS option areas. Substantial faculty refocusing will be needed in this area. Similarly, our Biology program will be making the transition to an increased molecular approach. In addition to reallocation of faculty resources, this transition will be capital-intensive: $2-3M over the first 4-5 years is minimal. Stand-alone Chemistry degrees will be common (and have a robust service component) for the foreseeable future. But ASU’s niche may end up involving Environmental Chemistry or even Chemical Engineering. This instrument-intensive transition will be expensive: $1M/annually is not unusual.

**Missing in Action:**
- Environmental Science (2 lines & $200K)
- GIS (2 lines & $300K)
- Biomedical Science (2 lines & $500K)

The three programs listed above are the obviously missing components in any list of pathfinder science programs. As noted elsewhere in the narrative, all three of these program options could be handily created from existing programs in the college. These are, however, interdisciplinary offerings which will require innovative administrative structures to cultivate.

**Administrative Enhancements:**
- College of Health Sciences
- Interdisciplinary Realignments

Throwing money at programs will not, by itself, enhance anything. But providing the resources to reach a sharply defined strategic goal will. In order to define that goal and build a team excited about reaching it, we must create administrative structures which encourage rather than channelize innovation.

The Health Sciences have a clearly-defined educational goal set by national accrediting bodies – organizations which expect and respect academic commitment in the form of dedicated administrative structures. Colleges of Nursing, Health Sciences, Allied Health, etc. are currently in a growth phase analogous to the fissioning of Education and Business a generation ago. Traditional science disciplines are headed in the opposite direction.

All of the sciences are operating in data rich environments; so rich that we now require dedicated computational tools to uncover new insights. The standard science curriculum
of biology, chemistry and physics, is rapidly morphing into an amalgam of interdisciplinary talents driven by a need to address the complexities of the scientific frontier. Mathematical Modeling and the full incorporation of scientific visualization, database mining, and information extraction are the hallmarks of these new interdisciplinary initiatives.

*Biochemical Computational Geophysics* and other such hybridized disciplines are much more likely avenues for discovery today than any of the traditional disciplines alone. Existing administrative structures (based on traditional standalone disciplines) will have to be replaced with more responsive initiative-based models. This applies at the college level as well as the departmental level. (e.g. Agribusiness, Science Teacher Education, Science Journalism, GIS/MIS, and Kevin Lambert’s concept of *culturally-literate* science programs for international programs).

I believe that these last points constitute ASU’s niche. Anyone can come up with cute-sounding exotic degree programs. But very few institutions have the academic guts, nimbleness and creative cohesion of ASU to actually make the sort of changes which will result in 21st century scholars. We can make that choice and we can make the decision to follow through on that choice. Enhancement may just be too small a word for the future of Angelo State University.