

Enhancing Student Learning through Technology: Technology and Pedagogy

Committee Report:

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Mission Statement

The mission of this Quality Enhancement Plan proposal is to implement university-wide a four-pointed m-learning 'compass' that serves as a guide in the creation of a comprehensive instructional technology plan that supports faculty and staff in making appropriate selections as to course delivery modality as a part of the implementation and execution of tasks associated with the overall mission and goals of the university.

This plan specifically addresses the following Florida Gulf Coast University goals:

- **Goal 4:** Effective communication
- **Goal 6:** Information literacy
- **Goal 7:** Problem-solving abilities
- **Goal 8:** Develop knowledge of modern technology.

Environmental Scan

In the 1960s Seymour Papert and colleagues initiated research that supported of the development of novel educational approaches and associated technological tools to help them learn new things in new ways. Now, almost fifty years later, these same questions are being asked. But this time we have the benefit of almost five decades of observing the outcomes, practices, and theories behind constructivist learning. With constructionism, students do not obtain ideas, they make/discover them. Constructionists believe in a form of experiential learning that suggests that students are more likely to internalize new ideas when they produce authentic artifacts that represent their understanding of newly acquired concepts and then share and reflect on them. In this view, constructionism involves the intersection of constructing knowledge in context of the meaningful artifacts they design and build during (or as the result of) the learning process. If our university is to successfully align itself with this duality, we must provide an instructional infrastructure, models, and systems that support the designing and building process, invest in faculty professional development, and ensure that our students understand the connotations associated with this environment.

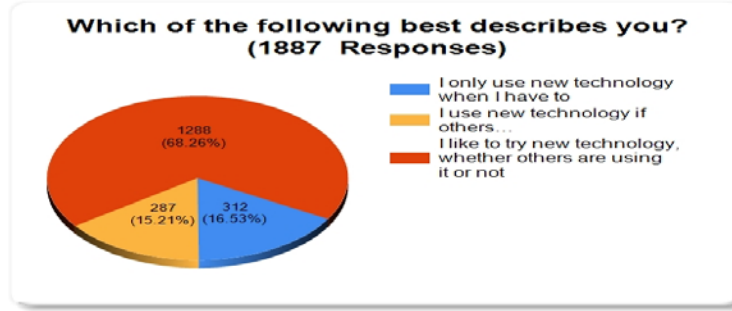
Universities are no longer viewed as institutions that exist to simply provide instruction. A paradigm shift is under way that changes emphasis from instructional design towards a new value system that is focused on learning design. The following is an excerpt from a recent exit interview/reflection posted by a pre-service teacher who was participating in an introduction to technology in the College of Education:

"When I first realized I wanted to teach, I always thought that I would be the type of teacher that would teach from books, and find creative ways to keep my students engaged. But as time has passed, and during observations, I have realized that technology can be a great way to do so. I never thought I would "cross over to the dark side" and become one of those teachers until I realized how beneficial it could actually be. Society is becoming so technologically advanced at such a fast rate that it seems nearly impossible to avoid using it. From smart boards to even some schools using iPads as a way of interacting, it is proving to be that technology is a positive asset to the classroom. It is a great way to keep students involved while teaching them computer skills that they will need later on in life. I remember sitting in computer class in elementary school when computers were becoming popular, it was a hard concept to learn how to type and move around the net. I think introducing it at a younger age through games and online readings can help students overcome typing barriers and help them be successful in future endeavors. Now with all the new devices you do not even have to know how to type to use them! Although I am a firm believer in going to library and checking out research books, I think incorporating online/technology usage in the classroom can help better our future generations and society and will serve as a valuable resource in education. It puts my mind at ease knowing that thanks to these advances, it will be easier to keep my students involved/have a good time while ensuring they receive a proper education."

It is a misconception to believe that today's *media-centric* youth are 'digital natives', which implies they come to us with sufficient production skills to actually be able to create/construct the knowledge based products that Papert and his followers indicated were required in this emerging digital age. The literature tells us that they are really 'digital consumers' rather than producers of media who are need us to show them how to produce meaningful mediated artifacts. The following are results from a survey of experiences and background with technology that was solicited from this same group of students. It

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clearly demonstrates the point that incoming students are not always equipped with the skill sets they need to be able to create and share:



Fall 2011 FGCU Student Technology survey:
Question: Which best describes you? ■ I only use new technology when I have to ■ I use new technology if others are using it ■ I like to try new technology whether others are using it or not

Similar results were reported by graduates in recent surveys administered by the College of Education as a part of its recent accreditation process. In those exit surveys, only a little more than one half of the respondents expressed satisfaction with their technological skills and learning experiences as a result of their participation in the program.

Results from a Fall 2011 survey administered by the Faculty Senate Outcomes and Assessment Task Force further substantiate these findings. Less than one-half of full time faculty members currently incorporate technology / information literacy into their courses and fewer than one-quarter of those responding indicate that they assess it (or even care to).

(168 Responses)

	I teach this SLO.	I assess this SLO	I would be willing to teach and assess this SLO in the future.	I think someone else in my program should teach and assess this SLO.
Aesthetic Sensibility	48 (28.57%)	23 (13.69%)	29 (17.26%)	42 (25.00%)
Communication	119 (70.83%)	104 (61.90%)	42 (25.00%)	30 (17.86%)
Community Involvement	61 (36.31%)	34 (20.24%)	38 (22.62%)	44 (26.19%)
Continuous Improvement	79 (47.02%)	61 (36.31%)	21 (12.50%)	25 (14.88%)
Critical Thinking	145 (86.31%)	117 (69.64%)	48 (28.57%)	24 (14.29%)
Disciplinary Knowledge/Skills	134 (79.76%)	118 (70.24%)	39 (23.21%)	19 (11.31%)
Diversity/Multiculturalism	84 (50.00%)	46 (27.38%)	36 (21.43%)	33 (19.64%)
Ecological Perspective	64 (38.10%)	43 (25.60%)	25 (14.88%)	43 (25.60%)
Ethical Responsibility	109 (64.88%)	65 (38.69%)	40 (23.81%)	23 (13.69%)
Information Literacy	103 (61.31%)	79 (47.02%)	35 (20.83%)	27 (16.07%)
Leadership	50 (29.76%)	28 (16.67%)	30 (17.86%)	34 (20.24%)
Problem-solving Abilities	133 (79.17%)	104 (61.90%)	40 (23.81%)	22 (13.10%)
Quantitative Reasoning	67 (39.88%)	54 (32.14%)	26 (15.48%)	47 (27.98%)
Technological Literacy	80 (47.62%)	54 (32.14%)	32 (19.05%)	42 (25.00%)

FGCU's 2010 Noel Levitz survey concluded points out that among FGCU's challenges, were related to things such as variety of course offerings, or ability to register for chosen courses. Level of instruction, particularly in distance learning classes, had high gap scores.

What we are suggesting is that there appears to be a significant disconnect between the stated mission of the university regarding technology and information literacy and what is appears to be taking place. To be sure, there are exists small pockets of individuals who are doing some wonderfully creative things with their classes. But these appear to be mainly 'bootstrap' activities that are not centrally driven or done with a single purpose, as indicated in the university goals and mission statements. It is one thing for the university to adopt a goal that includes "technology as a guiding principle". It is another that so many individuals either do not address it or consider it to be of lesser importance. It would seem that imposing additional hybrid and or virtual course modalities into the mix without a complete review of student needs, faculty professional development, and infrastructural support may be problematic.

Faced with these realities, this committee decided to change focus of this proposal from exploring the relative benefits of specific delivery modalities (face-to-face versus hybrid, versus virtual) to investigating the issues associated with making those decisions. In short, we began to realize that if we simply made “means” or “method” decisions without exploring the broader questions our responses may well have been out of synch with the circumstantial realities the university is facing.

Design Thinking

In order to conduct our review to address the real needs at appropriate levels, we adopted the tenets of design thinking. Design thinking refers to those methods and processes that are used to investigate ill- or lesser-defined problems to advance a series of solutions. As a style of thinking, it is generally considered to be looking at a problem by identifying its context; creatively generating several appropriate insights and solutions, and then rationalizing and analyzing the fit the potential solutions may have in that situation. In this respect, it is similar to systems thinking as an approach to understanding and solving problems.

Using the precepts of design thinking made it easier for the committee to grasp the framework in which this proposal needs to reside. As stated in the original topic proposal given to us, it is not just about supporting specific technologies –or even making decisions about delivery modalities. In order to propose something that is both scalable and provides continuity, we quickly arrived at a consensus that a paradigmatic shift in our thinking needed to take place. Instead we need to focus on how the university views professional development, how it is to support an ever-changing technological landscape, and how it can move away from decentralized, reactive, bootstrap activities towards institutionalizing its subsystems to better support reflect its mission and goals.

In our review of the current state of the art of technology and e-learning at other universities, we discovered that our situation is not unlike what they have been also experiencing. As recently reported in *Education Week*, a new national certification program in education technology provided by a private firm is being adopted by many states. Their “Leading Edge Certification” program appears to be gathering support nationwide because it appears that those institutions that had failed to come to grips with evolving from brick and mortar instructional delivery to a distance learning model did so without adopting an institutionalized system of thought about the implications, costs, limitations of instructor bandwidth, and the subsequent drain on the quality of instruction.

It is fairly easy to make the case that technology has yet to deliver on its promise to transform education – or even has had a minimal effect on learning outcomes. This begs the question as to why should we place any technological solution at the forefront of the kinds of significant investment required by a university-wide QEP? For one thing, we found that most proposed technology-based solutions we investigated generally lagged behind the state of the art of those found in every day society. Further, those that have been most widely adopted were mainly used to simply capture lectures and traditional lesson content and convert it into digital form. To be successful, any proposed technology plan needs to be based on an environmental scan and organized around the adoption of an affordable and scalable pedagogical model that drives the selection of course delivery methodology. We believe our proposal does just this. In addition, the technologies that are currently available can easily incorporate the measureable metrics to assess success in terms of improved student learning and engagement.

Proposal

The latest iteration of technology and instructional media found in the marketplace are significant improvements over previous iterations because they now involve the ability for users to (both individually and collectively) effectively and easily communicate, share, and interact. Mobility, interaction, and the ability to communicate and share are three essential elements for satisfying the basic converging educational needs associated with providing constructivist/participatory learning that are synergistic and translatable to the social system in which our students will work and play. So our resulting technological focus is based on the so-called **m-learning paradigm** –a term coined over a decade ago by Clark Quinn, that describes the latest wave of technology development in terms of it being based on low entry point mobile devices that combine and interact with an ever-more pervasive wireless or Internet-based infrastructural platform. Our review of the current state of the art of the course delivery ecosystem paints a

picture of an educational landscape that is inundated with free and open source instructional materials that are available to students for a significant number of academic areas available anywhere and at any time. Audio and video content is freely and readily available for instructors and students to use and remix for their own learning purposes at places like iTunes. MIT has placed on the Web almost all of its curricula free of charge through its grant-funded 'Open-Courseware' initiative. Other universities such as Yale and Stanford College of Engineering have followed suit and are offering selected courses online free to the general public. Students can also find most of the information they need on *Google Scholar*, *YouTube*, a myriad of academic Wikipedia-like applications, and Online Self-Organizing Social Systems (O.S.O.S.S.) that David Wiley and others claim have "decentralized future of online learning".

This ever-increasing access to online learning caused us to think about and analyze the real value that we as an institution might add to and facilitate in order to make more relevant class time and associated activities that our students will experience. We believe our proposal more than meets the needs expressed in the topic suggestion that we were tasked with reviewing because it addresses technology in a broader scope and in terms of an overall **paradigm shift**. We suggest that the current and immediate future state of the art in technology and digital media is at it is at the point where it can adequately support a major shift in thinking about specific strategies/focal points that should be adopted university-wide. Our task was not to decide which specific technologies we need to implement, but rather, how to effect a major change in focus in which we follow a model-based (rather than a rules-based) system of thinking. Our proposed 'model/compass' encompasses these four major steps:

- Adopting the tenets of Signature Pedagogy, which is in essence a pedagogical philosophy that addresses life-long learning in terms of guiding us to more accurately reflect on and predict how students will eventually behave in the workplace and society.
- Re-thinking our course delivery systems in terms of how they support a context-driven, task-sensitive, and performance-support learning model.
- Reassessing student outcomes in terms of how technology should support the acquisition of knowledge that is expressed in terms of being able to utilize sharable media artifacts that more accurately evaluate student performance and knowledge acquisition in authentic contexts.
- Providing on an institution-wide infrastructure that supports personal digital learning environments.

Signature Pedagogy

Signature Pedagogy is a model-based, systematic approach to learning that organizes and provides a data-driven means to predict the fundamental ways in which future citizens are educated for their respective professions as well as their entry into society. A benefit of this system of thinking is that it, along with the tenets of the science of teaching and learning (SOTL), provides the basis for formulating essential metrics for measuring the effectiveness of teaching and learning (i.e., student outcomes). Signature pedagogy is based on the old adage that when the student is ready to learn, the 'teacher' will appear. So-called 'novices' are taught to think, perform, and to act with integrity—a process found to be a valid and reliable way to predict how today's students will react in society. The inference is that signature pedagogy better prepares students to enter the workforce and life because it assesses whether they can demonstrate experiential knowledge of things they have learned on a conceptual level. It is a confirmatory view of constructionism in that students demonstrate what they are discovering or constructing using authentic experiences.

The philosophical underpinnings of signature pedagogy help future lawyers, engineers, and teachers, etc. break established habits and learn to think heuristically. Because signature pedagogy is grounded in authentic settings, the kinds of artifacts students create in their coursework adequately reflect constructivist thinking. This is especially fortunate because it appears that technology has finally caught up with these needs. An example would be students posting e-Portfolios and reflective letters about their work using various Web 2.0 tools. Signature pedagogy is also reflective of incorporating practices reminiscent of informal learning environments and contexts that are most prevalent means in the real world circumstance to acquire knowledge. Today's m-learning solutions can (and do) support informal learning methodologies that are situated in the context of the working and social environments in which

students will be placed. In order to be relevant to these new realities, it is not enough to simply think of course delivery in terms of face-to-face versus hybrid, versus virtual. The structure of the delivery must also support these means of output production.

To institutionalize this line of thinking into a universally adopted learning pedagogy will require focus and support from the Teaching, Learning and Assessment Initiative (TLAI). We suggest that it establish competitive faculty fellowships in which members become 'champion/advocates' who are immersed in the process and create a culture at the university in which faculty members utilize models instead of rules to decide on course content delivery. They become experts in signature pedagogy as a way of thinking about teaching and learning and translate this knowledge in ways that it becomes institutionalized as an integral part of the learning process in our classrooms.

From Courseware to Performance-ware

Hand in hand with implementing signature pedagogy is the need to rethink traditional ideas about course delivery in terms of the m-learning conceptual framework. Some institutions have gone as far as deciding that current ideas about centralized Learning Management Systems are past their prime... to be replaced by a Content Management (CMS) framework. In a learning management systems model the delivery of learning content is re-envisioned in terms of using a context-driven, task-sensitive, performance-support model that utilizes novel ideas, such as shared course content across academic disciplines using reusable 'learning objects' and template-driven and modular course content creation. With this model, the faculty becomes knowledge acquisition 'chaperones' that provide guided tasks job-aids, and reference-ware. Students take advantage of such emerging Web-supported assessment models such as peer evaluations and the 'wisdom of crowds'. We should introduce an increased number of collective, informal 'design studio' approaches to course strategies similar to the O.S.O.S.S. model proposed by Wiley that can be found in sites such as slash.com and k12.com, for example.

Assessing Student Outcomes

At the student level, performance objects are analogous to the learning objects created by faculty. If the latter represent exemplar, universal standards of knowledge acquisition, then it follows that the former can become interchangeable standards may be defined that reflect attainment of the so-called 'performance-objects', which are delivered within the context of specific discipline-driven job tasks. Standardization of the learning object-performance object axis brings about reliability and validity, as well as scalability and sustainability to the learning process in ways that were not previously attainable with previous iterations of technology. Reliability and validity support the need for measureable outcome assessments.

Hand in hand with current technological developments is the ability to automate the rudimentary administration and assessment task associated with task completion (i.e., simple check-offs according to pre-determined specifications) and basic knowledge acquisition (i.e., quizzes and exams) vis-a-vis Bloom. This automation will permit instructors to place increased emphasis on assessing critical thinking and discourse, gains in information and technology literacy. M-Learning supports students' efforts to regularly and easily communicate with each other and their instructor (i.e., instructor and social presence), present opportunities for increased, directed disposition attainment, ideation, analysis, evaluation, arguing, debating, and questioning. In short, our proposed shift in the way we think about implementing e-learning solutions will support faculty in their efforts to more effectively redirect their courses more towards constructionism, design thinking, and experiential learning on a much larger scale than was previously available. Realigning student assessment and critical task completion in this framework is a significant contribution of the technologies we implement to improving our educational system.

Digital Learning Environments

While the idea of interest-driven learning is not new, the m-Learning movement provides resurgence in its growth, thanks to advances in individualized learning technology and the new role the 'student as a collaborator' plays in the creation of curriculum. This 'bottom-up' approach to course design and delivery includes our actively adopting e-books (which Cator redefines as "Digital Learning Environments,

(DLEs”) and includes more than digitized text and pictures, but also video and Web sites, simulations, visualizations, and other virtual environments. Our utilizing design thinking when looking at e-books and has realized some interesting unintended consequences. For example, Ganis found in recent studies into the use of tablets that they can provide shortcuts to knowledge building through and improved, student-centered interface design. What we are suggesting is that we do not yet realize all the ramifications (both positive and negative) of our active participation in the e-book revolution but we do know that it must become an integral part of our QEP that evolves over the next few years.

Specific Recommendations

It is reasonable to ask when deciding whether or not to adopt our proposed plan is if it is actually ‘doable’. Recall, that what we are proposing are not specific technologies but an overall perspective that provides a focus –a ‘compass’ or guide to ensure that appropriate decisions are made when selecting technologies and course delivery options. It will also help to inform decisions we may be making with regards to organization charts and reporting relationships. We suggest that without a unified, model-based technology plan, growth will be hindered as well as our ability to make informed decisions regarding course delivery options. For example, one of the things that has prevented us from being able to evaluate student learning via alternative methods is the limitation of our current course management system to provide media streaming services in spite of the fact that it has been long-established that such a product is sorely needed. In addition, while several ‘bootstrap’ efforts have been made towards the professional development and training of faculty and staff with regards to integrating technology into their curriculum, the need for significant improvements remain. It is our position that simply expanding the number of hybrid course offerings without the benefit of adopting an instructional focus and guidelines for taking advantage of added functions and opportunities provided by the Web and mobile learning, and institutionalized infrastructure and training support will result in less than desired results, increased overall costs, reduced student engagement, and additional instructor “bandwidth’ issues.

Specifically, we suggest the following initial actions be taken initiated to provide a universal framework for additional, yet unrealized activities as we move forward. Others will certainly be realized as the implementation committee begins its work:

- Finalize plans and budgets for the Teaching and Learning Initiative (TLAI) and implement a fully-funded Teaching Academy in support of several enterprises:
 - Institutionalize and expand the technology retreats currently provided by TLAJ to embrace ‘emerging trends in teaching and learning’ via increased and regularly scheduled workshops and retreats.
 - Provide technology integration support for colleges with dedicated ‘champions’/advocates. These are staff positions relieved of day-to-day operational activity responsibilities. We believe at a minimum two are needed: one to devise and support continuous and scaled trainings for faculty and staff and another whose responsibilities would be to locate, produce, and support the wide range of existing instructional resources such as learning objects that can be utilized across the curriculum in support various courses.
 - Initiate, via competitive grants, TLAJ sponsored faculty fellowships and sabbaticals in support of these support operations. The faculty fellows will report to TLAJ and will do research and support become instruction design efforts.
 - Provide a university-wide ‘digital sandbox’/laboratory where faculty and staff can experiment with new technologies and emerging technologies (such as e-books and mobile computing) to help them make decisions as to applicability in their classrooms.
 - Institutionalize the tenets of Signature Pedagogy and the Science of Teaching and Learning (SOTL) to act as guiding principles for the proposed teaching Academy.
 - Implement a university-wide, formal information literacy campaign.
 - Establish longitudinal studies with incoming students, departing seniors and graduates, and alumni that provide continuous feedback on the long-term efficacy of our technology solutions.
 - Establish a technology advocacy function for adjunct faculty –a well-known but often over-looked group of individuals whose efficacy and dispositions towards technology that can easily negate any gains we accomplish in e-learning and m-learning.

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- The evaluation of the success of most technological improvements and choices associated with experiential learning are best measured in terms of the authentic artifacts that are being produced. Therefore, one way to measure those gains would be to host, possibly during Research Week, a university-wide showcase /demonstration of student and faculty projects. We could invite local businesses and experts and possibly expand this exhibit to local K-12 school districts.
- Review existing reporting relationships inside of, and adjacent to, information technology and academic support to determine possible needs to streamline technology, training, and infrastructural support.
- Coordinate efforts with the university library to re-envision its role in the new learning paradigms that incorporate collectivism and social learning, changes in artifact production to assess learning outcomes, and the use of m-learning and e-learning solutions.
- Better define and track enrollments in online, hybrid and face-to-face classes. Currently no function exists in Banner or Gulflite to do this. Develop metrics to capture various technologies and digital resources used in teaching and learning.
- Implement digital portfolio system for students, faculty and staff to track and assess learning
- Implement integrated digital asset repository (Orange Grove) to share and repurpose content.

Timetable

It is anticipated that, once the initial principles contained in this proposal are developed, and working closely with administration, faculty, and staff, the follow-up implementation committee will be able to endorse a significant number of additional specific recommendations within specific time frames. Adoption will be facilitated by the fact that we will have our proposed compass to guide us to more closely align to several university goals.

We believe that many of those activities proposed for the TLAI can be implemented within the first year. The champions/advocates will evolve their responsibilities over the ensuing two years and become active partners in the LMS selection and implementation committee.

Paying for It

Perhaps the real question is whether we can afford not to. Under the principles of Signature Pedagogy, we are faced with little choice with regards to expanding on-line and Web-enhanced solutions for course delivery, regardless if they are actually labeled 'hybrid' or 'virtual'. In the vernacular being adopted by the state for example, each of these is beginning to carry specific connotations. The need to institutionalize and expand professional development, training, and education for our students on the use of technology for learning is well documented.

It is fortunate that we are well positioned to implement much of this proposal without adding significant additional costs. We are in the midst of looking for new LMS and the TLAI initiative is about to be funded. Faculty and staff appear to be eager to move closer to doing something dramatic. We have established a baseline with existing surveys to measure progress towards the goals.

Efforts to raise capital to support these initial start-up costs will require some creative thinking on the part of the implementation committee. For example, current efforts are underway to find a streaming media server. One vendor has offered support in the investigation of grant opportunities that are available to us if we partner with local, under-served and/or remote, rural populations. Using excess capacity, we could in fact develop a plan to extend the initial grant's revenue stream by devising some way of providing media services to those who could not otherwise afford them... using the model that ARPA utilized when it originally placed super computers on college campuses just prior to the commercialization of the Web that these institutions placed a significant (and financially rewarding) role. Sustainability and scalability

are of importance to grant funding agencies. These types of service offerings can become potential revenue sources and justification for the grants. Other universities have led the way with exemplar opportunities. The *Teach-Me Lab* at the UCF, for example, has already provided sustainability from a previous grant and evolved the project into a continuous revenue stream for the university. In another example, member institutions of the state university system are already exploring with the FLDOE opportunities to offer differentiated tuition for STEM courses. A further example is USF, who is currently charges a separate 'technology fee' as a part of its pricing scheme for virtual and hybrid course offerings. The advantage to students in this scenario is that they are no longer asked to purchase limited term software licenses for specific courses. As a result of expanded capabilities of e-books/publications, much of the course materials are provided on a turnkey basis under a single pricing scheme.

Lastly, we will expect that we would be able to expand course offerings and programs once we become better versed in the aspects of providing quality e-learning classroom experiences. Increasing lower-cost, quality services will help us not only cope with expected enrollment increases but also encourage us to seek additional students in additional program areas.

Certainly expanding the use of shared 'learning objects' concept will require us to develop creative solutions regarding faculty copy and intellectual property rights. For answers we might explore some of the provisions provided by MIT during formulation of its Open Courseware Initiative in which faculty were awarded various forms of royalty compensation for providing access to their course materials.

Summary

We realize that this proposal is much broader in scope than, perhaps, what the proposal committee had envisioned. This is because the ecological system in which technology now has to operate is significantly larger. The questions we had to cope with were much more ill-defined, requiring us to look at any potential solutions we propose would be best served in reference to establishing a framework the covers pedagogy, infrastructural support, and faculty and staff training in order to overcome what we perceive to be a disconnect between stated goals and mission and the realities we face.