A Proposal for the program "Information Communication Technology For Development"

(ICT4D) to the Cal Poly Campus

A Senior Project Presented to

The Faculty of the Communication Studies Department

California Polytechnic State University, San Luis Obispo

In Partial Fulfillment

Of the Requirements for the Degree

Bachelor of Arts

By

Mika Jennifer Raz

Dr. David Askay

_____   _____   _____

Senior Project Advisor   Signature   Date

Dr. Bernard Duffy

_____   _____   _____

Department Chair   Signature   Date

© 2015 Mika Raz

TABLE OF CONTENTS

A Proposal for the program "Information Communication Technology For Development"

(ICT4D) to the Cal Poly Campus

By Mika Raz

Abstract

California Polytechnic State University is a university that prides itself on the "Learn by Doing" motto. A qualitative study was completed to analyze students and faculty views on the amount of "Learn by Doing" and interdisciplinary work that is currently done within specific colleges and courses. By proposing an implementation of the Information Communication Technology for Development (ICT4D) program to the Cal Pol campus, students will have the opportunity to engage in more "Learn by Doing" and interdisciplinary work. Positive feedback was retrieved, however several organizational barriers arose.

Introduction

As a graduating Communication Studies Major at California Polytechnic State University, I am currently reflecting on the college courses I have taken at Cal Poly. Cal Poly initially sparked my interest due to the "Learn by Doing" motto of the university. I wanted an education where I felt would best prepare me for the real world post college. In President Armstrong's 'Welcome to Cal Poly' letter he states that the learn by doing approach provides students with "daily opportunities to apply classroom theory to real-world problems" as it "[prepares] them to become resourceful and innovative professionals (Armstrong, 2015)." Within the Mustang Way it is stated that "As Cal Poly Mustangs: Learn by Doing is the foundation of our engaged pursuit of knowledge and scholarly achievement (Armstrong, 2015)." Cal Poly Mustangs should leave college feeling as if they had a well-rounded, "Learn by Doing" approach to their education.

After spending my last summer interning in the Human Resources department at the Golden State Warriors corporate headquarters, I began to understand how no successful business or project can be facilitated by the knowledge of only one major. It took me first hand experience to fully grasp the understanding that different skill sets and knowledge is what creates a successful business. With this knowledge, I began to think about how Cal Poly could benefit from more interdisciplinary, "Learn by Doing" projects in which students from different majors can come together to fulfill a goal. As a university that already prides itself on "Learn by Doing" work, there is always room for improvement. In President Armstrong's "Vision 2022: The Future of Cal Poly" it states, "Students will leave Cal Poly empowered with the holistic, interdisciplinary, ex-

perience that prepares them for success in a global economy and instills in them a culture of philanthropy (Armstrong, 2014)." President Armstrong envisions Cal Poly to have a greater interdisciplinary experience within the next five years and sees this as a quality Cal Poly graduates should acquire. In order to fulfill President Armstrong's vision for the future, improvements to what is available for students on campus should be made.

Working with students of different expertise and knowledge would better prepare Cal Poly students for the working world where people come together each with their specific skill sets. In an article, "Launching Interdisciplinary Programs as College Signature Areas: An Example" it states the many reasons interdisciplinary work should be added to various colleges, which can be done by "changing nature of research, curricula, and external funding (Stone, Bollard, Harbor, 2009, p. 323)." The article states how many current scholars do not benefit "within a single traditional discipline and benefit from multiple perspectives" (Stone, Bollard, Harbor, 2009, p. 322). By working with students from different majors, Cal Poly students would have the opportunity to benefit from multiple views. Interdisciplinary work goes hand in hand with "Learn by Doing" work as the two help students better prepare for the future and assist with learning valuable skills such as teamwork and communication. According to Forbes, in a survey completed by The National Association of Colleges and Employers (NACE), the number one skill employers claim they seek is the ability to work in a team structure. It is followed by the ability to communicate verbally with people in and out of the organization (Adams, 2014). The current workforce stresses the ability to work in teams and to communicate effectively. Interdisciplinary work would add to the "Learn by Doing" goals of Cal Poly and better prepare students for the modern corporate world where teamwork is highly valued and stressed.

In order for me to figure out a way to add more "Learn by Doing" and interdisciplinary work to Cal Poly, I interviewed ten students (two from each college) to first gain an understanding of students' perspectives on the amount of "Learn by Doing" they've done so far within their major courses. In this paper I follow the student interviews by proposing an additional program to the Cal Poly curriculum which would benefit the university and fulfill President Armstrong's vision for 2022 stated above. I proceed by creating a powerpoint presentation that I presented to five faculty members. I followed each presentation with an interview. After analyzing the results and responses, I am proposing a substitution for certain GE courses that will fit as ICT4D courses. I will be proposing this document of an implementation of the new program to President Armstrong and the GE board for a new addition to the Cal Poly curriculum.

Student Interviews

According to the admissions board, Cal Poly believes that the best way for a student to learn is to do it, which has been the philosophy since the school began. The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding of the needs at Cal Poly.

• "I've had the opportunity to work with real small businesses to solve real problems they are currently experiencing, my learn by doing experience has been extremely beneficial to talk about in job interviews and gain an edge over other candidates who don't have the 'Learn by Doing' background (Alyssa Isom, Orfaela College of Business, Appendix A)."

• "I feel like I would have enjoyed less time in lecture and more time doing projects, that would

help me practice the skills I have learned as oppose to just listen to the professor and take notes

(Charles Machado, Orfaela College of Business, Appendix B)."

• "I have experienced internships throughout the summer that have given me a lot of training for

when I enter the world after graduation, but I would like to see training being done in my Cal

Poly classes such as how to write professional emails, write educated press releases, and learn

how to interview properly (Alex Barzilai, College of Liberal Arts, Appendix C)."

   After my interview with Alex Barzilai, we discussed how these techniques can be learned

in the course Business and Professional. She replied that this specific course is an elective and

not required, and because of this she hasn't taken it yet. Providing more "Learn by Doing" op-

portunities at Cal Poly would help students like Alex Barzilai.

• " I feel like many of my Communication classes have been theory based. Classes such as Small

Group Communication is what really taught me how to work in teams and experience 'Learn

by Doing'. (Ashley Ha, College of Liberal Arts, Appendix D)."

• "I feel like Cal Poly had us learning by doing from the very start, they had us taking apart en-

gines and putting them back together within the first few weeks of school (Courtney Haas, Col-

lege of Engineering, Appendix E)."

• "I do feel like I incorporated 'Learn by Doing' at Cal Poly, my professors pushed me to try new

experiments and play with very expensive materials such as carbon fiber composite materials.

The only improvement I can see made would be to allow first and second years the ability to be

involved in technical experiments to allow the students to become responsible and aware of

what the world of engineering has to offer (Ben Sweeney, College of Engineering, Appendix

F).”

- “My major requires me to be very hands on and by having resources such as the crops unit and

  dairy science unit I have acquired the skills I have today (Kelsey Rustigan, College of Agricul-

  ture, Food, and Environmental Sciences, Appendix G).”

- “Many of my classes gave us real life situations to deal with and even had us do free business

  for struggling companies! (Bo Ellis, College of Agriculture, Food, and Environmental Sci-

  ences, Appendix H).”

- “I feel as if Biology majors really incorporate the ‘Learn by Doing’ philosophy of Cal Poly, as I

  have been in at least 2-3 labs every quarter with very hands on material (Ali Perez, College of

  Science and Mathematics, Appendix I).”

- “The most ‘Learn by Doing’ within my major is done in your senior project where you get to

  choose a cross disciplinary problem to analyze. (Helen Schalow, College of Science and Math-

  ematics, Appendix J).”

     At this point in my accumulated knowledge, I began to understand that there were some

mixed responses. Many of the students I interviewed expressed positive feedback for “Learn by

Doing” application at Cal Poly. The only negative feedback I received were from the two

Communication Studies students I interviewed who felt that many of the classes they have

been taught are theory based. This makes sense due to the high level of theoretical knowledge

Communication Studies students are supposed to have. I researched some ways in which Cal

Poly in fact has been incorporating “Learn by Doing” programs to the College of Liberal Arts

already. Recently, Cal Poly has begun incorporating interdisciplinary programs such as LAES (Liberal Arts and Engineering Studies) and the minor STS (Science, Technology, and Society). LAES is a program which combines the studies of engineering and technology with culture, arts, and humanities. This program incorporates intercultural technology and culture projects. The STS minor provides students the opportunity to participate in development teams and learn ways in which science and technology shape social, cultural, political, ethical, economic, and legal factors and institutions in both historical and contemporary contexts. The goal of this minor is to help prepare students to work, collaborate, and interact in an increasingly diverse and globalized workplace that as stated above stresses teamwork and communication.

While LAES and STS programs on campus are fantastic initiatives aimed at incorporating more "Learn by Doing" at Cal Poly, I believe that there is a need for a new and alternative Cal Poly program on campus. LAES and STS programs both do not contain an international component, where students are able to travel abroad to complete projects. I am proposing a program that will incorporate "Learn by Doing", interdisciplinary work, and a philanthropic international component as well. Once again, in President Armstrong's vision for 2022 he states, "Students will leave Cal Poly empowered with the holistic, interdisciplinary, experience that prepares them for success in a global economy and instills in them a culture of philanthropy (Armstrong, 2014)." The rest of this document will introduce the Information Communication Technology for Development (ICT4D) initiative, how it has been successful at other universities, and how it will add to President Armstrong's future vision. By identifying a new program on campus that has proven to be successful at other universities, I want to feel confident that I help bring it to the Cal Poly campus.

Explanation of New Program

Information Communication Technology for Development (ICT4D) is an initiative aimed at linking the areas that "have" and "don't have" technology and helping economic development by ensuring fair access to up to date communication technologies. Within the past several years the technological world has been greatly advancing, but not everywhere. ICT4D improves people's lives with better education, health and employment opportunities. Information and Communication technologies include any communication device such as cell phones, radio, television, network hardware/software, satellite systems, etc. Technological progress is a leading force behind economic growth and citizen engagement. In developing countries in particular, businesses, public officials, and citizens are working together to use Information Communication Technologies to improve society through economic development, efficiency, and strengthened social networks (Rouse, 2011). ICT4D programs would address the limitations stated above. The missions of Cal Poly as a polytechnic university are to foster teaching, scholarship, and service in a learn by doing environment. In the mission statement it is stated that Cal Poly encourages cross-disciplinary and co-curricular experiences. These link very similar to the goals of ICT4D.

Within the past fifty years, there has been great global economic growth. However, more than 65% of the world is still extremely poor, leaving several countries with very few opportunities. Information and Communication Technology (ICT) has a goal of addressing the needs of these low-income communities and countries. Within the past few generations, technology has grown immensely. The rate of technological innovation has increasingly expanded, and the goal

of ICT4D is to spread these technological advances to societies that don't have access to them yet (Kramer, Jenkins, Katz, 2007). The goal of ICT4D programs at universities is to allow students to complete local and international projects to help societies develop.

At several universities, ICT4D are implemented and proven to be successful. At University of California, Berkeley, the ICT4D program is located within the Berkeley School of Information. The program contains three goals; 1) To understand current processes of technology diffusion and adoption in developing regions, 2) to act through the design and deployment of information systems in close collaboration with the communities they are meant to support, 3) to reshape the dialogue about the role of technology in the global economic and political processes that affect developing regions (UC Berkeley School of Information, 2013).

An example UC Berkeley ICT4D project included the study of sub-Saharan agriculture. The 2008 World Development Report identified agriculture as the leading engine for economic growth and poverty reduction. The students within Berkeley's School of Information identified that two thirds of Sub-Saharan Africa works in agriculture and that the use of modern inputs such as cereal varieties, irrigation, fertilizer, and water management is lagging. The potential for significant improvements by inserting ICT systems such as searchable digital libraries regarding priority crops, use of cell phones for communication between farmers and extension officers, as well as low-cost and accessible information-based precision farming tools were identified by the students. The project goal consisted of identifying the needs and defining opportunities that the information and communication technologies can increase agricultural small-holder productivity, profitability, and sustainability. The project included reinforcing peer-to-peer communication

networks and supplier-based agricultural extension, fame education programs, and peer information exchange systems. Five multidisciplinary teams of three students guided by a faculty member traveled to Africa with the goals of learning from past/existing efforts to increase farmer to farmer networking, identify ways in which ICT's could enhance effectiveness, develop high-level design specification for applications/system, and collect data (UC Berkeley School of Information, 2013).

At Michigan State University, the College of Communication Arts and Sciences works with the College of Engineering and Honors College to find ways to bring the benefits of information and communication technologies to the world's least developed regions. This specialization (and soon to be minor) works with the Global Corps – Study Abroad program in which students from different majors first enroll in a Field Study ICT4D course. The MSU ICT4D students and faculty work within five schools in Tanzania, Africa where they design and install internet-connected, solar powered computer systems. However, this program is not only for technical students. Technical and non-technical tasks include; educational content, game design, training teachers and students with software and computers, and designing efficient power systems. In this particular instant, Michigan State houses their ICT4D program within a study abroad program (Michigan State University, 2014).

Penn State's ICT4D program is housed within the College of Communications and focuses on the use of technology to bring about socio-economic development, international development and human rights. The four research themes are; 1) Development informatics, 2) Social Media and empowerment, 3) Trustworthy ICTs, 4) ICT use for formal and non-formal education.

An example project highlights the use of non-technical students. Penn State students studied what predicts the success of electronic voting machines in India. This project researched how Indians mistrust the technology and the uses to which it can be put by the government such as electronic voting machines and national ID numbers. The goal of this research was to better understand the contradictions by investigating social and psychological factors underlying trust in information and communication technologies (Penn State, 2015).

These examples of Information Communication Technology for Development programs highlight both "Learn by Doing", as well as interdisciplinary work. Students from different majors are able to work together to complete a project and truly make a difference in the world. Cal Poly is in need of an additional program because of the motto of the University and President Armstrong's vision for the future. Without new ways to work with other students and apply concepts to the world, Cal Poly won't reach its goal of more interdisciplinary work stated in President Armstrong's future vision for 2022.

Explanation of Project:

It is evident that in order to live up to the "Learn by Doing" reputation of Cal Poly, the university needs more "Learn by Doing" opportunities. Next, due to the high demand of interdisciplinary skill sets post-college, and President Armstrong's vision for 2022, Cal Poly could benefit from more opportunities for students to engage in interdisciplinary projects. Two essential components to Cal Poly's vision and motto (interdisciplinary and "Learn by Doing") application can be improved. These limitations can be solved with the implementation of ICT4D which would add interdisciplinary *and* "Learn by Doing" application, while giving student's phil-

anthropic culture. Therefore, Cal Poly would highly benefit from an ICT4D program. The addition of an Information Communication Technology for Development program would be beneficial to Cal Poly students for the following reasons. Cal Poly students would gain the opportunity to be involve in "Learn by Doing" projects with students from various majors, working with students from different majors would implement more interdisciplinary work so that Cal Poly students are better prepared for the workforce, and President Armstrong's vision for 2022 would be fulfilled. Lastly, the implementation of ICT4D would create new job opportunities for students to work internationally and not focus solely on their major.

Methodology

I took a number of different steps to better understand the feasibility of implementing an ICT4D program at Cal Poly. First, I engaged in qualitative research by becoming aware of the constraints through engaging in interviews with deans and professors. I presented a powerpoint I created and then interviewed the associate dean from the college of Business, a political science professor, the dean of College of Education, a history professor and STS advisor, and the GE governance board chair. The presentation and interviews lasted between 20-60 minutes. The interview responses gave me insight into an understanding of the organizational barriers at Cal Poly which would prevent a new program such as ICT4D from being implemented. Next, I incorporated the input gained by the ten interviewed students as well as the input from the interviewed deans and professors and reviewed the Cal Poly university General Education catalogue requirements and descriptions. I created a set of coursework for an ICT4D program by researching ICT4D classes that can substitute current GE classes offered at Cal Poly. This information is

being used to discuss the reasons ICT4D should be implemented at Cal Poly to the General Education board and President Armstrong.

Presentation Presented to Deans

Firstly, in order to introduce ICT4D and it's goals, I created a powerpoint presentation (Appendix K) to present to the different faculty members I spoke to. The goal of the presentation was to introduce the program, explain how other universities incorporate it, and therefore why it would be beneficial at Cal Poly. This section investigates the interest and feasibility of an ICT4D program from the perspective of faculty and administration. Within this presentation, I initially introduced what Information Technology for Development is. I then discussed the ICT4D programs at the universities mentioned above (UC Berkeley, Penn State, and Michigan State) and presented some example projects. I followed up by stating why ICT4D would benefit Cal Poly and proceeded by asking my interview questions. In order to create a persuasive presentation, I used strategies learned in my Persuasion class to enhance my credibility. As a communication studies student with the proper training and knowledge of theories and vocabulary, I was able to establish credibility. In order to establish credibility, I came prepared and on time to my scheduled presentations, identified my sources of evidence, adopted an appropriate delivery style, and gauged my audiences' attitude. As a senior Communication Studies major, I applied my public speaking skills that I have acquired during my time at Cal Poly. Through developing visuals in which I referred to, I also prepared prompters so I didn't constantly look at the powerpoint while presenting. I spoke in a clear manner and avoided unnecessary words and fillers. After each presentation and interview, I analyzed my results. I analyzed my results by reviewing each interview

and finding common themes within the responses. I paid attention to which barriers constantly were spoken of and I wrote down consistent themes from each of the interviews. I present some of the significant barriers I found below.

Organizational Barriers

After analyzing the interviews, several common organizational barriers became apparent. The interviews (Appendix L) were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent. Four initial barriers emerged that explain the difficulties in implementing an ICT4D program at Cal Poly. They are the following:

Curriculum

One of the initial barriers is lack of room within the Cal Poly curriculum. Each major has a set number of major courses, followed by support courses, then general education courses, and finally free elective courses in which the student can choose from. Whereas Communication Studies has 24 free electives to choose from, Aerospace Engineering has 0 free electives to choose from. This makes working in interdisciplinary teams very difficult.

- "I find ICT4D very interesting and beneficial, but I don't think it should be formal, there is nowhere it would fit in the curriculum. It could be a senior project or a club on campus (Keving Lertwachara, Appendix M)."

- "It would be great to have engineering students work with other students on senior projects, but I understand engineers work on senior projects for 3 quarters whereas others work on

their senior projects for 1 quarter, this causes a problem in the curriculum (Laura Hosman, Appendix N)."

- "I find students at Cal Poly to be very tied down to their majors which is a good thing but also limiting, there isn't much room in the curriculum to explore other options (Dr. Margerum Leys, Appendix O)."

- "Cal Poly could find a way to split up the units for senior projects in order to have it be cohesive for all colleges, it would be a great to find a way for students to work in interdisciplinary groups (Kathleen Murphy, Appendix P)."

Although several curriculum barriers were presented, there are ways to work around this and still implement an interdisciplinary program such as ICT4D. By substituting general education classes into ICT4D related courses, and incorporating ICT4D projects into senior projects, students have the ability to work around the curriculum barriers to still be involved in ICT4D.

Funding

Another common barrier I found through the interviews is the funding barrier. Cal Poly is a state school, and according to the findings from the condition of education of 1977, "the defining distinction between private and public schools is their different sources of support (Riley, 1977, p.2)." State schools depend on local, state, and federal government funds primarily. The added costs of implementing an ICT4D program at Cal Poly remains a significant barrier.

- "I would love to teach abroad for a quarter, but funding would be a big constraint, I would be more than willing to oversee a project for a group of students somewhere abroad but I would have no time to arrange travel costs which might be the situation for many other professors as well (Kevin Lertwachara, Appendix M)."

- "Funding would really be my only concern. I know schools such as UC Berkeley and Michigan State are sponsored, but if there's a will there's a way! (Laura Hosman, Appendix N)."

- "In the School of Education it is very expensive for the education program to put students into schools as student teachers, but it is completely worth it (Dr. Margerum Leys, Appendix O)."

- "It would have to be made a case worthwhile investing for donors or alumni (Kathleen Murphy, Appendix P)."

Funding is a barrier in almost every situation, especially when dealing with a State School. In order to solve the funding issues, ICT4D at Cal Poly would have to be marketed in a way so that alumni and donors felt that it is an important enough program to donate to. Raising money and building awareness around the San Luis Obispo area would help with funding as well.

Amount of "Learn by Doing"

Based off of the different interviews, there were varied responses to the amount of learn by doing done within each department. However, a common response is that there is always room for more.

• "I currently teach a computer programing class which incorporates learn by doing, my students

   have helped the SLO bike shop create a website (Kevin Lertwachara, Appendix M)."

• "In Political Science we want to do more 'Learn by Doing', the students included. The Liberal

   Arts and Engineering Studies interdisciplinary major is a great opportunity offered at Cal Poly,

   but there should be more opportunities offered (Laura Hosman, Appendix N)."

• "Within the school of Education there is excellent 'Learn by Doing', all programs have a field

   component. Students are out in schools from day one! (Dr. Margerum Leys, Appendix O)."

• "The history department incorporates 'Learn by Doing' pretty well, students are able to do in-

   tense research as historians (Kathleen Murphy, Appendix P)."

   Through the interviews I gained a better understanding of the culture at Cal Poly. 'Cul-

ture' refers to the unique sense of the place that organizations generate through ways of doing

and ways of communicating about the organization; it reflects the shared realities and shared

practices in the organization and how they create and shape organizational events (Gass, H.,

Seiter,2003). When speaking to Dr. Margerum Leys, we spoke of the goal-oriented culture of Cal

Poly. Students are required to pick their major before entering this organization, and often come

in with very clear career goals. Dr. Margerum Leys stated, "Cal Poly students might question

whether ICT4D will help them reach their goals." Individual goals vs. University goals seem to

come into conflict. Although professors and deans have certain goals for their students, many of

the university goals conflict. In Organizational Communication we learned that the relationship

functions refers to the communication that helps individuals define their roles and assess the

compatibility of individual and organizational goals.

<u>Personal View vs. University View</u>

Everyone I talked to agreed that ICT4D would benefit the Cal Poly campus, however this may be in conflict with the University goals as a whole.

• "I personally find an addition to ICT4D at Cal Poly very interesting and beneficial, but there are a lot of difficult logistics (Kevin Lertwachara, Appendix M)."

• "I consider ICT4D my field, there is a huge interest in international work here at Cal Poly (Laura Hosman, Appendix N)."

• "As the Dean of Education, economic development part of ICT4D is something we really care about, it's in line with what happens with kids (Dr. Margerum Leys, Appendix O)."

Although there appears to be a huge interest in an ICT4D program at Cal Poly, the university might not see it as important as the professors and deans. Looking at the university as an organization as a whole, it is often difficult to incorporate programs such as ICT4D due to the barriers mentioned above. However, each of the five faculty members who I interviewed saw the program as a valuable addition.

Recommendations

After engaging in interviews, it appears as if the desire for an ICT4D program among faculty is there. However, making room in the curriculum seems to be the initial barrier. At Cal Poly, general education classes are required for each major. By having some ICT4D classes available in replacement for specific GE's, this could allow more room in each major's curriculum. I met with Brenda Helmbrecht, Chair of GE Governance Board, and she informed me on

each GE requirements. For GE Area A (Communication), students are taught the foundation of

clear thinking, speaking, and writing through reasoning in both oral and written communication.

In GE Area B (Science and Mathematics), students are provided a basic understanding of the na-

ture, scope, and limitations of mathematics and the physical and life sciences. Courses in this

area should include an appropriate writing component to further student understanding of basic

scientific, mathematical, and statistical concepts. GE Area C (Introduction to Arts and Humani-

ties) gives students the basic understanding of the traditions, values, and achievements found in

literature, philosophy and performing arts. In GE Area D/E (Introduction to Society and the Indi-

vidual) students are provided with the understanding of humans, and their social achievements in

contemporary and historical contexts. Lastly, in GE Area F (Technology), students are required

to take an upper division elective that will instruct students about one or more areas of technolo-

gy, and develop an awareness of how basic scientific and mathematical knowledge is used.

     With these requirements in mind, I researched courses from other Universities that fulfill

ICT4D requirements. Many of the educational goals of the GE's mentioned above fit with IC-

T4D courses. I added ICT4D courses into General Education areas at Cal Poly where they fit. Dr.

Helmbrecht explained that a new catalogue is put out every two years and that a proposal for a

new General Education course must go through several committees before being approved. Typi-

cally, changes can only be made every two years when a new catalogue comes out.

ICT4D Courses Substituted for GE's

   An implementation of the course "Information and Communication Technologies and Devel-

opment: Context, Strategies and Impacts" could be substituted for GE area D/E. This course dis-

cusses the role information and communication technologies play in transforming the lives in developing economies. This interdisciplinary course positions recent public and private sector initiatives in the context of postwar development theory and practice, and surveys methods of evaluating projects that develop technologies or happy new technologies to areas such as health-care, government, microfinnace, and literacy.

The course "Information and Communications Technology for Development" can be substituted for GE area D/E. This course reviews current literature and debates regarding Information Communication Technology for Development. This course draws on insights from economics, sociology, engineering, computer science, management, public health, etc.

The course "Designing Rural Computing Applications" can be substituted for GE area F. This course investigates design methods for developing rural computing applications. This class will begin with a focus on participatory and value-sensative design methods, and how they can be adapted for new cultures and social settings.

The course Communication Systems" can be substituted for GE area A. This course explores the various affective communication styles needed to teach in an educational setting. This class draws on insights from basic introduction to oral communication courses.

Several ICT4D courses offered at other universities can already function as GE courses at Cal Poly. The following is a list of ICT4D courses which could be replaced by Cal Poly GE area D's:

• Anthropology of the Environment and Development (GE Area D)

- Anthropology of Latin America (GE Area D)

- Anthropology of South Asia (GE Area D)

- Economics of Developing Countries (GE Area D)

- Economic Analysis of Latin America (GE Area D)

- Economic Analysis of Asia (GE Area D)

- Economic Analysis of Sub-Saharan Africa (Ge Area D)

By introducing these course substitutions to the GE governance board and getting these cour-
ses substituted, Cal Poly students would have room in the curriculum to be involved in ICT4D at
Cal Poly. Students of every major are required to take General Education classes, and therefore
this would apply to everyone who wanted to be involved in ICT4D.

Conclusion

Within my proposal for an implementation of an Information Technology for Develop-
ment program to Cal Poly, I have addressed the need for more "Learn by Doing" and in-
terdisciplinary work to fulfill President Armstrong's vision for 2022, I have interviewed various
students and faculty on their thoughts, I have analyzed the responses and summarized the barri-
ers, and I have proposed ICT4D classes that can be substituted for GE's at Cal Poly. I used public
speaking techniques learned in Advanced Public Speaking to deliver my presentation, and Per-
suasion techniques to make my powerpoint more effective. In Organizational Communication, I
learned that each organization has it's own culture. Through the interviews I gained a better un-
derstanding of the culture at Cal Poly. According to Gass, H., and Seiter, 'Culture' refers to the

unique sense of the place that organizations generate through ways of doing and ways of communicating about the organization; it reflects the shared realities and shared practices in the organization and how they create and shape organizational events. Cal Poly stands by a very goal-oriented, driven, culture which takes away from ICT4D projects being implemented because students may feel that ICT4D isn't helping them directly achieve their goals. However, through this document I have proved that ICT4D would in fact enhance "Learn by Doing" as well as interdisciplinary work.

In an article "A Communication-Rules Approach to Organizational Culture" Schall differentiated defining a culture by what the organization *has vs.* something the organization *is*. Stating what a culture *is* explains the views shared by most of the members and the goals found most important within the organization (Schall, 1983). Although Cal Poly is a very goal-oriented, major based organization, I state the benefits an ICT4D program would bring to Cal Poly as an organization. By proposing this document to President Armstrong and the GE board I am confident that an implementation of an ICT4D program can occur at Cal Poly. This implementation would only benefit Cal Poly students and would add for more well-rounded individuals who will graduate with the proper tools to be successful in a team-work oriented working environment.

References

Adams, S. (2014). The 10 Skills Employers Most Want in 2015 Graduates. Retrieved June 3, 2015.

College of Communication Arts and Sciences. (n.d.). Retrieved June 8, 2015.

Gass, Robert H., and John S. Seiter. "Pgs. 95-99, 289-291." *Persuasion, Social Influence, and Compliance Gaining*. 5th ed. Boston, MA: Allyn and Bacon, 2003. N. pag. Print.

Home- president's Office- Cal Poly, San Luis Obispo. (n.d.). Retrieved June 5, 2015, from http://president.calpoly.edu/

Information & Communication Technologies. (2014, October, 1). Retrieved June 3, 2015.

Information and Communication Technologies. (2013, October). Retrieved June 10, 2015.

Kramer, William J., Jenkins, Beth, and Katz. Robert S. (2007). The Role of the Information and Communications Technology Sector in Expanding Economic Opportunity.

Nutting, M. M. (2013). How Interdisciplinary Liberal Arts Programs Prepare Students for the Workforce and for Life. *New Directions For Community Colleges*, *2013*(163), 69-78. doi: 10.1002/cc.20072

Rouse, M. (2011, March 1). What is ICT4D (Information and Communications Technology for Development)? Retrieved June 1, 2015.

Riley, R. (1997). Public and Private Schools: How Do They Differ? Retrieved June 4, 2015.

Schall, M. (1983). A Commnication-Rules Approach to Organizational Culture. *Administrative Science Quarterly.* Retrieved June 3, 2015.

Stone, T., Bollard, K., & Harbor, J. (2009). Launching Interdisciplinary Programs as College Signature Areas: An Example. *Innovative Higher Education*, *34*(5), 321-329. doi:10.1007/s10755-009-9119-y

Vegetable Supplies in China. (n.d). Retrieved June 1, 2015, from http://comm.psu.edu/research/centers/ict4d

Appendix A

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Alyssa Isom

Major: Business Administration, Marketing Concentration

Year: Senior

Career Goals: Marketing Associate for Stryker

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I feel that I have definitely incorporated learn by doing at Cal Poly. In multiple business and Marketing classes I have had the opportunity to work with real small businesses to solve real problems they are currently experiencing. This has been extremely beneficial to talk about in job interviews and gain an edge over other candidates who don't have a 'Learn by doing' background. As far as incorporating more learn by doing into the curriculum, I feel that focusing on working more with 'business to business' situations and case studies, rather than focusing entirely on 'business to consumer' situations, because many students will be working in business to business roles and the experience would be extremely beneficial."

Appendix B

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Charlie Machado

Major: Business Administration, Human Resources and Management Concentration

Year: Senior

Career Goals: Anything to make a lot of money

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I feel like some of my classes incorporated 'Learn by Doing', although I spent more time in lecture than I would have liked to. I would say making the underclassmen classes more project based would help to add 'Learn by Doing' to the curriculum because I would have liked that experience from an early start. Besides that, I have gained a lot of valuable knowledge being a Business major at Cal Poly."

Appendix C

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Alex Barzilai

Major: Communication Studies

Year: Junior

Career Goals: Public Relations, Marketing, or Event Planning

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I think Cal Poly as a whole needs to work on improving their motto of 'Learn by Doing'. In regards to the college of Liberal Arts, as a communication studies major I have experienced internships throughout the summer that have given me a lot of training for when I enter the world after graduation. What I would like to see is that training being done in my classes. For example, practicing how to write professional emails, how to write an educated press release or even how to interview properly. These are all things that I earned though experience outside of my career at Cal Poly but I feel as though it would have been more beneficial to have learned this skills in the classroom."

Appendix D

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Ashley Ha

Major: Communication Studies

Year: Senior

Career Goals: Public Relations or Marketing in the fashion industry

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I feel like many of my Communication classes have been theory based. Classes such as Small Group Communication is what really taught me how to work in teams and experience 'Learn by Doing'. I think that for most of my classes I have been required to memorize various theories and I feel as if there could have been a better way for me to learn all of the information that would involve more 'Learn by Doing' work."

Appendix E

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

_____

Name: Courtney Haas

Major: Mechanical Engineer

Year: Freshman

Career Goals: work in the energy industry or work for a green construction company

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I definitely feel like Cal Poly had us learning by doing from the very start because i came in as a mechanical engineering major and they had us taking apart engines and putting them back together within the first few weeks of school. I think they could add more learn by doing to the curricula by offering an internship as a technical elective like they do for other majors to get more experience in the field!"

Appendix F

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Ben Sweeney

Major: Aerospace Engineer

Year: Senior

Career Goals: To design and work on composite skin materials that are placed on UAV drones like carbon fiber, Kevlar, and fiberglass

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I do feel like I incorporated learn by doing at Cal Poly. Especially this year, as a senior, my professors pushed me to try new experiments and literally play with very expensive materials, such as carbon fiber composite materials. Learning first hand and individually researching to answer my own questions really made it feel like I learned by doing. I think that the Cal Poly engineering college could add to the learn by doing curriculum by allowing younger undergraduate students the opportunity to perform more expensive and technical experiments to ultimately allow the students to become more responsible and aware of what the world of engineering has to offer."

Appendix G

       The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Kelsey Rustigan

Major: Agricultural Business

Year: Senior

Career Goals: To plan events for a winery

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I do feel like I have incorporated the 'Learn by Doing' aspect at Cal Poly because my major requires me to be very hands on and if we didn't have the resources we do such as the crops unit and the dairy science unit i wouldn't have acquired some of the skills i have today. Ag bus uses a lot of learn by doing as it is just because as an ag student there are so many classes that require you to learn how things work, but if it could add more learn by doing it would be a good idea to have more lab classes to teach us how processing of our crops work."

Appendix H

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

Name: Bo Ellis

Major: Agricultural Business

Year: Senior

Career Goals: Marketing for a company

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"I feel that I have incorporated 'Learn by Doing' at Cal Poly, especially in my ag business classes. Many of my classes gave real life situations and even had us do free business for struggling companies. I thought that the projects I had done prepared me for what I will be doing at a job. I could have had more 'Learn by Doing' in my GE classes though."

Appendix I

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

_____

Name: Ali Perez

Major: Biology

Year: Senior

Career Goals: Nurse Practitioner

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

 "I feel like biology majors really incorporate the 'Learn by Doing' philosophy. I have been in at least 2-3 labs every quarter and every lab is very hands on. For my anatomy labs specifically, having hands on activities really helps me to learn the material faster. I feel like that math and science department does a good job with learn by doing. If anything, it is hard to get into labs because the resources are scarce but once you get in the class we do a lot of hands on stuff!"

Appendix J

The first step I found in exploring the need for more "Learn by Doing" work at Cal Poly was to see the thoughts of other Cal Poly students on their "Learn by Doing" application thus far. To do this, I interviewed ten students, two from each college, to gain a better understanding for the needs at Cal Poly.

_____

Name: Helen Schawlow

Major: Math

Year: Senior

Career Goals: Unsure

1. How well do you think your college has incorporated "Learn by Doing" to your courses during your time at Cal Poly?

"Yes, I've worked on so many projects where I've learned skills that couldn't be taught in lecture. I think the best "Learn by Doing" requirement in my department is the senior project, where you get to choose a cross disciplinary problem to analyze. The college could also add capstones and continue to have the great research opportunities they offer undergrads."

Appendix K
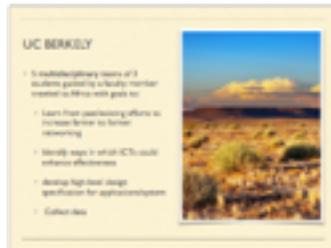
Appendix L

After interviewing the associate dean from the college of Business, a political science professor,the dean of College of Education, a history professor and STS advisor, and the GE governance board chair, several common organizational barriers became apparent. The interviews were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent.

_____

Interview Questions

- Which college do you teach for?
- College of Science & Mathematics
- Orfalea College of Business
- College of Liberal Arts
- College of Engineering
- College of Architecture, Food, & Environmental Sciences

- Do you know what ICT4D is?

- How do you think ICT4D could benefit your Cal Poly department or school?

- Do you think students could use ICT4D for their senior project and work with students from other colleges?

- Would you consider teaching abroad for quarter?
- Yes
- No

- Could you fit ICT4D into your curriculum?
- Yes
- No

- How well do you think your major incorporates the "Learn by Doing" motto?

- What is stopping you from working with other colleges?

- What organizational barriers do you think there are preventing a program such as ICT4D from occurring?

- What kind of support can you offer?

- What are some concerns you have?

Appendix M

After interviewing the associate dean from the college of Business, a political science professor,the dean of College of Education, a history professor and STS advisor, and the GE governance board chair, several common organizational barriers became apparent. The interviews were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent.

_____

Name: Kevin Lertwachara

College: Orfalea College of Business

Position: Associate Dean, Undergraduate Programs

1) Do you know what ICT4D is?

• "I had a basic knowledge before listening to the presentation."

2) How do you think ICT4D could benefit your Cal Poly department or school?

"I find ICT4D very interesting and beneficial, but I don't think it should be formal, there is nowhere it would fit in the curriculum. It could be a senior project or a club on campus."

3) Do you think students could use ICT4D for their senior project and work with students from other colleges?

"Yes."

4) Would you consider teaching abroad for quarter?
"I would love to teach abroad for a quarter, but funding would be a big constraint, I would be more than willing to oversee a project for a group of students somewhere abroad but I would have no time to arrange travel costs which might be the situation for many other professors as well."

5) Could you fit ICT4D into your curriculum?
 "Maybe, classes are hard to get into even as a business major, this is a barrier."

6) How well do you think your major incorporates the "Learn by Doing" motto?
• "I currently teach a computer programing class which incorporates learn by doing, my students have helped the SLO bike shop create a website."

7) What is stopping you from working with other colleges?

"Mainly just curriculum requirements and the logistical aspect of working with students with different courses."

8) What organizational barriers do you think there are preventing a program such as ICT4D from occurring?
"The main barrier is that for instance the College of Business has almost 20 units of free electives whereas the College of Engineering has almost none. Also, I am concerned about the longterm viability. There needs to be someone who would oversee such a program, and many professors don't have time."

9) What kind of support can you offer?
• "I believe once the logistics are figured out, it would be a great addition to Cal Poly."

10) What are some concerns you have?
"I personally find an addition to ICT4D at Cal Poly very interesting and beneficial, but there are a lot of difficult logistics."

Appendix N

After interviewing the associate dean from the college of Business, a political science professor,the dean of College of Education, a history professor and STS advisor, and the GE governance board chair, several common organizational barriers became apparent. The interviews were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent.

Name: Laura Hosman

College: College of Liberal Arts

Position: Assistant Professor of Political Science, involved with STS minor

2) Do you know what ICT4D is?

"I consider ICT4D my field, I studied at the UC Berkeley School of Information and I am a huge advocate!"

2) How do you think ICT4D could benefit your Cal Poly department or school?

"I think it could greatly benefit my department. Political Science students want to do more learn by doing."

3) Do you think students could use ICT4D for their senior project and work with students from other colleges?

"Yes, what I've noticed at Cal Poly is the huge international interest and would want to work together."

4) Would you consider teaching abroad for quarter?
"Yes, definitely."

5) Could you fit ICT4D into your curriculum?
 "Yes, I could see it coexist with LAES and STS."

6) How well do you think your major incorporates the "Learn by Doing" motto?
"The Political Science department could improve it's 'Learn by Doing."

7) What organizational barriers do you think there are preventing a program such as ICT4D from occurring?

"We need a team of students to work with an ICT4D program, not just one major. Each major has different requirements at Cal Poly. Whereas College of Engineering has 3 quarters to do senior project we have 1."

9) What kind of support can you offer?

"I am the biggest advocate you can find."

10) What are some concerns you have?

"Funding is the only concern I would have."

Appendix O

After interviewing the associate dean from the college of Business, a political science professor,the dean of College of Education, a history professor and STS advisor, and the GE governance board chair, several common organizational barriers became apparent. The interviews were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent.

———

Name: Jon Margerum-Leys

College: School of Education

Position: Dean

1) Do you know what ICT4D is?

"I didn't know exactly what the acronym stood for."

2) How do you think ICT4D could benefit your Cal Poly department or school?

"In the school of education, we care about what happens to kids k-12, economic development is something we really care about, ICT4D could benefit the School of Education."

3) Do you think students could use ICT4D for their senior project and work with students from other colleges?

"Yes."

4) Would you consider teaching abroad for quarter?
"Yes, but more so if I didn't have a family."

5) Could you fit ICT4D into your curriculum?
 "Yes."

6) How well do you think your major incorporates the "Learn by Doing" motto?

"Excellent, all programs have a huge field component and students are out in schools from day one."

7) What is stopping you from working with other colleges?

"Cal Poly is only five percent graduate students, and bridging graduate students with undergraduate students is difficult."

8) What organizational barriers do you think there are preventing a program such as ICT4D from occurring?

"I find students at Cal Poly to be very tied down to their majors which is a good thing but is also very limiting, there isn't much room in the curriculum to explore other options. The faculty workload is also a barrier, faculty works hard and are already stretched thin doing what they do."

9) What kind of support can you offer?

"As the Dean of Education, economic development part of ICT4D is something we really care about it's in line with what happens with kids."

10) What are some concerns you have?

"Funding is a big concern. In the School of Education it is very expensive for the education department to put students into schools as student teachers, but it is completely worth it. Finding more funding to implement an ICT4D program would be difficult to do at this point. "

Appendix P

After interviewing the associate dean from the college of Business, a political science professor,the dean of College of Education, a history professor and STS advisor, and the GE governance board chair, several common organizational barriers became apparent. The interviews were able to give me a sense as to what the barriers of implementing a new program at Cal Poly are, as the organizational culture of Cal Poly became apparent.

Name: Kathleen Murphy

College: College of Liberal Arts

Position: History professor, involved with STS minor

1) Do you know what ICT4D is?

"Yes."

2) How do you think ICT4D could benefit your Cal Poly department or school?

"History students would be very interested in it. In order to be involved with ICT4D you need sensitivity to cultural norms, like history and anthropology students. It would differentiate getting a liberal arts degree from a polytechnic university vs. another college"

3) Do you think students could use ICT4D for their senior project and work with students from other colleges?

"Yes, the university would need to find ways to split up units for senior project evenly to find ways for students to work in interdisciplinary groups."

4) Would you consider teaching abroad for quarter?
"Yes, I have taught abroad in England already."

5) Could you fit ICT4D into your curriculum?
 "Yes, it goes hand in hand with History."

6) How well do you think your major incorporates the "Learn by Doing" motto?
"The history department incorporates learn by doing pretty well, students are able to do intense research as historians"

7) What is stopping you from working with other colleges?

"Mainly curriculum barriers."

8) What organizational barriers do you think there are preventing a program such as ICT4D from occurring?
"To add a minor or a concentration is a very rigorous process, and someone has to run the program as well."

9) What kind of support can you offer?
"I think it is great, it goes hand in hand with STS minor nicely."

10) What are some concerns you have?
"In order to help with funding, It would have to be made a case worthwhile investing for donors or alumni."