

Strategies for integrating teaching and research with community service

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ABSTRACT

External and internal expectations and pressures are increasing on universities to better address their community needs and student's needs through service, research, learning and teaching. It is common nowadays that universities set up strategic plans to face these pressures. Generally, these strategic plans set out the mission and core values of the university, along with goals, strategies and performance indicators to guide the decisions of the university as a whole and its staff individually. Most of these plans are built around four pillars: learning and teaching – research – community engagement – resource generation and management. It is admitted that both research and teaching continue to dominate the activities of most academics and their institutions, whereas community service is behind them and should receive more attention

This communication explains why universities should integrate education, research and service community to achieve its mission. How can university faculty balance the seemingly disparate responsibilities of research, teaching, and community service? One possibility is to undertake collaborative efforts that combine community service with research and teaching. This communication explores the strategies of universities and how the integration has been taken into consideration in fulfilling the university's mission. The benefits gained by the university, students, and the community as a whole are cited. Some examples are given to highlight the impact of the integration on education, research economy and community service.

Universities can systematically address the demands for more social engagement only by exploring new reward and administrative structures. Nowadays, many universities have made great strides in the implementation of community service as an integral part of their academic core [1]. However universities face many challenges, such as mobilizing all the university campuses and facilitating even greater participation by other role players, such as, the support services, the communities, the private sector and other service providers. The support of management and the council of the University are very important for successful integration as well as the dedicated capacity to be appointed to facilitate the implementation of the community service policy on various levels. Community Service Committees may be appointed in faculties and support service divisions. A Central Community Service Committee may be instituted and various task teams within the Committee may be involved in embedding the aspects of community service learning into the fabric of this university [1]. The integration activity can also be supported by a pooling of resources across sectors of the campus as well as within the community. When these features are present, the resulting partnership is likely to be mutually beneficial and can build the capacity and competence of all parties. These relationships also create conditions for enriching the student experience.

Keywords: university/teaching/research/community/service/integration.

1. INTRODUCTION:

Most universities are guided by their strategic plan that is consistently being revised to reflect the changing needs of their students, faculty and staff and the community in general. In the strategic plan is included service, in addition to teaching and research, as part of their mission to serve the community by the discovery, dissemination and application of new knowledge [2] and to anticipate and respond to issues and challenges in different fields (like agriculture, food systems, environment and natural resources), in order to empower people to improve their lives, the lives of others, and the environments on which they depend [3]. However, the activities that “service” denotes vary widely, ranging from membership on university committees and short-term volunteer efforts to major, time-consuming outreach programs concerning community service. These more substantive programs include cooperative extension, service learning, university-industry partnerships, and community measure issues. Regardless of the type of outreach, these efforts are seldom seen as contributing to the core mission of the university, and are almost always devalued relative to teaching and research. This communication concentrates on how the university can use its full potential to make a contribution towards resolving the most pressing problems of the society and how it can establish partnership with the industry. These two missions are valuable not only because they address social and environmental issues and help the industry to keep up with the pace of scientific and technological progress, but also because they can enhance and advance many teaching and research efforts.

In the following sections the impact of the integration of teaching research and community service on teaching, research, the society and the economy is discussed. Strategies and models offered by some universities to be sought for successful integration are reviewed .

2. REASONS FOR INTEGRATING TEACHING AND RESEARCH WITH A COMMUNITY SERVICE

As it is well known, the university has a tripartite mission: education, research, and service. The service which can take a number of forms, including the production of knowledge and the development of knowledgeable citizens, combined with other kinds of academic learning should receive a more equitable place. And it is through the integration of its three missions that the University best fulfills each. They should not be regarded as separate but as integrally interconnected.

Integrated community service can clearly be contemplated in a first-world, developed society; however it finds a deeper significance in a developing society. In a developing society – where there are so many needs and so few institutional and other resources - institutions such as universities do have a responsibility to broaden their scope and their focus in order to support the development of society [1].

Inadequate resources are a barrier to the success of industrial research projects. Therefore, making full use of all the available resources is a priority. One advantage of collaborative research between a university and a community is that the resources from all parties involved in the project can be better utilized. As we know, universities have tremendous human and material resources, such as well educated personnel, laboratory equipment, computers, library and other facilities required for carrying out research projects. Therefore, having universities participate in projects is an effective way to reduce project costs and train students for jobs in the industry [5].

The participation of universities in collaborative research and in its contribution to solving most pressing problems of a society may also change the face of academic research. This kind of research projects can force university research to be more in tune with the national economy and industrial business activities.

University education is an important way to produce educated and qualified personnel for the industry and the society. The products of universities include knowledge, new technology and educated people. Unfortunately, most academic research projects do not provide the opportunity to have their students directly involved in a practical knowledge. Excellent research always trains outstanding students. Lacking practical knowledge, the students need to be trained for a long time before they become qualified in their field of research or education. With integrated teaching and research and community service, academic content of course material comes to life through the practical application of learning in the community. Teachers who engage in real-world, problem-based research, and who use that research to illuminate disciplinary theories for students, conduct better research. The integration strengthens students understanding of course material and improves critical thinking skills and recognition of the complexity of problems.

The above discussion gives an insight of the importance of integrating teaching, research and community service. Activities relating to community service should therefore not be seen as separate from the university's core activities of the 21 first century university. To illustrate the need of collaboration for example, between university and industry which is a part of a community, table1 shows some motivations for research partnership [5-6].

University	Industry
To obtain financial support	To access the research infrastructure
To fulfill the service mission of the university	To access expertise
To broaden the experience of students and faculty	To aid in the renewal and expansion of new technologies
To enhance regional or national economic development	To gain access to potential employees
To increase employment opportunities for students	To expand external contacts for the industrial laboratory
Table1: Motivation for research partnership	

3. STRATEGIES FOR LINKING TEACHING AND RESEARCH

One of the principal strategies in support of University's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives [7].

The way to interpret the idea of integration of research and education is that [7]:

The results of research can be incorporated into educational practice to promote more effective approaches to teaching and learning. This can be most effectively accomplished when researchers and practitioners work together to define problems of special importance,

gather data and interpret those data. This process of collaborative research also facilitates the application of research findings to practice while making it possible for the realities of practice to challenge theory and define research goals. [7]

In some instances, research can be incorporated into the design of educational experiences for all students, not just those who can be accommodated on a research team or in a field or laboratory research project. This can be done through such pedagogies as service-learning, inquiry-based learning, project-based learning.

In all cases, a scientific mindset and an approach that promotes quantitative literacy can be introduced into the classroom so that students learn in a mode comparable to that employed by an investigator, even if the work they are doing is not an original contribution. [7]

A basic model that might individuals and course teams can adapt and use to consider their current curriculum and in designing new courses is given below [8].

- Develop students understanding of the role of research in their discipline

By developing:

The curriculum to bring out current/or previous research developments in the discipline student awareness of learning from staff involvement in research.

Student understanding of how research is organized and funded in the discipline/institution.

- Develop students abilities to carry out research/consultancy in their discipline

Develop the curriculum, in particular how students learn in ways that mirror/support the research/consultancy processes in the discipline

Assess students in ways that mirror/support the research/consultancy processes in the discipline. For example requiring students to have their work assessed by colleagues according to the house style of a (fictitious) journal before submitting it to you; this mirrors how academic journals use referees to decide on whether an article is to be published.

- Provide training in relevant research/consultancy skills/knowledge
- Require all students to undertake some research

This is the effective approach developed in those UK/Australian institutions which require a dissertation for Honors Degrees.

- Develop student involvement in staff research/consultancy

This is the approach of many US universities – often supported by national/ corporate sponsorship

- Evaluate/research student experience of research/consultancy and feed that back into the curriculum.
- Support students in making clear to them the employability elements of research and consultancy.

This is particularly important for those students whose focus is on using a degree to get employment - and who may not otherwise appreciate the value of a research based approach.

- Conduct class research projects with students as a part of a course

4. STRATEGIES FOR INTEGRATING TEACHING AND RESEARCH WITH COMMUNITY SERVICE

As articulated by Ernest Boyer (1990), the complete university must attend to four separate yet interrelated scholarly functions: discovery, integration, application, and teaching. Teaching not grounded in research and practice is hollow. Research not applied and transferred to real world problems is without value. Community service not informed by research and pedagogy is ineffective [9]. That is why university faculty are responding to social and funding pressures for greater public engagement. Besides teaching and research the universities develop and nurture relationship with communities they serve. They offer education and training programs closely matching the emerging needs of the community and the labor market [4, 10]. Therefore, universities should develop models that contribute to successful integration between teaching research and community service and have significant impacts on society and communities. Within such models, students and faculty can be more effectively engaged than in traditional endeavors in research or teaching alone, because their work can address the broader social or public concerns that traditional disciplinary practice may not, and because they experience enhanced interactions with other interested people both within and outside the university [4]. Addressing community issues can enhance and advance many teaching and research efforts as students can participate in addressing a community-identified need by a structured course around that community issue. All three of the classic elements of campus life---research, teaching and service ---can be conducted in an “engaged mode.” Whether it is discovery or learning, the activity can be community-based and can be conducted within the context of a true partnership. It can have shared goals that link the mission university with the goals of the community participants as well as an agreed-upon definition of success that will be meaningful to the institution and the community [7]. For instance industry and university, although they are different in many ways, they can find ways to work together successfully for mutual benefit. The partners have to organize themselves through a collaboration process in which the missions and strategies to be used are clearly defined. As an example of a collaboration organization, Figure1 illustrates the basic collaboration process between the university and the industry which is a part of the community [11].

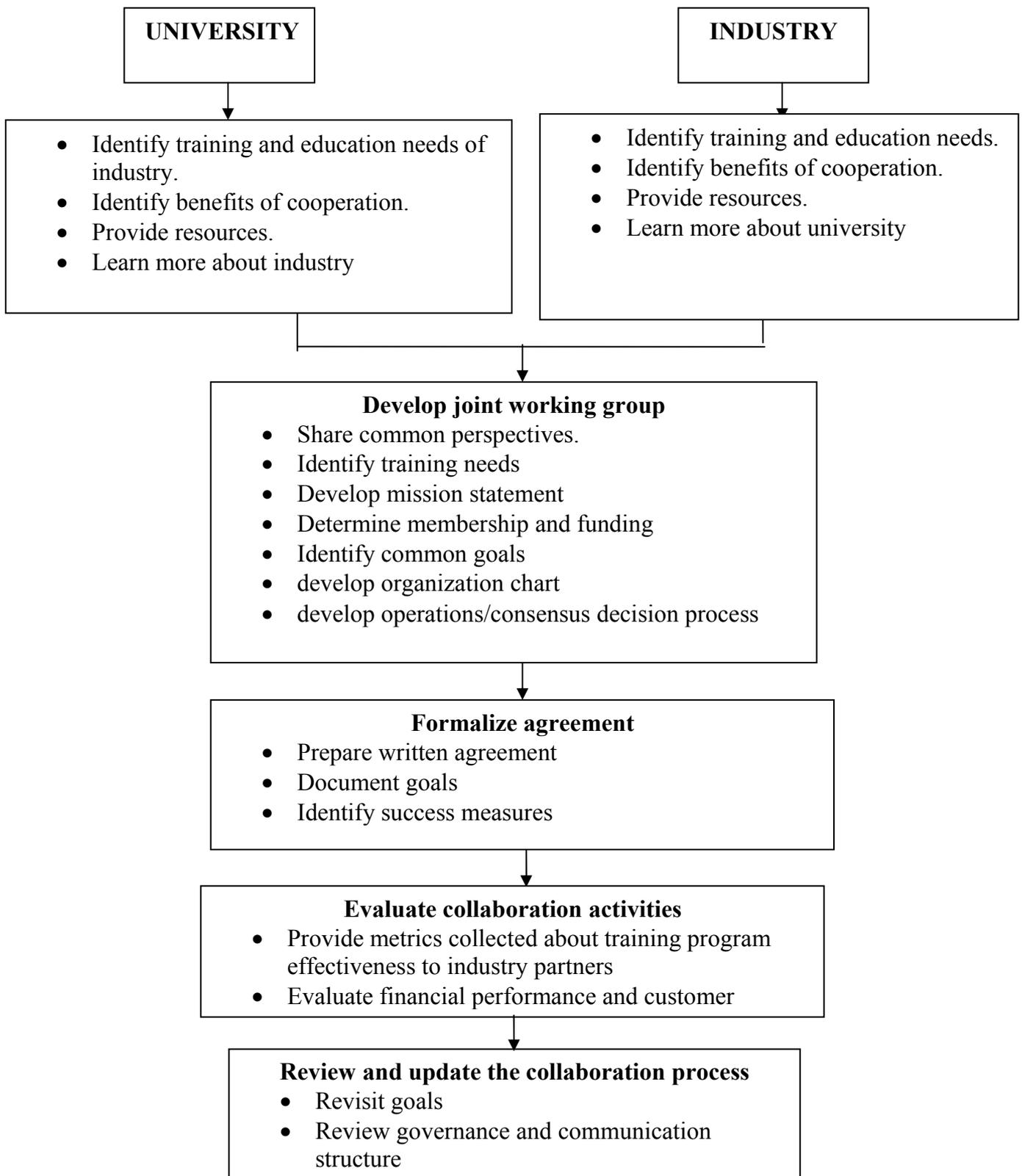


Figure1. University and Industry Collaboration Process

However the support of management and the council of the University are very important for successful integration of teaching and research with the community service as well as the dedicated capacity to be appointed to facilitate the implementation of the community service policy on various levels. Community Service Committees may be appointed in faculties and support service divisions. A Central Community Service Committee may be instituted and various task teams within the Committee may be involved in embedding the aspects of community service learning into the fabric of this university [1]. The integration activity can also be supported by a pooling of resources across sectors of the campus as well as within the community. When these features are present, the resulting partnership is likely to be mutually beneficial and can build the capacity and competence of all parties. These relationships also create conditions for enriching the student experience.

In order to strengthen the university's role in the transfer of knowledge and expertise between the university and society, to the benefit of both the strategies may be developed in the context of the following assumptions [12].

- Community service is valued as one of three missions of the university.
- Community service, research, and teaching will form an integrated and seamless university program.
- Community service functions through a college-based delivery system that is supported by a centralized administrative structure.
- Community service engages faculty, staff, and students with the university's global communities.
- Community service is a form of scholarship that strengthens the university and generates resources.
- Community service excellence will be rewarded through the promotion, tenure, and merit review processes.
- Community service provides a catalyst for economic and social transformation.
- Community service generates goodwill by assisting those we serve in understanding the value of the university in meeting the needs of our society.

Here are some strategies that may be used by the University for successfully integrating teaching research with the community service [13].

a- The university may strengthen and sustain its impact as an institution serving diverse communities by:

- Seeking to understand the needs and interests of diverse communities
- Establishing a clear responsibility within the university for the collection, analysis, and measurement of public and community service efforts
- Designing organizations and processes that successfully coordinate public and community service efforts and information.
- Creating and developing opportunities and incentives to apply research and scholarship for the public good
- Committing sufficient financial and other resources to achieve community service goals
- Developing an inventory for all internal activities and continuously assessing their impact on the community

b- The university may build stronger community partnerships that enrich and enhance its teaching and research mission. The strategies which will need to be employed for this goal to be realized may include:

- creating meaningful structures, mechanisms, and ways for the community and the university to interact;
- developing a community partnership plan with targets, tasks, resources, responsibilities, timelines, and measures for success;
- Creating organizations and processes that successfully coordinate and manage key institutional partnerships.
- Facilitate and support collaborative projects between the University faculty and other organizations

Further, the university should consider establishing and implementing focused and selected programs that have mutual benefit to the community and the university; and continuously evaluating the impact of existing partnerships and identifying potential institutional partnerships including a focus on geographical locations.

c- The university may cultivate a culture of community engagement in students, staff, and faculty. The following strategies may be activated to achieve this goal, including:

- providing rewards, recognition, incentives, and institutional support for focused community engagement;
- fostering a sense of civic responsibility in student population; and
- Continuously promoting community engagement to faculty, students, and staff.
- The establishment of integrated community service as a core function.
- Require departments to define teaching-learning and research-creative work appropriate to their faculties. Recognize good interdisciplinary work.
- Encourage departments to foster faculty productivity by altering the mix of teaching, research, and service.
- Innovate and use technology to improve teaching, learning, and research.
- Remove barriers to interdisciplinary interactions by advancing the availability and utility of communication, collaboration, and cooperative technologies.
- Enhance interdisciplinary teaching and research and scholarly activities and strengthen connections among teaching, research, creative, and public service activities
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Because there are varying purposes and goals for integrating teaching research and community service, various innovations and practices are being initiated in different universities Here are some examples each illustrating a different approach to linking community service with research or teaching, and to social change

a- The Canadian university of Alberta and the Canadian pulp and paper plant have created a research team with two government agencies. They set up clearly defined missions. The parties provide expertise, funding and technical support to their project. They also, clearly defined responsibility and intellectual property of each partner. They have also defined organizational aspects of the research project such as good communication, regular project meetings to improve communication between different parties in the project, exchange the research results, and evaluate these results. [6]

b-The Cornell Waste Management Institute, explores how cooperative extension programs can expand their audiences and activities beyond farmers and other practitioners to involve policymakers and university researchers. It has addressed a number of issues, including the use of wastes in agriculture, and recycling yard trimmings, food scraps, and other organic wastes. [4].

c-Garden Mosaics, takes a novel approach to balancing the interests of community members and university researchers in a youth science education program. Garden Mosaics engages youth in conducting research into planting practices and social and cultural activities in urban community gardens. The primary purpose of the youth research is educational – youth learn to conduct investigations, including interviews with adults and observations in gardens. Mosaics youth conduct three core investigations to learn about gardens, gardeners, and their neighborhood [4].

d-The Cornell Science Inquiry Partnerships (CSIP) shows how community service (outreach) can provide professional development for graduate students while improving high school science teaching. SIP focuses primarily on integrating graduate student training with outreach. It provides funding for graduate student fellows to teach and develop curricula for high school students. For example, a fellow working at an alternative school led students in research focusing on the impact of invasive worms on soils. Fellows use their research to enhance standard labs. For example, a fellow whose research focused on dolphin muscles added an inquiry component and upgraded the science content of a unit on respiration [4].

e- At Purdue University the integration of engineering design and service learning in the Engineering Projects in Community Service (EPICS) program has been developed. Under the EPICS program, multidisciplinary (including both engineering and non-engineering students), vertically-integrated (first-year students through seniors) teams of undergraduates earn academic credit for multi-year projects in the community [14].

f- At the University of Washington, a multinational project-based approaches to integrating engineering education and research has been developed. Starting as early as the freshman year, students work in multinational teams on topics of critical importance to partner regions, such as reducing the environmental impact of materials processing and use, new drinking and wastewater treatment technologies, solid oxide fuel cells, and botanical biodiversity [15].

g- At the University of California–Berkeley, the integrating cutting-edge research with teaching scholarship in a service-learning context has been experimented. Students studied research in gender equity in engineering and applied this research to designing learning environments for science museums and Girls, Inc [16].

h- At The Ohio State University they have experimented with designing graduate research seminars to culminate in a “miniconference”. This model blends the three pillars of academia— research, teaching, and service—within the context of a single course. Throughout the quarter, students pursue original research projects in the discipline of the seminar course. At the end of the quarter, students write their findings as technical conference papers, then act as the miniconference program committee in reviewing each other’s submissions [17].

i- At George Town University the integration of research, teaching and community service by an indirect model of service learning has been developed. The students do not participate

directly in field work, but learn about some sector of the community through their teacher's own research and/or community service and use knowledge acquired through their course to create a service or product which helps to meet a need of the community [18].

j- In university of technology (UTS), in Sydney a project of twenty five hectares of rainforest as a sustainable site has been developed. The project involves several departments (science, humanities, design and architecture, education, business) and the local community in creating a model of sustainability [19].

Certainly, there are many more examples of how dealing with community issues contributes to and bridges the teaching and research missions of the university. Integrating teaching, research with community service not only enhances the ability of the university to positively impact society, but also enriches professional experience of teachers and researchers

5-BENEFITS OF INTEGRATING TEACHING RESEARCH WITH THE COMMUNITY

Some of the benefits of integrating teaching research with the community can be summed up as follows [3, 6]:

- Research can encompass community-based scholarship and the development of new knowledge through collaborations with community participants.
- Teaching and learning can be done in a way that links educational goals with the challenges of life. Common forms of engaged learning are service-learning and problem-based learning, both utilizing community issues as a starting point for accomplishing educational goals. For instance:

For Students

- Academic content of course comes to life through the practical application of learning in the community.
- Strengthens their understanding of course material.
- Improves critical thinking skills and recognition of the complexity of problems.
- Introduces students to current societal issues.
- Broadens students' perspectives by connecting them with the larger world.
- Helps them understand the difference between assisting an individual and becoming involved in public policy to foster change.
- Increases their multicultural fluency and understanding of differences between socio-economic classes.
- Aids students in making an impact on the community where they live.

For Faculty and Staff

- Strengthens and renews teachers because students are more engaged in learning.
- Serves as a catalyst for faculty to review their teaching methodologies and experiment
- Extends the classroom into communities for the development of mutually-beneficial knowledge, such as new community-based research projects which test current theories and practices.
- Demonstrates faculty commitment to the community by awarding academic credit for research and service directly related to course content.
- Increases opportunities for professional recognition and rewards.

- Provides opportunities for faculty to introduce the latest research to the community.

For Community partners like industry and agencies

- Supports the work of agencies which are often understaffed and under-budgeted by providing resources and time given by students, faculty, and staff.
- Creates new alliances and partnerships with the University; demystifies a large and complex institution.
- Creates opportunities to learn about the latest research in their areas and work to test that research.
- Creates opportunities to ask for more research on practical questions for staff and clients.
- Allows for example, industry to work with students and decide whether there are some future recruits among them.
- Fosters connections across generations.
- Instills a lifelong commitment to service in students.

For Community

- Provides community with direct or indirect services which might not otherwise be available to them.
- Gives clients the opportunity to teach students about the many aspects of their lives.
- Community can provide direct feedback about the services and the research being done in the agencies and the university.

For example, from the collaboration process between the university and the industry which is part of the community service, the university would benefit from collecting additional funds to support research, from keeping up with the latest advances in technology and from retaining the skilled professionals. The company would benefit from conducting research using the university's laboratories, libraries and personnel to keep up with technological progress at a low cost. In addition the public companies would benefit from promoting programs of social, technological, economic and strategic interest of the society. Moreover, this partnership might bring about major changes such as the emergence of spin-off industries, the generation of job opportunities, the development of skilled labor and the increase in revenue. The impact of this collaboration through integration is the transfer of new technology from the university to the industry.

Table2 below gives some benefits as cited in [11]. The authors surveyed both academic and industry representatives of 23 collaborations and selected 4 of these collaborations: Texas Tec University (TTU), Florida Atlantic University (FAU), Software Engineering Forum for training, California state/Long Beach (SEFT/CSULB), and American University/Center for Systems Management (AU/CSM).

Financial benefits	Increased university and partner revenue
	Cost savings
	Increasing support for research program
Business growth	Opportunity for follow on business
	Attracted students for degree programs
	Enhanced partner's marketing
	Extended the reach of the university
Fulfilling an organization's educating/training mission	Top quality training
	Best use of company's training resources
	Fulfills company training requirements for specific courses
	Occasional use of academic knowledge and courses to supplement industry training
Enhancing organizational reputation	Better name recognition for both parties"
	Public relations benefit and local credibility from the partnership
Providing a staffing source	Excellent sources of interns and potential hires
Table2: Some benefits of partnership	

6. CONCLUSION

This paper discussed the need of integrating teaching, research and community service. A basic model of integrating teaching and research is given. Four examples are cited to illustrate how scientific research and student training can be linked with community. Certainly, there are many more examples of how dealing with community issues contributes to and bridges the teaching and research missions of the university. Integrating teaching, research with community service not only enhances the ability of the university to positively impact society, but also enriches professional experience of teachers and researchers. Therefore instead of framing faculty work as three distinct functions essentially subsumed by the teaching and research, universities should think of new policies that envision the work of faculty as occupying different points in the space where research, teaching and community service intersect.

Nowadays, many universities have made great strides in the implementation of community service as an integral part of their academic core [1]. However universities face many challenges, such as mobilizing all the university campuses and facilitating even greater participation by other role players, such as, the support services, the communities, the private sector and other service providers. The support of management and the council of the University are very important for successful integration as well as the dedicated capacity to be appointed to facilitate the implementation of the community service policy on various levels.

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