COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 09-29	FOR NSF USE ONLY
NSF 07-530 04/23/09	NSF PROPOSAL NUMBER

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S)   (Indicate the most specific unit known, i.e. program, division, etc.)

DUE - ATE-Projects

0938522

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
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EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)	SHOW PREVIOUS AWARD NO. IF THIS IS ☐ A RENEWAL ☐ AN ACCOMPLISHMENT-BASED RENEWAL	IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYM(S)
131988190		

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE	ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE
CUNY Kingsborough Community College	**CUNY Kingsborough Community College** **230 W. 41st Street** **New York, NY. 100367296**

AWARDEE ORGANIZATION CODE (IF KNOWN)	
0026948000	

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE	ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE

PERFORMING ORGANIZATION CODE (IF KNOWN)

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)	☐ SMALL BUSINESS ☐ MINORITY BUSINESS ☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS	☒ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Using Economic Data as a Catalyst for Sustainable Technological Education Program Dissemination in BioTech, Nanotech and IT**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **804,826**	**36** months	**04/15/10**	

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

☐ BEGINNING INVESTIGATOR (GPG I.G.2)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C.1.e)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.D, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ EAGER* (GPG II.D.2)   ☐ RAPID** (GPG II.D.1)
☐ VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____
    PHS Animal Welfare Assurance Number _____

☐ HUMAN SUBJECTS (GPG II.D.7) Human Subjects Assurance Number _____
    Exemption Subsection _____ or IRB App. Date _____
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED
    (GPG II.C.2.j)
    _____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR
    REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT **Economic and Workforce Development**	PI/PD POSTAL ADDRESS **2001 Oriental Boulevard**
PI/PD FAX NUMBER **718-368-4880**	**Brooklyn, NY 11235** **United States**

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME				
Stuart A Schulman	**EdD**	**1988**	**718-368-5143**	**sschulman@kbcc.cuny.edu**
CO-PI/PD				
Edgar E Troudt	**MPhil**	**2009**	**718-368-6598**	**etroudt@kbcc.cuny.edu**
CO-PI/PD				
Christoph Winkler	**MA**	**2003**	**718-368-4539**	**cwinkler@kbcc.cuny.edu**
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), nondiscrimination, and flood hazard insurance (when applicable) as set forth in the NSF Proposal & Award Policies & Procedures Guide, Part I: the Grant Proposal Guide (GPG) (NSF 09-29). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

Conflict of Interest Certification

In addition, if the applicant institution employs more than fifty persons, by electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of the NSF Proposal & Award Policies & Procedures Guide, Part II, Award & Administration Guide (AAG) Chapter IV.A; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Drug Free Work Place Certification

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Drug Free Work Place Certification contained in Exhibit II-3 of the Grant Proposal Guide.

Debarment and Suspension Certification   (If answer "yes", please provide explanation.)

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency?   Yes ☐   No ☒

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Debarment and Suspension Certification contained in Exhibit II-4 of the Grant Proposal Guide.

Certification Regarding Lobbying

The following certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding $100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Certification Regarding Nondiscrimination

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative is providing the Certification Regarding Nondiscrimination contained in Exhibit II-6 of the Grant Proposal Guide.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a & §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

(1)   community in which that area is located participates in the national flood insurance program; and
(2)   building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

(1)   for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
(2)   for other NSF Grants when more than $25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **Kirstin E Swanson**	**Electronic Signature**	**Apr 22 2009 3:07PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
718-368-4539	**kirstin.swanson@kingsborough.edu**	**718-368-4590**

* EAGER - EArly-concept Grants for Exploratory Research
** RAPID - Grants for Rapid Response Research

<div align="center">

NATIONAL SCIENCE FOUNDATION
Division of Undergraduate Education

NSF FORM 1295: PROJECT DATA FORM

</div>

The instructions and codes to be used in completing this form are provided in Appendix II.

1. **Program-track** to which the Proposal is submitted: **ATE-Projects**
2. Name of **Principal Investigator/Project Director** (as shown on the Cover Sheet):
   Schulman, Stuart
3. Name of submitting **Institution** (as shown on Cover Sheet):
   CUNY Kingsborough Community College
4. **Other Institutions** involved in the project's operation:

   _____

   _____

   _____

   _____

   _____

   _____

Project Data:

A. Major Discipline Code: **99**
B. Academic Focus Level of Project: **LO**
C. Highest Degree Code: **A**
D. Category Code: **R**
E. Business/Industry Participation Code: **PSP**
F. Audience Code: **H** _ _ _ _ _ _ _
G. Institution Code: **PUBL**
H. Strategic Area Code: **IT**
I. Project Features: **2** _ _ _ _

Estimated number in each of the following categories to be directly affected by the activities of the project during its operation:

J. Undergraduate Students: **0**
K. Pre-college Students: **0**
L. College Faculty: **15**
M. Pre-college Teachers: **0**
N. Graduate Students: **0**

NSF Form 1295 (10/98)

Using Economic Data as a Catalyst for Sustainable Technological Education Program Dissemination in BioTech, Nanotech and IT
The Center for Economic and Workforce Development at CUNY Kingsborough

Project Summary

NSF confronts what the investigators term the Vegas syndrome: what novel program innovation happens within a funded project often ends with the project. Task-oriented budgets and a highly local focus often make widespread dissemination beyond the reach of most projects. ATE has wisely sought to address this problem through the creation of National Centers and ATE Central, both of which are hubs for sharing best practices. While these efforts have helped improve collaboration, three major limitations remain: (1) What is the incentive of a content producer to support their materials beyond the life of NSF funding?; (2) Do either the content developers or adopters have the expertise in getting faculty "buy-in" and training for new programs?; (3) How does an institutional content consumer justify and offset the expenses incurred in the adoption of new programs?

To address these questions, the Investigators propose a project in Sustainable Dissemination, which seeks to connect content developers and adopters, providing research on the short- and long-term economic impacts of programs to help assist program managers as they seek funding from industry partners or economic and workforce development offices at the local, state and Federal levels. A summary of the process is as follows:

1. Evaluate and report on the economic impacts of existing projects in BioTech, Nanotech and IT.
2. Create an "economic dashboard" site to allow for the identification of workforce opportunities nationwide.
3. Match the impact found in step 1 to those opportunities found in step 2.
4. Identify and partner with Community Colleges where regional impact could be made by adopting an existing ATE curriculum/program to fill a gap in current degree/program offerings.
5. Liaise between content developer (the ATE Center) and the Community College for customization and adoption of the content.
6. Encourage and support collaborative resource seeking (for the content developer and adopters) from educational and workforce grantors.

Broader Impacts – ATE Centers tend to be located at sites with relevant faculty expertise, but certainly not near every strong cluster of the relevant industry. This project could allow the work of various ATE Centers to impact communities far beyond the Center's immediate geographical reach. Should the model be successful, it could be scaled up to catalyze significant adoption of NSF-funded programs at numerous educational institutions. The value to NSF of such work is the continued life of projects after the end of the funding period. Similarly, content developers are provided a sustainable stream for their work through consulting and sub-grant revenue. And for content adopting institutions, the barriers are lessened.

Intellectual Merits – This proposed project is part of a wider movement to bridge the gap between the capacity building of the NSF ATE Centers and economic and workforce development professionals. If successful, it will show the value of economic modeling data in identifying communities of educational content demand. It will also further the research into assessing economic impacts of technician education, and how each region's industry and occupational mix might benefit from new STEM-based training and business development opportunities.

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For font size and page formatting specifications, see GPG section II.B.2.

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Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) **(Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**	6	
References Cited	1	
Biographical Sketches (Not to exceed 2 pages each)	6	
Budget (Plus up to 3 pages of budget justification)	7	
Current and Pending Support	0	
Facilities, Equipment and Other Resources	0	
Special Information/Supplementary Documentation	0	
Appendix (List below.) **(Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**		

Appendix Items:

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

Using Economic Data as a Catalyst for Sustainable Technological Education Program Dissemination in BioTech, Nanotech and IT
ATE Project Proposal – Targeted Technician Research Track
The Center for Economic and Workforce Development at CUNY Kingsborough
for a term of 36 months beginning April 2010

Background: The Problem

NSF confronts what the investigators term the Vegas syndrome: what novel program innovation happens within a funded project often ends with the project. Task-oriented budgets and a highly local focus often make widespread dissemination beyond the reach of most projects. ATE has wisely sought to address this problem through the creation of National Centers and ATE Central[1], both of which are hubs for sharing best practices. While these efforts have helped improve collaboration, three major limitations remain: (1) What is the incentive of a content producer to support their materials beyond the life of NSF funding?; (2) Do either the content developers or adopters have the expertise in getting faculty "buy-in" and training for new programs?; (3) How does an institutional content consumer justify and offset the expenses incurred in the adoption of new programs?

When moving from institutions to a broader community or regional context, these issues arise in two related forms: 1) how does a region determine its need for specific technician education programs based on economic forecasting?; and (2) how does it access these targeted programs?)

From an economic and workforce perspective, education can be understood as the cultivation of skills, trades, or professions. In today's competitive, global economy, skills and training are the fuel that drives successful regional economies.[2] As a result, educational institutions should have a working knowledge of local, regional, and national labor markets, business trends, and industry needs so that they can be cultivating the right skills, trades, and professions in their communities. This will ultimately drive business growth, entrepreneurial development, and help diversify local economies. In particular, training providers need to better understand the composition and strength of local industry clusters. Regions with strong and growing clusters tend to be more prosperous and more resilient in the face of our current global economic downturn. Armed with the right data, career-oriented schools and centers can understand, on a region-by-region basis, which clusters can be realistically pursued – based on the current mix of industries, occupations, demographics, and the overall economic base. Such efforts in turn will help to ensure that programs are meeting the demands of the ever-changing economy and are placing students in occupations that drive this cluster forward.[3]

This project proposes to accomplish this by linking the **Capacity Building** of the ATE Centers with economic and workforce development **demand.** It seeks to use the bridge of education as means to help train and prepare a qualified workforce with skills needed by local and regional employers. This task is especially urgent because of our current economic situation; large

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[1] Advanced Technology Education. (2008)."ATE Central" http://www.atecentral.net. Retrieved on 4/01/09.
[2] Economic Modeling Specialists, Inc. "Are Your Programs Demand-Driven?" http://www.economicmodeling.com/solutions/education.php. (EMSI is a partner on this project.)
[3] Economic Modeling Specialists, Inc. "Regional Industry Focus Report 2007-2012." Region of study is the Kingsborough service area; report includes overview, focus occupations and training programs. EMSI.

numbers of people find themselves unemployed, underemployed, or largely dissatisfied with their opportunities. As a result, much should be done to develop the right approach to career and technical education on a local/regional/national basis. ATE Centers tend to be located at sites with relevant faculty expertise. This expertise is often, but not always, located near strong industry clusters or some type of centers of excellence. New research and innovation may be transferred to these local partners, but it rarely disseminates more widely. From an economic development standpoint, the work of various ATE Centers could and should impact communities far beyond the Center's immediate geographical reach. Identifying these other communities has to do with understanding other local economies and assessing how each region's industry and occupational mix might benefit from these new STEM-based training and business development opportunities.

Program Description

The Investigators propose a project in Sustainable Dissemination, which seeks to connect content developers and adopters, providing research on the short- and long-term economic impacts of programs to help assist program managers as they seek funding from industry partners or economic and workforce development offices at the local, state and Federal levels. This project is proposed in ATE's third track: Targeted Research in Technician Education.

A summary of the process is as follows:
1. Evaluate and report on the economic impacts of existing projects in BioTech, Nanotech and IT.
2. Create an "economic dashboard" site to allow for the identification of workforce opportunities nationwide.
3. Match the impact found in step 1 to those opportunities found in step 2.
4. Identify and partner with Community Colleges where regional impact could be made by adopting an existing ATE curriculum/program to fill a gap in current degree/program offerings.
5. Liaise between content developer (the ATE Center) and the Community College for customization and adoption of the content.
6. Encourage and support collaborative resource seeking (for the content developer and adopters) from educational and workforce grantors.

The program has two facets, focusing on both content developers and content adopters. The first part of project helps colleges track and communicate their impacts so they can sell training to outside funders, especially economic developers. The second part is a market identification function, helping content adopting colleges identify new areas for training as well as funding streams for it.

The *first facet* of the project is modeled after the NSF EvaluATE center, which sustains itself by providing crucial educational-outcomes evaluation consulting to ATE Centers and Projects. Our project seeks not to replicate their work, but instead extends the evaluation process of ATE project outcomes to also include outcomes that are economic. Current ATE evaluations assess immediate program outcomes on students and institutions; our proposal seeks to supplement these evaluations with a look at the wider economic impacts of program interventions. In other words, how do programs relate to the regional economic environment?

The core of this program facet would be the production of standardized reports that tag each project with how it affects workers and the local economy, including:

- Skill-set imparted by the program.
- Types of jobs to which the skills are applicable.
- Existing and emerging industries and clusters that utilize the skills and jobs for which the program trains.
- Average and estimated salary and dollar contribution of these existing and emerging industries to local economies.
- Potential for synergistic industry growth.

Economic development professionals frequently used this type of research when conducting analyses tied to industry cluster development or site selection. This data is critical for many investment decisions. Yet, at present, economic developers lack tools that would permit a similar assessment of technology training programs. These new reporting tools can help fill that void. By providing a targeted, adopter-friendly means to communicate program outcomes and impacts, the reports will help community colleges make a stronger case to program partners.

In addition to support for communicating program outcomes and impacts, community colleges also need tools to help identify future market needs. Community colleges lack the resources of large universities, so researching future market trends often poses a major resource challenge. Thus, the *second facet* of the project addresses the research needs of the content adopter. The project will provide a complete adoption plan for consumer institutions for short-term workforce (re)-training programs and long-term economic development through degree programs. Such a plan includes:

- Research on the regional economy, identifying growing clusters and other local competitive assets and gaps. This data will help depict how new programs would positively affect the local economy over the desired time-frame.
- Advice on potential funding sources, including NSF, US/State Departments of Labor, and private philanthropic and industry funders.
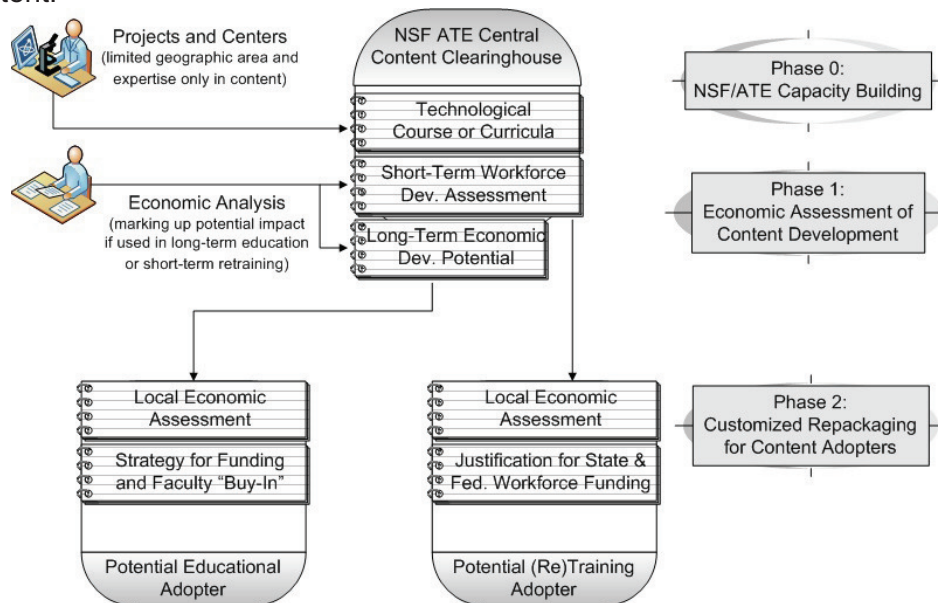- Suggestions for how to engage faculty on campus in the adoption and ownership of content.

Figure 1: Process flow for the sustainable dissemination of technological education content.

The project would provide an economic dashboard for both community colleges and their customers. We would ultimately seek to develop a user friendly website and database where training providers could generate their own dashboards that assess local economic conditions and potential program impacts. Examples of similar tools include the Economic Development Administration-funded Rural Clusters database[4] and the Lowe Foundation's YourEconomy website[5]. (Figure 1 summarizes the process. See the "Evaluation Framework" section for more details on dashboard content.)

This proposed project is part of a wider movement to bridge the gap between the capacity building of the NSF ATE Centers and economic and workforce development professionals. On a grand scale, the goal would be to cause significant adoption of NSF-funded programs at numerous educational institutions. The value to NSF of such work is the continued life of projects after the end of the funding period. Similarly, content developers are provided a sustainable stream for their work through consulting and sub-grant revenue. And for content adopting institutions, the barriers are lessened.

However for the scope of this project, the Investigators will concentrate specifically on three areas: BioTechnology, Nanotechnology, and Information Technology. We will work with three ATE Centers linking their resources to three geographic areas not being served by these ATE Centers. The project will draw from content already fully developed and submitted by these centers to ATE Central by other investigators' ATE-funded projects. Over the three year funding period, we seek to develop a standardized reporting format and studies of 18 curricula.

The geographic areas to connect the Centers with will be selected by a determination of near-term growth and development as measured by a forecasting tool that combines qualitative and quantitative data that indicate growth in the above named technology areas. The project will serve as a bridge between the ATE Centers, Colleges and Universities and the Economic and Workforce Development communities in each area served. Over the funding period, we will work with a minimum of three institutions new to the content adoption process.

Further, the Investigators will study the feasibility of operating such a process as a National Center charged with servicing all ATE-supported disciplines.

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[4] Unlocking Rural Competitiveness: The Role of Regional Clusters. "Rural Clusters Database". Web site: http://www.ibrc.indiana.edu/innovation/data.html
[5] Your Economy.org. "YourEconomy" .Web site: http://www.youreconomy.org

The Evaluation Framework: A Data-Driven Approach to Link ATE Centers, Education Programs and Community Economic Development

In the current turbulent economy, with historic labor market data having largely lost its predictive force, we propose the development of a combination of predictive and labor market data components that will help inform the choices made by regions to implement on a fast-track basis the education and programming already developed by the ATE Centers to serve the economic development needs of those communities that may be unacquainted with the resources presented by the ATE Centers.(this first sentence is a little long, but makes the point) In today's tight budget environments, education and training programs will need rock-solid data on how their programs work, how they fit with local economic assets and gaps, and how they provide a significant return on investment in both the short and long term. This project will provide sustainable support for the ATE Centers while they, in turn, support the development of an educated and skilled workforce.

The economic crisis and stimulus package have brought about a renewed interest in fiscal impact modeling, input/output, and economic impact modeling in its various forms and permutations. In addition, the relatively new art of looking at economic and workforce characteristics is generating some of the new resources that make this project possible. Many data tools now exist that will allow practitioners to understand these issues and generate key information that can be used to derive information – on the front-end – to develop the best decisions.

An effective evaluation framework should include several key components via the deliverables of this project:

1. Transparency and Accountability
Desired program outcomes and metrics that clearly assess progress toward outcomes, must be clearly understood by all key stakeholders. Progress must be tracked on a regular and systemic basis, so that mid-course corrections can, if necessary, be made in a timely manner.

2. Consistency and Comparability
Projects need to be assessed using similar criteria and measurements so that "apples to apples", inter-project comparisons can be made. Our reporting tools will use similar metrics so that stakeholders can assess programs across geographies, target populations and target industry clusters.

3. Comprehensiveness and Validity
Affecting regional economic and workforce trends is a complicated process that cannot be achieved by a single program intervention or assessed by utilizing a single performance measure. A diverse set of metrics is needed. Our assessment tools will combine both qualitative and quantitative measures to provide a more complete picture of the program's wider community impact.

Having access to and providing solid analysis on a step-by-step basis is a key to program success as is the coupling of the ATE Centers, Educational Institutions and the Economic and Workforce Development sectors.

Management and Partners

The lead institution on the project is the **Center for Economic and Workforce Development** (CEWD) at CUNY's Kingsborough Community College. The PI of this grant is the Executive director of the Center. CEWD will manage the operation of the project and the various consultants needed to complete the goals of the work. CEWD will also employ the academic content specialists: Edgar Troudt (co-PI), serves as IT-area expert, has experience in training faculty in STEM-based pedagogies, and has in-depth knowledge of grants development in STEM-fields. Two other faculty-associates in BioTech and Nanotech will be given release time for their content expertise. CEWD will employ a project manager for day-to-day coordination of the work.

CEWD was launched as a Presidential Initiative in 2006, generating nearly $8 million in grants and contracts and 300 FTE's ($600,000). The Center develops programs which provide access to academic fulfillment, develop career pathways and build career opportunities that would lead to higher wage and higher-skill jobs. The Center will commit its extensive framework of training and counseling, career-resources and curriculum toward achieving your outlined goals.

The **CUNY Institute for Virtual Enterprise** (IVE), based at CUNY's Kingsborough Community College, is a University-wide Institute that specializes in the development and administration of both academic and non-credit programs that provide students with the soft- and leadership-skills that are crucial to the workforce. It operates programs that reach each of the 23 CUNY campuses, and works collaboratively with higher-education institutions across the United States and the world. IVE will provide its network of regional academic partners both to assist in the economic assessments and as an avenue of dissemination. Dr. Jonathan Deutsch, an expert in workforce matters, has pledged support on behalf of IVE. Christoph Winkler, IVE's associate director (and co-PI), echoes the similar experience in conducting training as Troudt, and also has connections with a national network of Community Colleges through the Virtual Enterprise network he manages.

Entreworks, Inc. – Erik R. Pages, Ph.D., and his team will provide program measurement and assessment. Dr. Pages previously served as Policy Director for the National Commission on Entrepreneurship and he directed the Commission's research and policy operations. Dr. Pages also held senior positions at the U.S. Department of Commerce's Economic Development Admisnistration (EDA) and was an official advisor to to the 1995 White House Conference on Small Business. He is a Senior Fellow at the Center for Regional Competitiveness. He received his Ph.D. from Georgetown University. Dr. Pages has pledged his support.

EMSI, Inc.— Henry Robinson, Ph.D., Economics and Kjell Christopherson, Ph.D., Economics are principals of EMSI, the foremost provider of socioeconomic impact studies to technical and community colleges throughout the United States. EMSI specialties include integrated data collection and analysis and economic Modeling. EMSI will provide economic modeling expertise for the project.

Grant Associates, Inc. – Dale Grant, President is a Fellow of the Society of Actuaries, a member of the Academy of Actuaries and a former Chairperson of the ERISA Advisor Council Grant Associates provides human capital development through various workforce and economic development projects including the management of two 1 Stop Centers and a Workforce Solutions Center in New York City. Ms. Grant will provide expertise in reaching the Federal and regional workforce support systems.

References

Advanced Technology Education. (2008)."ATE Central" http://atecentral.net/. Retrieved on 4/01/09

Economic Modeling Specialists, Inc. "Regional Industry Focus Report 2007-2012." Region of study is the Kingsborough service area; report includes overview, focus occupations and training programs. EMSI.

Unlocking Rural Competitiveness: The Role of Regional Clusters. "Rural Clusters Database". Web site: http://www.ibrc.indiana.edu/innovation/data.html

Your Economy.org. "YourEconomy". Web site: http://www.youreconomy.org

Stuart A. Schulman, Ed.D.

(a) Professional Preparation

The City College of New York	Accounting	BBA (1962)
New York University	International Marketing and Management	MBA (1970)
The George Washington University	Higher Education	Ed.D. (1988)

(b) Appointments

Executive Director, Center for Economic and Workforce Development, Kingsborough Community College, 2006 – Present.

Executive Director, Institute for Virtual Enterprise, City University of New York, 2002 – Present.

Professor and Former Chair, Department of Tourism and Hospitality, Kingsborough Community College, CUNY, 1982 – Present. (promoted from adjunct, assistant and associate)

Executive Director, Tourism Research Center, Kingsborough Community College, 1982 – Present.

Executive Director, Institutional Development & Enrollment Management, Kingsborough Community College, CUNY.

Associate Director, Bethesda Campus for Graduate Studies, The George Washington University, 1983 – 1999.

Adjunct Professor, Education. Graduate School of Education and Human Development and Human Kinetics and Leisure Studies (HKLS) Tourism and Hospitality, The George Washington University, 1983 – 1999.

Adjunct Professor of Marketing and Management, Institut Superieur De Gestion, 1989 – 1992.

Director of Travel and Tourism Continuing Education Programs, Queens College of the City University of New York, 1979 – 1983.

President, Celebros Associates, 1978 – Present.

President, Schulman/Competielle, Inc, 1984 – 1993.

President, Enculturation, Inc., 1973 – 1978.

President, Cahners Travel Group, 1969 – 1973.

Executive Vice President and Treasurer, Colonial Penn Group, Inc., 1963 - 1969

(c) Publications

Related to Proposal:

"The Internet & Travel in Tourism Education", The Haworth Hospitality Press, 2002

"The Virtual Enterprise: Using Internet Based Technology to Create a New Educational Paradigm for the Tourism and Hospitality Industry," Journal of Teaching in Travel & Tourism Vol 1, numbers 2/3, 2001

"National Hospitality Curriculum," National Academy Foundation, CTB/McGraw-Hill, 1998. "A Review of the Literature on Tourism Education," Community College Review, Vol. 21, No. 4, Spring 1994.

"Community College Tourism Education: A Study of institutional Linkages," Community College Review, Vol. 22, No. 2, Fall, 1994.

Other Publications:

"The Emergence of Travel and Tourism Education," The Journal of Tourism Studies, Vol. 13, 1991.

"Perspectives on Travel and Tourism Education, Part I - III," International CHRIE: The Hospitality and Tourism Educator, May 1993, August 1993, November 1993.

"Ecotourism and Tourism Education," International Ecotourism Journal, Winter 1994.

"Transportation: How Do You Get From Here to There? A Curriculum Model," Society of Travel and Tourism Educators Journal, November, 1994.

"Data-Base Marketing," Travel Weekly, November 3, 1994.

(d) Synergistic Activities

PI, "Enhancing Soft and Entrepreneurial Skills Training for Two-Year College Technicians Using a Contextualized Business Simulation Program", NSF ATE DUE- 0802365, $749,217.00, 8/2008 – 7/2011.

PI, "Project Welcome", President's Community-Based Job Training Grants [http://www.dol.gov/opa/media/press/eta/eta20062030.htm], United States Department of Labor, 2007.

PI, "Virtual Technology Information Enterprises (VEIT): An Integrated Vehicle for Technology Education Reform", NSF ATE DUE-0501711, $149,990.00, 9/2005 – 8/2007.

CUNY Distinguished Technology Fellow

Co-PI, Virtual Enterprise: A Mechanism for Entrepreneurship across the Curriculum at Kingsborough Community College, CUNY, Coleman Foundation and United States Association for Small Business and Entrepreneurship

Participant, Cluster-Based Entrepreneurship Alliance, Ford Foundation/US Department of Education

Co-PI, Virtual Enterprise: A Model for Entrepreneurship and Life, Ewing Marion Kauffman Foundation of Kansas City, Kauffman Collegiate Entrepreneurship Network

Sub-Contractor, Learning through Simulated Information Technology Enterprises, ATE, National Science Foundation

(e) Collaborators & Other Affiliations
- **Collaborators and Co-Editors:** Anthony Borgese (Kingsborough); Jonathan Deutsch (Kingsborough); Richard Graziano (Kingsborough)

Edgar Troudt, M.Phil, MA

(a) Professional Preparation

CUNY Queens College	Computer Science	BA (2001)
CUNY Queens College	CCNA Instructor Training	(2001)
Regional Cisco Academy		
CUNY Brooklyn College	Computer Info. Systems	MA (2005)
The Graduate Center,	Computer Science	M.Phil (2009)
City University of New York		
The Graduate Center,	Computer Science	PhD Candidate
City University of New York		(9/2003-present)

(b) Appointments

Instructor of Virtual Enterprise, Department of Tourism and Hospitality, 9/2005.

Substitute Lecturer, Cross Appointment in Departments of Mathematics, Computer Science & Computer Information Systems and Tourism & Hospitality, 9/2004-2005.

Adjunct Lecturer, Department of Mathematics, Computer Science & Computer Information Systems, Kingsborough Community College, City University of New York, 2004

Adjunct Lecturer, Department of Economics, Queens College, City University of New York, 2003

Adjunct Lecturer, Department of Tourism & Hospitality, Kingsborough Community College, City University of New York, 2003

Technology Coordinator and Fellow, Institute for Virtual Enterprise, City University of New York, September 2003-present

Adjunct Lecturer, Honors Business & Liberal Arts Program, Queens College, City University of New York, 2002-2004

Substitute Lecturer, Department of Computer Science, Queens College, City University of New York, 2002-2003

Instructor, After-school Computer Literacy Program, Pomonok Community Center, New York City Housing Authority, 2001-2002

Adjunct Lecturer, Department of Computer Science, Queens College, City University of New York, 2001-2004

Technology Coordinator, Business and Liberal Arts Program, Queens College, City University of New York, 1998-2001

(c) Publications

Software Related to Proposal:

E. Troudt, C. Winkler, C. Hunt-Walker; CyberHotel (online training simulation environment for hospitality workers) [in progress since 2007].

E. Troudt, C. Winkler, A. Sverdlov; The MarketMaker (integrated economic simulation for VE network) [http://www.ivefinancial.com, 2005].

Other Publications:

E. Troudt, D. Nixon, *Algorithmic Problem Solving*, Department of Computer Science, Queens College. Internal publication.

(d) Synergistic Activities

Co-PI, "Enhancing Soft and Entrepreneurial Skills Training for Two-Year College Technicians Using a Contextualized Business Simulation Program", NSF ATE DUE- 0802365, $749,217.00, 8/2008 – 7/2011.

Faculty Associate, "Project Welcome", President's Community-Based Job Training Grants [http://www.dol.gov/opa/media/press/eta/eta20062030.htm], United States Department of Labor, 2007.

Project Manager, "Virtual Technology Information Enterprises (VEIT): An Integrated Vehicle for Technology Education Reform", NSF ATE DUE-0501711, $149,990.00, 9/2005 – 8/2007.

Presenter: Entrepreneurial, Soft, IT, and the Shared Core Skills for Technicians; Fourteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/29-31/2008).

Presenter: Robust Online Tools for Supporting Learning; Connecting Students and Dissemination; Fourteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/29-31/2008).

Coordinator and Presenter, with C. Winkler, J. Deutsch, A. Borgese, *The Marketmaker: Financial Literacy through a Global Technology Network*, 2nd Annual CUNY IT Conference, City University of New York

Developed proficiency examination for Computer Science majors, Department of Computer Science, Queens College, City University of New York, 2002

Course Coordinator, *Algorithmic Problem Solving*, Department of Computer Science, Queens College, City University of New York, 2002-2003

Research Mentor for Farah Nasir, *Online Registration Systems: Serving the eStudent*, Louis Stokes Alliance for Minority Participation, 7th Annual DOE EPSCOR Conference (3rd Place), 2004

(e) Collaborators & Other Affiliations
- **Collaborators:** Anthony Borgese (Kingsborough); Jonathan Deutsch, (Kingsborough); Simina Fluture (Queens College); Christopher Hunt-Walker (DesignAttic); Stuart Schulman (Kingsborough); Alex Sverdlov (The CUNY Graduate Center); Christoph Winkler (Institute for Virtual Enterprise).

- **Thesis Advisor:** Dr. Danny Kopec, Brooklyn College (areas of study: Artificial Intelligence, Knowledge Representation and Educational Simulation Design)

Christoph Winkler, Mag. rer. soc. oec.

(a) Professional Preparation

Johannes Kepler University   Business Pedagogy   Magister (2003)

The Graduate School,   Educational Psychology   Ph.D. Candidate
   City University of New York   (2005-present)

(b) Appointments

Associate Director and Manager, CUNY Institute for Virtual Enterprise (IVE),
   Kingsborough Community College, The City University of New York, 02/2007-
   present.

Adjunct Lecturer, Department of Tourism & Hospitality, Kingsborough Community
   College, The City University of New York, 09/2003-08/2004 & 02/2007-present.

Adjunct Lecturer, Business and Liberal Arts Program (BALA), Queens College, The City
   University of New York, 2004-present.

Associate and Curriculum Director, CUNY Institute for Virtual Enterprise (IVE),
   Kingsborough Community College, The City University of New York, since
   09/2003-02/2007

Full-time Substitute Lecturer, Department of Tourism & Hospitality, Kingsborough
   Community College, The City University of New York, 09/2004-02/2007

Academic Program and Project Developer for the CUNY Institute for Software Design
   and Development (CISDD), The City University of New York, 2003

(c) Publications

Related to Proposed Work:

Borgese, A. & Deutsch, J. & Winkler, C. (2004). A Multifaceted Approach To Leadership
   Education: CUNY's Institute for Virtual Enterprise. Journal of Leadership
   Education, 3(3), 38-43.

Winkler, C. (2003). The Leadership Institute of The CUNY Institute for Virtual Enterprise
   – A Successful Way of Teaching CUNY Students Leadership Skills?, Linz: N/A.

Software Publications:

E. Troudt, C. Winkler, C. Hunt-Walker; CyberHotel (online training simulation
   environment for hospitality workers) [in progress since 2007].

E. Troudt, C. Winkler, A. Sverdlov; The MarketMaker (integrated economic simulation
   for VE network) [http://www.ivefinancial.com, 2005].

(d) Synergistic Activities

Project Manager, "Enhancing Soft and Entrepreneurial Skills Training for Two-Year
   College Technicians Using a Contextualized Business Simulation Program", NSF
   ATE DUE- 0802365, $749,217.00, 8/2008 – 7/2011.

Principal Investigator, "Measuring self-regulation in computer-based inquiry learning
   environments." PSC-CUNY Award # 61295-00 39, $3790.00, 7/2008.

Faculty Associate, "Project Welcome", President's Community-Based Job Training Grants [http://www.dol.gov/opa/media/press/eta/eta20062030.htm], United States Department of Labor, 2007.

Faculty Associate, "Virtual Technology Information Enterprises (VEIT): An Integrated Vehicle for Technology Education Reform", NSF ATE DUE-0501711, $149,990.00, 9/2005

Presenter: Entrepreneurial, Soft, IT, and the Shared Core Skills for Technicians; Fourteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/29-31/2008).

Presenter: Robust Online Tools for Supporting Learning; Connecting Students and Dissemination; Fourteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/29-31/2008).

Presenter: The CUNY/IVE Leadership Program – Building the Future: Finding Your Inner Leader: An "Aha!" Conference, Brooklyn, NY (06/20/2008).

Keynote Presenter, Impulse für das curriculare Verständnis einer modernen Entrepreneurship Erziehung and berufsbildenden Schulen: Entrepreneurial Spirit 2008, Linz, Austria (03/11-12/2008).

Presenter, Bringing Learning to the Communities: KCC & CEWD, 2008 World Congress and International Association of Community Colleges, New York, NY. (02/18-20/2008)

Presenter, Virtual Technology Information Enterprises (ve^it): An Integrated Vehicle for Technology Education Reform, Thirteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/17-19/2007)

Presenter, Virtual Technology Information Enterprises (ve^it): An Integrated Vehicle for Technology Education Reform, Thirteenth National ATE Principal Investigators Conference (National Science Foundation), Washington D.C. (10/18-20/2006)

(e) Collaborators & Other Affiliations
Collaborators: Dr. Anthony Borgese, Kingsborough; Dr. Jonathan Deutsch, Kingsborough; Dr. Elisabeth Riebenbauer, University Graz, Austria; Dr. Stuart Schulman, Kingsborough; Edgar Troudt, Kingsborough.

Affiliations: Student Affiliate, American Psychology Association

Ph.D. Program Faculty Advisor: Dr. Barry J. Zimmerman, The Graduate School and University Center, The City University of New York.