GENERAL EDUCATION: A WHITE PAPER FOR THE RIT COMMUNITY

COLLEGE OF LIBERAL ARTS, COLLEGE OF SCIENCE & NATIONAL TECHNICAL INSTITUTE FOR THE DEAF

PHASE I: GENERAL EDUCATION LEARNING OUTCOMES & ASSESSMENT

PREFACE

Statement of Project Purpose: The New York State Education Department "general philosophical statement" describes the liberal arts and sciences (general education) as a set of educational experiences "that are either of a general and/or theoretical nature that are designed to develop judgment and understanding about [our] relationship to the social, cultural, and natural facets of [the] total environment." Rochester Institute of Technology fully subscribes to both the spirit and practice of this definition. RIT further believes, consistent with the historically expressed institutional agenda of preparing graduates

> **"… for the making of a living and the living of a life, not as two processes, but as one …"**
> **(G. W. Hoke, *Blazing New Trails,* 1937)**

that, although general education has its primary focus on the "living of a life" and that the professional program core is directed principally toward the "making of a living," the "not as two processes, but as one" is to be reflected not only in life after graduation, but also in the RIT educational experience. Specifically, the Learning Outcomes proposed herein have been designed to accommodate an RIT general education experience consistent with, complementary to, and supportive of the values deeply embedded within students' professional fields of study and with their interests and expectations.

RIT undergraduate education would thereby be characterized as a single integrated and coherent whole rather than as two (or more) discrete, disconnected, and discontinuous elements. Such a seamless melding of the general education and professional core curricula will thereby constitute a highly distinctive characteristic of the RIT educational experience. While an RIT General Education Curriculum based on the General Education Learning Outcomes presented in this White Paper would conform to the New York State Education Department definition of the "liberal arts and sciences," much of the corresponding knowledge and many of the skills are also embedded deeply within the principal field of study. Therefore, achievement of these Learning Outcomes as well as documentation through associated assessment tools will be derivable from student learning across their entire curriculum.

The present White Paper, which is in response to the first phase of a charge from Provost Stanley D. McKenzie directed toward a comprehensive study of general education at RIT, is presented to the faculty for review, comment, enhancement, and improvement

prior to its submission to Provost McKenzie and to initiation of the second phase of the study.

Statement of Project Genesis & Process: In late 2004, Provost Stanley McKenzie initiated a process designed to determine the desirability of a comprehensive review of General Education at RIT as a consequence of at least the following factors:

1. the collection of RIT undergraduate programs continues to change significantly (new programs added and existing programs improved and updated),

2. the profile of the RIT undergraduate student has changed dramatically over the recent past, and

3. the Institute has recently developed, approved, and begun implementation of the new 10-year strategic plan (***Category of One University: Uniquely Blending Academic Programs with Experiential Learning for Students' Success***).

Provost McKenzie described a two-phase project in which the first of the two phases would occur:

> "… on a very high philosophical plane responding to the question, 'What general education experience does a technical professional (or a professional within a technology field) need to be considered a competent and well-educated citizen of the world?' In England 150 years ago, the question was phrased as, 'What should the outcomes of an Oxford (or Cambridge) education be for a young gentleman?' and the answer was, 'How to recognize rot.' For RIT in the 21st Century, the answer will be much more complex and will encompass the humanities, social sciences, natural sciences, and mathematics. [This first phase would be carried out] largely on that philosophical level to articulate the desired educational outcomes."

The second phase would be "to hammer out a General Education mask of 90 credits that would meet [all accreditation] requirements (and in a truncated 45 credit version for the BFA programs) that achieved the educational outcomes with plenty of choice and self-determination for the students." The present White Paper has been prepared and is submitted in response to the first phase of Provost McKenzie's charge.

In October of 2005, pursuant to extensive discussion with faculty, deans, and other academic administrators (associate deans, assistant deans, department heads/chairs), the Executive Committee and the full Academic Senate, the faculty study team (listed below) was selected by the respective deans, from the three RIT academic colleges principally responsible for the delivery of the General Education Curriculum (College of Liberal Arts, College of Science, and the National Technical Institute for the Deaf) and commissioned by the Provost.

- Marianne Gustafson, Department of Communication Studies and Services, National Technical Institute for the Deaf; email: msgncs@rit.edu (2007 – present)

- Anne Coon, Senior Associate Dean, College of Liberal Arts; email: accgll@rit.edu (2007 – 2008)

- Lisa Hermsen, Department of English, College of Liberal Arts; email: lmhgsl@rit.edu (2005 – present)

- Ron Jodoin, Department of Physics, College of Science; email: rejsps@rit.edu (2005 – present)

- Joel Kastner, Chester F. Carlson Center for Imaging Science, College of Science; email: jhkpci@cis.rit.edu (2005 – present)

- Marilu Raman, Department of Science & Mathematics, National Technical Institute for the Deaf; email: mlrntm@rit.edu (2005 – 2006)

- Pat Scanlon, Department of Communication, College of Liberal Arts; email: pmsgsl@rit.edu (2005 – 2006)

- Katie Schmitz, Department of Liberal Studies, National Technical Institute for the Deaf; email: kls4344@rit.edu (2005 – present)

- J. Matt Searls, Department of Cultural & Creative Studies, National Technical Institute for the Deaf; email: jmsdhd@rit.edu (2005 – present)

- Sean Sutton, Department of Political Science, College of Liberal Arts; email: sdsgsm@rit.edu (2005 – present)

- Kristen Waterstram-Rich, Department of Medical Sciences, College of Science; email: kmw4088@rit.edu (2005 – present)

- Bob Clark, Professor of Chemistry Emeritus & Dean Emeritus, College of Science (Project Facilitator); email: racsse@cis.rit.edu (2005 – present)

The Team has produced the present White Paper, which consists of:

- A set of **Learning Outcomes** describing the knowledge base and skill set expectations of the RIT General Education Curriculum and

- Examples of associated outcomes assessment strategies and tools which are consistent with and support

1. **Disciplinary Collaboration** (liberal arts & liberal sciences, deaf studies, and all RIT professional degree programs)

2. **the RIT Institutional Framework** (*"Category of One University: Uniquely Blending Academic Programs with Experiential Learning for Student Success"*),

3. **Curricular Relevance** to students and their professional programs, and

4. **Regulatory Conformity** with the New York State Education Department and external/professional accrediting agencies.

LEARNING OUTCOMES & ASSESSMENT

Learning Outcomes and Assessment: General Considerations. The Faculty General Education Team developed five Learning Outcomes and examples of assessment tools in response to two questions:

- "What are the knowledge base and skill set expectations of the RIT General Education Curriculum?"

- "How will we know whether the students acquire that knowledge and those skills?"

The Team's working definition of a learning outcome is "what a student knows and/or is able to do as a result of an educational experience."

No priority is implied or intended by the order/sequence in which the Learning Outcomes are presented.

The assessment tools developed by the Faculty General Education Team were designed to provide examples of independent—but complementary to the existing methodologies of course-by-course evaluation—measures of achievement through validation that both the student and the Curriculum had successfully met the objectives expressed in the Learning Outcomes. The choice and ordering of specific assessment tools will be determined in the implementation phase of this project.

All RIT students are required to successfully complete the total number of credit hours with the distribution(s) across the humanities and social sciences (liberal arts) and mathematics and natural sciences (liberal sciences) disciplines prescribed by Institute Policy for the RIT General Education Curriculum. Any set of General Education Learning Outcomes must be accurately reflective of the objectives of the Institute Curriculum and *vice versa.* A set of operational principles[1] reflective of the spirit and

[1] Adapted from **9 Principles of Good Practice for Assessing Student Learning**, The Center for Teaching, Learning and Assessment of Indiana University Kokomo; (*http//www.iuk.edu/%7Ekoctla/assessment/9principles.shtm*)

intent of the RIT Faculty General Education Team in their development of assessment tools is presented herein.

The assessment of student learning:

1. is a vehicle for educational improvement that begins with institutional educational values,

2. measures not only what students know, but what they can do with what they know as revealed by performance over time,

3. is most effective when it reflects learning as multidimensional and integrated,

4. entails comparing educational performance with educational purposes and expectations derived from institutional mission, faculty intention in curricular design and a knowledge of the student's own goals,

5. is most effective when the programs it seeks to improve have clear and explicitly stated purposes,

6. requires attention to outcomes, but equally to the experiences that lead to those outcomes,

7. is a process whose power is cumulative and therefore most effective when it is ongoing, not episodic,

8. is a campus-wide responsibility and fosters wider improvement when representatives from across the educational community are involved,

9. makes a difference when it illuminates questions that people really care about,

10. makes its greatest contribution when the information it provides about learning outcomes is seen as an integral part of decision making central to the institution's planning, budgeting, and personnel decisions, and

11. is a conduit through which educators meet responsibilities to students and to the public.

The five Learning Outcomes are designed to constitute a coherent set descriptive of a comprehensive RIT general education experience. The examples of assessment tools fall into two distinct categories: those designed to assess the work and measure the achievement of individual students, and those designed to validate the Curriculum as a whole by assessing the collective achievement of groups of students and/or graduates. In what follows, the relevant assessment tools are listed with each Learning Outcome and are correspondingly designated as an Individual Student Assessment or General Education Curriculum Assessment.

General Education Learning Outcomes and President Destler's Vision for RIT. President William Destler has charged us to "**Imagine an RIT**" in which all that we do is characterized by "**Creativity**", "**Innovation**" and "**Integration**" (**Figure 1)**.

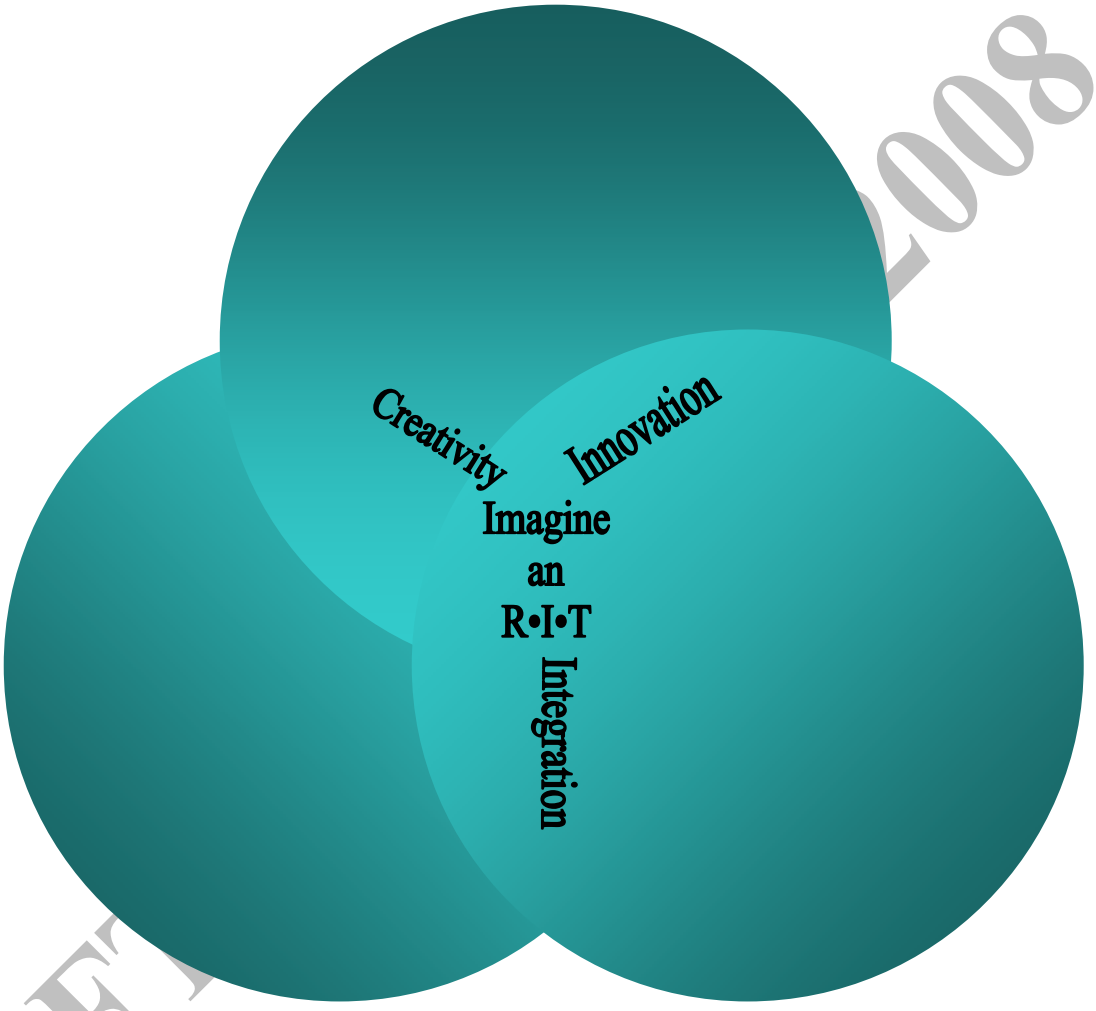

FIGURE 1. Imagine an RIT of Creativity, Innovation and Integration

General education at RIT is a major element of the educational experience for RIT undergraduate students (50 percent of the quarter credit hours for the bachelor of science degree and 25 percent for the bachelor of fine arts degree). The five General Education Learning Outcomes presented in this draft White Paper have been created as fertile arenas for the weaving of the principles of **Creativity, Innovation and Integration** into the fabric of the courses and projects in the liberal arts and sciences that will constitute a student's total general education experience at RIT (**Figure 2**).

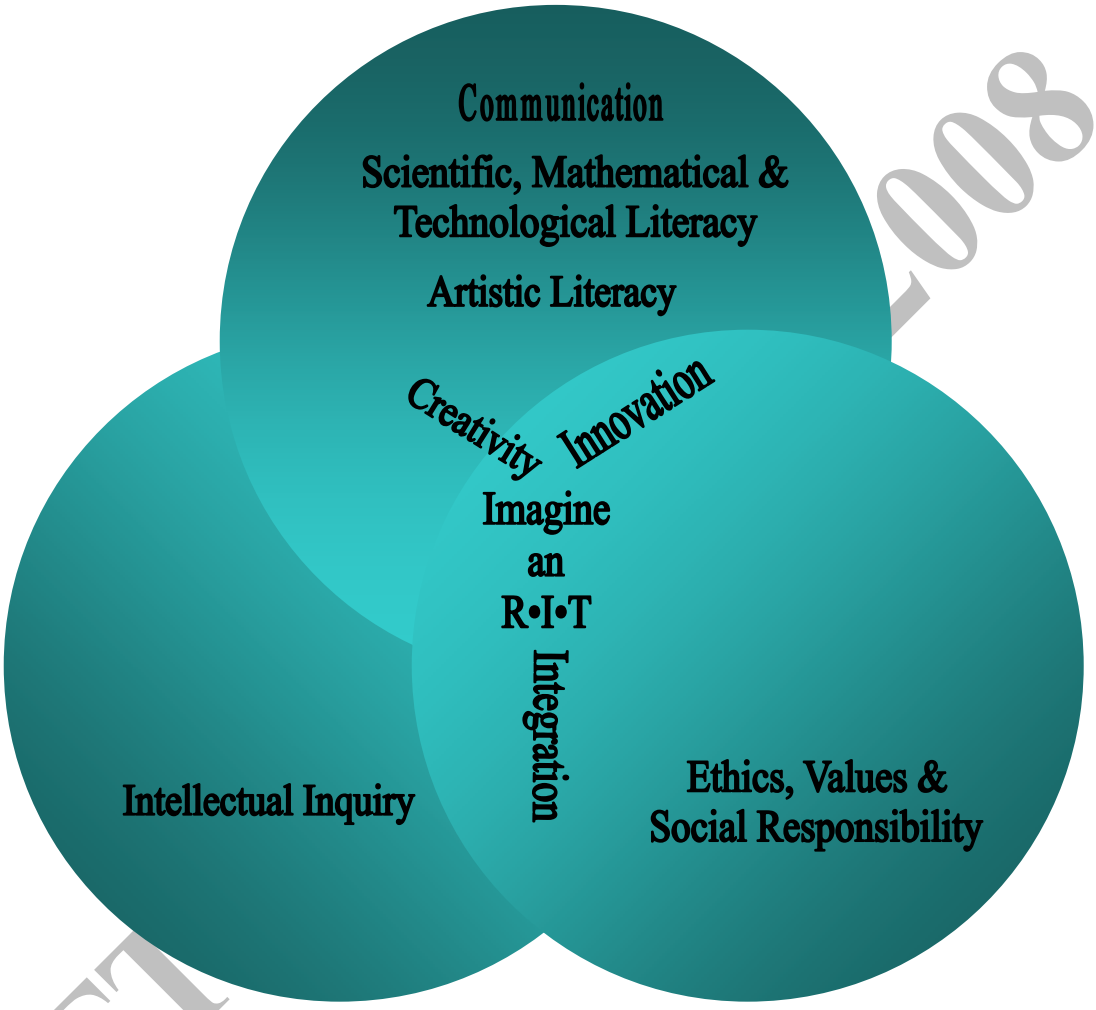

Figure 2. General Education Learning Outcomes and President Destler's Vision of an RIT Characterized by Creativity, Innovation and Integration.

RIT General Education: Learning Outcome and Assessment Tools. The following lists the five General Education Learning Outcomes developed by the Faculty General Education Team along with examples of relevant assessment tools. An RIT General Education Curriculum based on these outcomes would conform to the New York State Education Department definition of the "liberal arts and sciences." Yet, much of the corresponding knowledge and many of the skills are also embedded deeply within the principal field of study. Therefore, achievement of these Learning Outcomes, as well as documentation through the associated assessment tools, will be derivable from student learning across the entire curriculum.

For each of the five learning outcomes, potential examples of individual student assessment and general education curriculum assessment are given. A new position was created and a search for the Director of Student Learning Outcomes Assessment is presently in progress. This new Director will collaborate with faculty to create a more comprehensive strategy with reliable and verifiable measures for outcome assessment.

I. Communication: by the time of graduation from RIT, students will have demonstrated the ability to:

A. express themselves effectively both verbally and non-verbally
B. express themselves effectively in visual and multimedia modalities
C. express themselves effectively in written standard English
D. demonstrate comprehension of information accessed through reading, listening, and visual communication, according to standard English usage
E. use communication competencies to work effectively on collaborative group and team projects

Example of **Individual Student Assessment:**

- Entry in portfolio of written, oral, visual, and/or multimedia communication artifact that demonstrates expected competency levels.
-
- X% (*e.g.* 80%) of students will demonstrate competence in written, oral, visual, and/or multimedia communication on a paper or project as a part their General Education or professional program requirements.

Examples of **General Education Curriculum Assessment*:**

- x% (*e.g.*, 80%) of students will demonstrate competence in written communication on a selected assignment completed for the Writing Seminar course.

- Analyze the trends in the number of students who elect to take designated communication or writing courses, within general education, a concentration or minor, or as part of a professional program. (*E.g.*, do overall numbers increase? Are there proportionately more students in certain majors who elect the designated courses?)

* Numerical goals based on assessment of a statistically valid sample.

II. Intellectual Inquiry: by the time of graduation from RIT, students will have demonstrated the ability to

A. describe the essential knowledge and methods of mathematics, the physical and biological sciences, literature, history, philosophy, social sciences, and the arts

B. connect and integrate the knowledge, principles and methods of study and synthesis, analysis and innovation acquired in general education with their major field of study

C. acquire, assess, organize, interpret, analyze, synthesize, and apply qualitative and quantitative methodologies to construct and test hypotheses, theories, and theses

D. construct, analyze and evaluate logical and reasonable arguments, support them with relevant evidence, and anticipate counterarguments

E. creatively design and find innovative solutions for open-ended projects and problems, by collaborating with peers and working in teams across disciplines

Examples of **Individual Student Assessment:**

- Evidence in portfolio of completing an integrative project that demonstrates expected creative problem-solving competency levels.

- Evidence in portfolio of project(s) replicating qualitative and/or quantitative research methods by applying appropriate epistemological models of reasoning appropriate to disciplinary fields.

Examples of **General Education Curriculum Assessment*:**

- x% (e.g., 80%) of students will demonstrate competence in creative problem solving on a collaborative integrative project in a required culminating educational experience/course.

- Identify the courses in the general education curriculum and professional programs that require classification, integration and application of knowledge.

* Numerical goals based on assessment of a statistically valid sample.

III. Ethics, Values & Social Responsibility: by the time of graduation from RIT, students will have demonstrated the ability to:

- **A.** identify and describe ethical and social issues and conflicts embedded in political, economic, environmental/ecological and scientific/technological situations in local, national and global contexts
- **B.** describe the history, principles, and purposes of American government and society, including its place in the global community
- **C.** assess the strengths and limitations of American society and its economy, with regard to the diversity issues of equality, race, gender, and class
- **D.** summarize the significant similarities and differences found when religions, political systems, educational systems, economic systems, and cultural mores from around the world are compared
- **E.** participate in civic activities that demonstrate the taking on of the responsibilities of democratic citizenship on campus and in the local community as well as in the wider community
- **F.** apply the principles of ethical deliberation in personal and professional settings

Examples of **Individual Student Assessment:**

- Evidence in portfolio of reflection on personal involvement in student government, in the political community, in civic/community service projects, in community-based learning projects, and/or in service activities that promote cultural or international awareness.

Examples of **General Education Curriculum Assessment*:**

- x% (*e.g.*, 80%) of students will demonstrate competence in awareness and knowledge of issues relevant to the global community on assignments in liberal arts courses, for example, Humanities and Social Sciences.

- x% (*e.g.*, 80%) of students will demonstrate competence in ethical deliberation on papers or projects from courses in both the General Education Curriculum and the students' professional core.

* Numerical goals based on assessment of a statistically valid sample.

IV. Scientific, Mathematical & Technological Literacy: by the time of graduation from RIT, students will have demonstrated the ability to:

- **A.** describe the basic concepts, principles and elements of the physical, natural, life, medical, environmental, and social sciences
- **B.** describe and apply the methodologies used to identify and solve scientific problems, including innovation and serendipitous discovery; detect flaws in scientific and nonscientific arguments; recognize and be aware of controversies between the scientific and nonscientific approaches; and distinguish science from "pseudo-science"
- **C.** apply the methods of mathematics, such as basic algebraic, geometric and statistical concepts and scientific notation in personal, societal and environmental situations
- **D.** demonstrate mathematical and scientific competency/fluency at a level commensurate with the foundational requirements of their professional degree program
- **E.** use contemporary information technologies for communication, research, and in innovation and problem-solving in both personal and professional settings
- **F.** assess the impact of science and technology on society and the environment

Examples of **Individual Student Assessment:**

- Evidence in portfolio of participation in laboratory experiences that involve written reports and evaluation of experimental designs and results.

- Evidence in portfolio of written analyses of contemporary debates in scientific research, including appropriate citations to relevant contemporary and historical scientific literature.

- Documentation in portfolio of projects that study the promises and problems technology presents to society, including its ecological impact.

Examples of **General Education Curriculum Assessment*:**

- x% (*e.g.*, 80%) of students will demonstrate competence in modeling scientific methods on required laboratory reports in general education science courses.

- x% (*e.g.*, 80%) of students demonstrate competence on required course projects that use mathematical and statistical concepts.

* Numerical goals based on assessment of a statistically valid sample.

V. Artistic Literacy: by the time of graduation from RIT, students will have been exposed to several different forms of creative expression and innovative practice and will have demonstrated the ability to:

A. interpret, evaluate, and appreciate artistic expression in a variety of media in the context of the cultures that have created and cultivated them
B. generate, collaborate in, participate in, or attend creative expression, emphasizing verbal, visual, musical, spatial, or kinesthetic forms
C. recognize and describe the interrelatedness of the arts, mathematics, science, engineering, technology, humanities, and social sciences
D. describe or demonstrate ways in which concepts and problems from multiple disciplines may be addressed through creative expression and innovative practice

Example of **Individual Student Assessment:**

- Evidence in portfolio of reflection on personal creation of works, participation in performances, and/or attendance at artistic/creative events.

Examples of **General Education Curriculum Assessment*:**

- x% (*e.g.*, 80%) of students will demonstrate competence in describing the interrelatedness of the arts with mathematics, science, engineering, technology, humanities, and/or social sciences on a selected assignment completed for a designated course or a culminating course in General Education or the professional program.

- Analyze the trends in the number of students who take courses in which they engage, through performance or response, with dance, music, theatre, literary, and visual arts. (*E.g.*, do overall numbers increase? Are there proportionately more students in certain majors who are involved?)

* Numerical goals based on assessment of a statistically valid sample.

GENERAL EDUCATION: A WHITE PAPER FOR THE RIT COMMUNITY

PHASE II: IMPLEMENTATION STRATEGIES & TACTICS

"One ship sails East,
And another West,
By the self-same winds that blow,
Tis the set of the sails
And not the gales,
That tells the way we go."

Ella Wheeler Wilcox

Introduction. In Phase I of this project, the results of which are detailed in the foregoing section of this White Paper, answers to the questions of "What should the RIT General Education Curriculum achieve?" or "What are the skills and knowledge base students should acquire based on their general education experience at RIT?" and "How will we know when the Curriculum has delivered and students have achieved these goals?" have been cast in a set of five General Education Learning Outcomes and associated Assessment Strategies and Tools, respectively.

In the course of the 2006 – 2007 academic year at RIT, three events of great importance to the future of general education at the Institute occurred.

First, the Faculty General Education Team appointed by Provost McKenzie prepared a report (**General Education: A White Paper for the RIT Community**) and conducted a broad institutional review (RIT Academic Senate, College of Liberal Arts, College of Science, National Technical Institute for the Deaf, RIT Academic Council, and Education Committee of the RIT Board of Trustees) on its work to date on Phase I of the project. Feedback solicited in this review process was carefully assessed and incorporated as appropriate, thereby substantially improving the scope of the review and the overall quality and comprehensiveness of the **White Paper**.

Second, following examination of the institution's Self Study Report and a visit to the campus on March 20 – 23, 2007, RIT received the **Report to the Faculty, Administration, Trustees, and Students of the ROCHESTER INSTITUTE OF TECHNOLOGY, Rochester, New York,** prepared by the Evaluation Team representing the Middle States Commission on Higher Education. The Middle States Evaluation Team had, as a part of the Institute's documentation, the then current draft RIT Faculty General Education Team's **General Education: A White Paper for the RIT Community**, and the Evaluation Team has commented extensively, both on general education at RIT and upon the content of the draft **White Paper**.

The Middle States **Report** makes the following four key points, which are directly relevant to the continued development of RIT general education and which have been taken into account in the development of the present White Paper.

- From **Standard 12: General Education**, p. 17: "RIT has dedicated considerable resources toward greater refinement of general education goals and

objectives. This work has proceeded in the last two years and seems to be approaching some critical junctures that will be important for institution-wide understanding of general education goals and objectives. … It is clear that RIT is on an informed pathway, and the team recognized this, lauds it, and encourages continued progress."

- From **Standard 14: Assessment of Student Learning (*Recommendations*),** p. 21: "The Team recommends that an organizational infrastructure and sufficient resources be allocated to provide sustainable progress in the development of a student learning assessment model, … We further recommend that leadership and expertise in assessment be recruited, to coordinate the several assessment efforts …". President Destler and Provost McKenzie have approved a new position entitled Director of Student Learning Outcomes Assessment in the Division of Academic Affairs; the search designed to recruit an outstanding person to fill this position is currently in progress.

- From **VI. Summary of Recommendations for Continuing Compliance and Requirements**, p. 21: "Specifically, we recommend that RIT move rapidly to define explicit student learning outcomes for all its programs, including most particularly general education, and that it institutionalize assessment responsibility and expertise in an Institute-wide administrative organization that can and will support and encourage the development and application of assessment tools by all of RIT's colleges and administrative units."

- Also from **VI. Summary of Recommendations for Continuing Compliance and Requirements** and in direct reference to the point made in 3 (above) regarding the significance of "explicit student learning outcomes for all its programs, including most particularly general education" and "development and application of assessment tools by all of RIT's colleges and administrative units," "We [the Middle States Team] further recommend that this effort be made the focus of RIT's next Periodic Review Report in 2012."

Third, in the spring of 2007 after an extensive international search, RIT successfully recruited Dr. William J. Destler to become its next president, succeeding Dr. Albert J. Simone, who had earlier expressed his decision to retire at the conclusion of the 2006 – 2007 academic year. President Destler has clearly articulated his vision for the three central programmatic themes of creativity, innovation, and integration as characterizing RIT, and each of these themes clearly must have a central role in any RIT General Education Curriculum going forward.

Phase II: Strategies Foundational to Implementation

Responsibility for the design, development, and delivery of curriculum resides in the faculty working within the established Institute curriculum development, review, and approval governance system. In this context, in response to the three events just listed, and based on the foundational work described previously for Phase I of the project, Phase II will identify and describe a process for addressing five key issues that will require resolution as a foundation for future work of the faculty on the structure, content, and delivery of the curriculum and on the assessment of student learning. These five key

implementation strategies are reflected in the following five questions and answers.

QUESTION 1: How are the present educational experiences available to RIT students meeting the goals described by the five General Education Learning Outcomes in Phase I, and how well are we assessing whether students are successfully acquiring the knowledge base and skills delineated therein?

RESPONSE: **Current RIT Course Offerings: Correlation to the General Education Learning Outcomes.** The New York State Education Department (NYSED) mandates that one-half (90) of the quarter credit hours required for the Bachelor of Science Degree (one-quarter (45) for the Bachelor of Fine Arts Degree) be in the "liberal arts and sciences." The five General Education Learning Outcomes developed in Phase I of this study emerge directly from a consideration of the "liberal arts and sciences" most relevant and appropriate to the current portfolio of RIT undergraduate programs and the needs and interests of the RIT graduate. However, it is abundantly clear that the development of the skills and knowledge base inherent in these Learning Outcomes, while centered in the "liberal arts and sciences," occurs to some degree across the entire undergraduate curriculum. Consequently, additional information on how the present portfolio of RIT educational offerings (courses) addresses the suggested General Education Learning Outcomes will be essential as a prelude to further curricular planning and development.

As a part of the Institute self-study for the recent Middle States reaccreditation process and in collaboration with the Intercollege Curriculum Committee, RIT faculty have developed course-by-course learning outcomes and have documented these outcomes in a standardized RIT course outline format. Correlation with the five General Education Learning Outcomes can provide the faculty, who hold the authority and responsibility for development and delivery of curriculum, with a basis for determination of the opportunities presently available to students to successfully achieve the General Education Learning Outcomes and the data necessary for each program to determine how existing course offerings might be appropriately expanded or modified and/or what additional opportunities might need to be developed and added to the curriculum.

As a vehicle to assist in the acquisition and archiving of this course information, we have developed a prototype format based upon the current Institute course outline, which has been extended to include correlation of the documented course outcomes with the five General Education Learning Outcomes developed in Phase I of this study (see **Appendix I: General Education Course Outline Format**). This extended format also requests information and documentation of the methods used to assess student learning for each of the General Education Learning Outcomes included in the course, and we will be soliciting the appropriate faculty for this information on a course-by-course basis.

QUESTION 2: How can faculty ensure that all students have an educational experience available within the General Education Curriculum that incorporates the themes of creativity, innovation, and integration?

RESPONSE: **Thoughts on an Integrative General Education Experience: The New Horizons Concept.** Phase I of the of the present study has conceptualized a General Education Curriculum for RIT designed to be responsive to the current portfolio of RIT undergraduate programs, the profile of the current RIT undergraduate student, and the personal and professional needs of the RIT graduate. The General Education Curriculum conceptualized in this White Paper in the form of five General Education Learning Outcomes is, as described in Phase I, designed to be consistent with and supportive of President Destler's vision of RIT as the "Innovation University" incorporating the fundamental themes of creativity of thought, innovation of practice, and integration of purpose. Inherent in the concept of a curriculum is overall coherency of content, theme and delivery and the themes of **Creativity** and **Innovation** are bound together through these five **General Education Learning Outcomes** by the theme of **Integration** (see **Figure 2. General Education Learning Outcomes and President Destler's vision of an RIT Characterized by Creativity, Innovation and Integration**, p. 7).

Integration in student learning can take on at least two forms. First, there can be integration of content in which the traditional academic disciplinary lines are crossed, and second, integration of process in which a number of individuals work together as a team bringing together different sets of experience and expertise in order to address relevant aspects of the issue/problem. The development and implementation of an integrative educational experience as a part of the RIT student's general education curriculum can be an effective way of incorporating the concept of integration into the educational program. Further, if this "integrative educational experience" is structured around approaches to solutions to relevant contemporary problems, the pervasive curricular themes of creativity and innovation will inevitably become an integral part of the experience. Finally, in many instances, this experience may be directly responsive to the RIT strategic plan's mandate for increased faculty/student scholarship through its relationship to the evolving Institute-wide undergraduate research program.

An example of the characteristics of one strategy for the development and implementation of such an integrative general education program for RIT is presented in **Appendix II. An Integrative General Education Experience: The New Horizons Project**.

QUESTION 3: How can faculty most effectively assess both the content of the General Education Curriculum and the effectiveness of student learning throughout their entire RIT experience in the context of the established goals (the set of five **General Education Learning Outcomes**)?

RESPONSE: **Assessment of General Education Outcomes: Curriculum and Student Achievement.** Assessment of student learning is becoming of greater and greater visibility and significance as higher education is increasingly held accountable for its performance – by the students who attend the university, by the parents and others who pay the rapidly escalating cost of higher education, and by the general public who look to the academy for educational integrity and intellectual leadership for society at large. This increased visibility and accountability is clearly manifest in

the focus of professional, program, and regional accrediting agencies on assessment, not only in student learning, but in all phases of the university operation. The **Report to the Faculty, Administration, Trustees, and Students of the ROCHESTER INSTITUTE OF TECHNOLOGY, Rochester, New York** prepared by the Evaluation Team representing the Middle States Commission on Higher Education based on their March 2007 reaccreditation visit states the summary recommendation that "*development and application of assessment tools by all of RIT's colleges and administrative units … be made the focus of RIT's next* ***Periodic Review Report in 2012***."

The design, development, and implementation of an effective and efficient student learning outcomes assessment system for a curriculum, which constitutes fifty percent, or 90 quarter credit hours for the Bachelor of Science Degree (twenty five percent, or 45 quarter credit hours for the Bachelor of Fine Arts Degree), is a very major undertaking, particularly for a General Education Curriculum designed to be responsive to five different learning outcomes. Consequently, the optimal strategy for the creation and implementation of such a system will almost certainly need to involve a phased approach. **(**see **Appendix III: Possible Strategies for Phased Implementation of General Education Learning Outcomes Assessment)**

Under any circumstances, it will be essential for RIT to move forward in the development and implementation of a more comprehensive system of assessment of its General Education Curriculum, and the successful recruitment of the new Director of Student Learning Outcomes Assessment and engagement of this Director in collaboration with general education faculty will be absolutely critical to the success of the endeavor.

QUESTION 4: How can we effectively and efficiently define and manage the key data elements required to adequately assess individual student learning outcomes against the five **General Education Learning Outcomes** and manage these data in a cost and faculty time effective and efficient manner?

RESPONSE: **Managing the Assessment Process and Data: The e-Portfolio.** The traditional course grade recording systems of higher education are not designed to accommodate the kind of data and information generated by these more sophisticated and complex student learning assessment systems. Consequently, many universities are moving toward the creation of student e-portfolios and electronic data management systems as the repository for the assessment of outcomes.

Electronic student portfolios are used in higher education as a way to document, assess and enhance student learning. An e-portfolio is a collection of text-based, graphic, or multimedia elements (course assignments, photographs, videos, etc.) archived in an on-line database or other electronic space, such as a CD, DVD, or USB "thumb drive." These artifacts can either serve as evidence that an expected level of competence has been achieved for a given learning outcome, or they can be accessed later for evaluation. One benefit of student e-portfolios is the reflective opportunities that accompany various activities and artifacts. This collection of material is organized and managed to serve as an administrative tool used to document

accomplishments and meaningful learning experiences across time and in a variety of contexts. While student portfolios gained prominence in art- and communication-studies, e-portfolios are becoming popular in general education assessment to document skill sets in math and competencies in critical thinking. Colleges and universities around the world are using e-portfolios to help analyze the impact of general learning outcomes. It is suggested that RIT utilize this technology. Students might initiate their e-portfolios in the First Year Experiences program, contribute assignments from general education courses such as Writing Seminar, Arts of Expression, mathematics and science, choose artifacts from upper level and professional courses, and ultimately show evidence of completion of a culminating, integrative experience such as the New Horizons Project. (see **Appendix II. An Integrative General Education Experience: The New Horizons Project**)

Typically, an institution needs to provide support for the use of e-portfolios, including the necessary infrastructure. A significant aspect of the majority of contemporary student learning outcome assessment programs is the data management system, with the guidance of an assessment director. Many decisions need to be made at RIT regarding supportive technology/hosting service, student and faculty training, oversight, materials that constitute evidence for each of the five outcomes, connections to course assignments, role of faculty, and creation of rubrics for consistent assessment. An appropriate data management system will be necessary for validity and reliability. Presently, there are a number of systems that are commercially available for pilot and university-wide implementation of student learning outcomes assessment tracking, curriculum-to-outcomes mapping and/or e-portfolio management (see **Appendix IV: Examples of Commercially Available e-Portfolio Hosting Systems**).

QUESTION 5: How can RIT ensure that general education is a collaborative process, owned by the entire campus community, providing a curriculum that is both cross-disciplinary in design and delivery, and centralized in terms of assessment?

RESPONSE: **Oversight of RIT General Education.** General education at RIT continues to be delivered to students in a series of discrete pieces, and, while individual faculty from the various academic units have worked in isolated instances to cross the boundaries between the humanities and social sciences, mathematics and science, and the professional field of study in developing and delivering a number of excellent interdisciplinary courses, there remains no institutional oversight of the curriculum or of the assessment of student learning. In its 2007 **Report to the Faculty, Administration, Trustees, and Students of the ROCHESTER INSTITUTE OF TECHNOLOGY**, the Evaluation Team representing the Middle States Commission on Higher Education made the following suggestion, "Consider a more centralized general education assessment program and reporting structure that emphasizes the campus community's ownership of general education." (from **Standard 14: Assessment of Student Learning**, ***Suggestions***, p. 21). As the foundations are laid for the development and implementation of a coherent and uniformly assessable general education curriculum for RIT, consideration of the

organizational structure required to most effectively and efficiently develop, deliver, assess and monitor this curriculum to ensure "the campus community's ownership of general education" may be undertaken.

While much more remains to be done in terms of the content and structure of the RIT General Education Curriculum and in the articulation of this Curriculum with the broad range of professional programs across the landscape of RIT in such a way as to optimize the learning experience for all students, implementation of the foregoing five strategies is designed to lay a firm foundation for the faculty of RIT as they move forward in this important arena of undergraduate education.

APPENDIX I. GENERAL EDUCATION COURSE OUTLINE FORMAT

Rochester Institute of Technology
Rochester, New York

COLLEGE of _____
Department of _____

NEW (or REVISED) COURSE: XXXX-XXX

1.0 **Title**: _____ **Date**: _____
Credit Hours: _____
Prerequisite(s): _____
Corequisite(s): _____
Course proposed by: _____

2.0 **Course information:**

	Contact hours	**Maximum students/section**
Classroom		
Lab		
Studio		
Other (specify _____)		

Quarter(s) offered (check)
_____ Fall _____ Winter _____ Spring _____ Summer

Students required to take this course: (by program and year, as appropriate)

_____
_____

Students who might elect to take the course:

_____
_____

3.0 **Goals of the course** (including rationale for the course, when appropriate):

_____
_____

4.0 **Course description** (as it will appear in the RIT Catalog, including pre- and co-requisites, quarters offered)

_____
_____

5.0 Possible resources (texts, references, computer packages, etc.)

5.1 _____
5.2 _____

6.0 Topics (outline):

6.1 _____
6.2 _____
6.2.1 _____
6.2.2 _____
6.2.2.1 _____
6.2.2.2 _____
6.2.2.3 _____
6.3 _____ (etc.)

7.0 Intended learning outcomes and associated assessment methods of those outcomes

Upon completion of the course, the student will be able to:

Learning Outcome 1	Assessment 1	Assessment 2

General Education Learning Outcomes:

1. Select appropriate general education outcome(s) supported by this course
2. Indicate which sub-goal(s) (from Appendix A) will be addressed by course
3. For assessment, indicate course assignments that can be used

General Education Learning Outcome	Sub-goal	Assessment
Communication		
Intellectual Inquiry		
Ethics, Values & Social Responsibility		
Scientific, Mathematical & Technological Literacy		
Artistic Literacy		

8.0 Program learning outcomes supported by this course

8.1 _____

8.2 _____

9.0 Other relevant information (such as special classroom, studio, or lab needs, special scheduling, media requirements, etc.)

_____

10.0 Supplemental information

_____

Appendix A

General Education learning outcomes: extended descriptions

I. Communication: by the time of graduation from RIT, students will have demonstrated the ability to:

- **A.** express themselves effectively both verbally and non-verbally
- **B.** express themselves effectively in visual and multimedia modalities
- **C.** express themselves effectively in written standard English
- **D.** demonstrate comprehension of information accessed through reading, listening, and visual communication, according to standard English usage
- **E.** use communication competencies to work effectively on collaborative group and team projects

Example of **Individual Student Assessment:**

- Entry in portfolio of written, oral, visual, and/or multimedia communication artifact that demonstrates expected competency levels.

II. Intellectual Inquiry: by the time of graduation from RIT, students will have demonstrated the ability to

- **A.** describe the essential knowledge and methods of mathematics, the physical and biological sciences, literature, history, philosophy, social sciences, and the arts
- **B.** connect and integrate the knowledge, principles and methods of study and analysis acquired in general education with their major field of study
- **C.** acquire, assess, organize, interpret, analyze, synthesize, and apply qualitative and quantitative methodologies to construct and test hypotheses, theories, and theses
- **D.** construct, analyze and evaluate logical and reasonable arguments, support them with relevant evidence, and anticipate counterarguments
- **E.** creatively design and find innovative solutions for open-ended projects and problems, by collaborating with peers and working in teams across disciplines

Examples of **Individual Student Assessment:**

- Evidence in portfolio of completing an integrative project that demonstrates expected creative problem-solving competency levels.

- Evidence in portfolio of project(s) replicating qualitative and/or quantitative research methods by applying appropriate epistemological models of reasoning appropriate to disciplinary fields.

III. Ethics, Values & Social Responsibility: by the time of graduation from RIT, students will have demonstrated the ability to:

A. identify and describe ethical and social issues and conflicts embedded in political, economic, environmental/ecological and scientific/technological situations in local, national and global contexts
B. describe the history, principles, and purposes of American government and society, including its place in the global community
C. assess the strengths and limitations of American society and its economy, with regard to the diversity issues of equality, race, gender, and class
D. summarize the significant similarities and differences found when religions, political systems, educational systems, economic systems, and cultural mores from around the world are compared
E. participate in civic activities that demonstrate the taking on of the responsibilities of democratic citizenship on campus and in the local community as well as in the wider community
F. apply the principles of ethical deliberation in personal and professional settings

Examples of **Individual Student Assessment:**

- Evidence in portfolio of reflection on personal involvement in student government, in the political community, in civic/community service projects, in community-based learning projects, and/or in service activities that promote cultural or international awareness.

IV. Scientific, Mathematical & Technological Literacy: by the time of graduation from RIT, students will have demonstrated the ability to:

A. describe the basic concepts, principles and elements of the physical, natural, life, medical, environmental, and social sciences
B. describe and apply the methodologies used to identify and solve scientific problems, including serendipitous discovery; detect flaws in scientific and nonscientific arguments; recognize and be aware of controversies between the scientific and nonscientific approaches; and distinguish science from "pseudo-science"
C. apply the methods of mathematics, such as basic algebraic, geometric and statistical concepts and scientific notation in personal, societal and environmental situations

D. demonstrate mathematical and scientific competency/fluency at a level commensurate with the foundational requirements of their professional degree program
E. use contemporary information technologies for communication, research, and problem-solving in both personal and professional settings
F. assess the impact of science and technology on society and the environment

Examples of **Individual Student Assessment:**

- Evidence in portfolio of participation in laboratory experiences that involve written reports and evaluation of experimental designs and results.

- Evidence in portfolio of written analyses of contemporary debates in scientific research, including appropriate citations to relevant contemporary and historical scientific literature.

- Documentation in portfolio of projects that study the promises and problems technology presents to society, including its ecological impact.

V. Artistic Literacy: by the time of graduation from RIT, students will have been exposed to several different creative art forms and will have demonstrated the ability to:

A. interpret, evaluate, and appreciate artistic expression in a variety of media in the context of the cultures that have created and cultivated them
B. generate, collaborate in, participate in, or attend creative expression, emphasizing verbal, visual, musical, spatial, or kinesthetic forms
C. recognize and describe the interrelatedness of the arts, mathematics, science, engineering, technology, humanities, and social sciences
D. describe or demonstrate ways in which concepts from other disciplines may be expressed through the arts

Example of **Individual Student Assessment:**

- Evidence in portfolio of reflection on personal creation of works, participation in performances, and/or attendance at artistic/creative events.

Appendix II. An Integrative General Education Experience: The New Horizons Project

An Integrative General Education Experience: The New Horizons Project

Draft 12/6/07

Many universities require culminating academic experiences that serve as the "capstone" to an undergraduate education. These culminating experiences are often part of degree programs, where a specific course or seminar is designated as the "capstone" course. In some cases, students are free to choose from a selection of courses identified as satisfying the requirement. One limitation of the conventional "capstone experience" is that it does not provide an *integrative* experience by requiring students to work outside their academic specialty.

Developing a culminating academic experience for the General Education curriculum at RIT brings with it unique challenges, but also possibilities, since the curriculum and Institute culture create countless opportunities for students to integrate the knowledge gained in their professional studies with that gained in the liberal arts and liberal sciences.

We propose that the RIT student's General Education requirements include an academic experience that is recognized as significant and *integrative.* This experience should also include elements of innovation and/or creativity. Rather than culminating a student's academic career, this experience could be woven throughout his or her studies, ideally spanning academic years as well as different disciplines. In recognition of the optimism expressed in the RIT alma mater, this integrative academic experience could be known as "The New Horizons Project."

From RIT, our course is set;
We celebrate a promise kept;
A life, a living you have taught;
Let new horizons now be sought!

from RIT's *alma mater*

I. Characteristics of the New Horizons Project

- Provides an integrative academic experience
- Places deliberate emphasis on creativity and innovation
- Weaves throughout the undergraduate curriculum
- Except in rare instances, is team-based
- Goes beyond the reading, assignments, and evaluation required by courses in the student's major, concentration, or minor

- Brings together multiple disciplinary perspectives

- Results in a significant tangible outcome (such as an in-depth researched essay, work of creative writing, film, patent, piece of technology, or electronic presentation) that will become part of—or otherwise be documented in—the student's General Education Portfolio.

II. Possible Models for New Horizons Projects

Consistent with the characteristics outlined above, the New Horizons Project could be configured in a number of ways:

A. Linking General Education and Professional Studies

Students would identify a problem, question, or theme (working alone, with a partner, or in a team) that allows them to explore the intersections of their professional field with an area of the Liberal Arts and Sciences. They would be encouraged to go beyond other research or writing projects and take innovative or creative approaches to the material. This could include expanding the kinds of sources used for their research to include maps, archival records, interviews, films, government documents, etc. The project could produce a research paper, piece of creative work, or a "joint thesis" to which each person would contribute a specific portion.

The finished product would integrate the disciplinary approaches of Liberal Arts and Sciences with the techniques, technologies, and methods the students have learned in their professional disciplines. The finished project could be presented both in paper and electronic form.

B. Participating in an On-going Team Project

This project could wind through the students' 4-years of study at RIT and culminate in a project that was presented electronically. The projects would be ongoing, and students would join the project at the end of their second year of study to take the place of the previous year's graduates. Students new to the project would work with the senior members of the project. When the seniors graduate, the next group of seniors involved in the project would take the lead and take the project in the direction that interests them. The ongoing nature of the project would ensure that students are required to look at the project in innovative and creative ways.

Possibility B resembles in some ways the Gemstone Project put into place by William Destler at the University of Maryland.

For more details, refer to http://www.gemstone.umd.edu/Main/aboutus.htm.

C. Conducting Independent Research or Producing a Creative Work

With the sponsorship of a faculty mentor, a student could choose to work alone on an integrative capstone experience. In this case, the student would be responsible for developing and securing faculty approval for a project that would either cross disciplinary boundaries or take an innovative approach to the student's field of study or work in Liberal Arts and Sciences. The integrative qualities of the experience would need to be made clear in the proposal, and the student would need a faculty co-sponsor from outside his or her degree program who would also serve as a reader or evaluator.

III. Examples

Student teams could develop non-traditional techniques for teaching college concepts from the Liberal Arts or Sciences, perhaps by re-imagining ways to use existing technologies. These techniques could be presented at an annual interactive student research symposium.

Students could identify a technological development of the Modern Age, for example, the Brooklyn Bridge, and examine its influence on the 20th Century imagination by conducting research that brings together such sources as engineering reports, photographic images, poetry, and popular press accounts. The results could be presented in electronic form as an interactive, educational website.

Modeled on the approach currently used to engage and educate students for the responsibilities of editing and producing *Signatures*, RIT's annual student literary magazine, a project could include a cross-college team structure and curricular links (In this case, students have the option of taking the course "Editing the Literary Magazine"). Student teams in the New Horizons collaboration could be welcomed and given necessary background and skills in a seminar before working on a creative project. Projects could be voted on by campus members and might become part of the campus culture, for example, developing a solution—from design to implementation—to address a specific "quality of life" problem at RIT that requires integration of technical expertise and General Education outcomes.

A student who has completed a Creative Writing minor could take his or her work to a new level, completing a science fiction novel, a book of poetry, or a memoir; publishing it on Lulu.com.; and developing a marketing plan for the book.

IV. Possible Campus-wide Structures to Support the New Horizons Project:

- The First Year Enrichment program could have a role in explaining the importance of this curricular experience;

- The Institute could create both physical and on-line "idea boards" where students looking for creative partners, teams, or projects could post ideas and requests;

- A New Horizons Project on-line proposal process could be developed; and

- New Horizons Projects could be archived electronically and serve as teaching tools, resources, and a gallery of RIT innovation and creativity.

Appendix III: Possible Strategies for Phased Implementation of General Education Learning Outcomes Assessment

Possible Strategies for Phased Implementation of General Education Learning Outcomes Assessment

To begin the assessment process for general education, two different approaches appear possible. First, it would be conceptually possible to simultaneously initiate implementation of an assessment process for all five of the General Education Learning Outcomes by selecting one very small component of each. Alternatively, especially if there is a reasonable basis on which the learning outcomes can be prioritized, it would be possible to select a limited set (1 – 2) of the outcomes for full development and implementation, and this would appear to be the preferred approach. The Middle States website has a number of publications (see **http://www.msche.org/publications.asp**); *e.g.*, ***Assessing Student Learning and Institutional Effectiveness: Understanding Middle States Expectations*** and ***Student Learning Assessment: Options and Resources (2nd Edition, 2007)***, which provide substantial background for this process.

There are a number of criteria by which these five General Education Learning Outcomes might be prioritized for purposes of selection of the first small set to be developed and implemented.

- One method, which for a career oriented institution might be appropriate, could be based upon the expectations of the employers of graduates. ***Inside Higher Ed*** has recently summarized a national survey of employers conducted by the **Association of American Colleges and Universities** about the preparedness of college graduates on twelve Gen Ed outcomes (**http://www.insidehighered.com/news/2008/01/23/employers**), many of them similar to the five developed and delineated in the present White Paper (for the complete survey results, see **http://www.aacu.org/advocacy/leap/documents/2008_business_leader_poll.pdf**).
- Another consideration in selecting a small starting set of outcomes might be ease of implementation. If outcomes were selected for which there might already exist considerable data, or for which it might be judged easier to obtain, the startup could be less burdensome and produce results quickly.
- A third approach might be to consider the three curricular themes outlined on page 7: Creativity, Innovation and Integration. An initial set of outcomes could be derived from aligning each of the five general education outcomes with the learning domain it is most closely represents, and then beginning with one outcome from each domain.
- It might also be desirable to consider which of the learning outcomes distinguishes RIT.

Finally, it will be important in any implementation plan to use processes that look across the curriculum in all colleges and that look across time as students progress through their academic careers. One way to begin to implement this aspect of assessment would be to track a cohort of freshmen who maintain a portfolio over four to five years.

Appendix IV: Examples of Commercially Available e-Portfolio Hosting Systems

Examples of Commercially Available e-Portfolio Hosting Systems

Selected commercially available e-portfolio hosting systems include:

- The newly released Desire2Learn's e-portfolio system, which has the advantage of linking directly to RIT's course management system, myCourses, (http://www.desire2learn.com/eportfolio/).

Systems in wide use at other colleges and universities include:

- Nuventive's iWebfolio (http://www.nuventive.com/products_iwebfolio.html)
- eLumen's Achievement software (http://www.elumen.info/summary.html)
- ePortfolio (http://www.ePortfolio.org)

Overall data management systems include:

- Nuventive's TracDat (http://www.nuventive.com/products_tracdat.html)
- WEAVEonline (http://www.weaveonline.com)
- eLumen's Achievement software (http://www.elumen.info/summary.html)

For a more complete and up-to-date listing of e-portfolio software, as well as projects, presentations, documents/articles, and websites, see: (http://www.eportconsortium.org/Content/Root/resources.aspx)