REPORT

OF THE COOPERATIVE AGREEMENT

BETWEEN THE UNIVERSITY OF MARYLAND

AND USAID/RWANDA

FOR THE UNIVERSITY PARTNERSHIP

BETWEEN

THE NATIONAL UNIVERSITY OF RWANDA

AND

THE UNIVERSITY OF MARYLAND

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Executive Summary

The Cooperative Agreement (CA) between the University of Maryland (UMD) and USAID/Rwanda provides for three years of support to the National University of Rwanda (NUR) in three core areas: information technology, distance learning and conflict management. Phase 1, the first year of pilot activities, ended in September 2001. The CA calls for an assessment of the three core activities in order to document progress, identify and analyze any problem areas, and make recommendations for adjustments in Phase 2, in which the full-scale, two-year Partnership implementation will take place.

In two of the three core areas, distance learning and computer science, the two academic institutions have achieved a high degree of collaboration and have met or exceeded planned achievements in the pilot phase. In the conflict management core, progress has been less steady, and periodic attempts to get the relationship on track have not been successful. This assessment recommends renewed efforts in specific, targeted areas and a more regular presence at the CCM from UMD's Center for International Development and Conflict Management (CIDCM) for at least six months to get this aspect of the Partnership on a steady implementation track.

Distance Learning: The Distance Learning core area has made strong progress during the first year. Assistance from UMD has provided upgraded training for faculty in the Exact Science Department of NUR's Faculty of Education, including the provision of course teaching materials. UMD has helped the Faculty establish a distance-learning laboratory by providing equipment and training in information technology applications. Of particular importance are the products developed for both Chemistry and Biology and the Mentor/Mentee relationship that has been built between Maryland based Chemistry and Biology professors and NUR's Faculty of Education. 37 Chemistry modules and eight Biology modules have been developed and transferred electronically to NUR. In Phase 2, Mathematics and Physics faculty will work with Maryland mentors to develop materials that support and extend active learning principles, and assistance will be expanded to additional instructors in the Exact Science Department. In Phase 2, the Department of Exact Science, in addition to improving the quality of its own pre-service curriculum, will also develop and deliver in-service training to secondary school teachers in the Butare area to upgrade their science teaching skills. Many of these teachers do not meet minimum qualifications as defined by the Ministry of Education and are anxious to improve their capabilities.

The Partnership has linked a literature instructor at NUR with a trainer for *The Faculty On-Line Training Consortium in Maryland,* and they are working to develop a distance course on - African literature. UMD has also provided the International Communications and Negotiations Simulation (ICONS) to NUR's Faculty of Social Science, Department of Political Science. ICONS electronically joins groups of students from 15 universities with each university playing the role of a particularly country in the negotiation. Despite technical problems experienced by some of the students who had little familiarity with

information technology applications, the Partnership plans further ICONS simulations in Phase 2, using technology support that will make the process easier for the students.

Computer Science: The Computer Science core area has gotten off to an excellent start. UMD provides support both to NUR's Computer Center and to the Computer Science Department in the Faculty of Science and Technology. Two distance courses have been designed and delivered, and a strategy to transfer instructional support from UMD to NUR is already in place. The development and approval by the NUR Faculty Senate of a revised curriculum that transforms the Computer Science Department from one based on theory and electrical engineering to a curriculum that uses theory to delivery practical applications has required a sustained collaborative effort on the part of both partners. The ability to transform this academic program is a testimony of the solid theoretical program already established by NUR and the willingness and commitment by both partners to adapt that program to the Information Communications Technology and Information Technology (ICT/IT) needs of Rwanda's private and public sectors. During Phase 1, UMD delivered two courses in UNIX and C++. UMD also provided equipment for one Internet lab dedicated to the Computer Science program. Mud's support has been crucial to enhance NUR's already strong commitment to link the university to the outside world through IT applications. UMD has worked closely with the NUR to seek out and secure other sources of IT support to NUR, such as the Cisco Academy, to enhance the impact of NUR's Computer Science program.

In Phase 2, the Computer Science Department will be challenged to meet the teaching demands of the new curriculum particularly in areas such as system administration, website design, multimedia applications, programming language and business telecommunications. The Partners will need to work closely to identify creative ways to develop these courses and to support students who will respond to the growing demand for IT needs in both the public and private sectors of Rwanda's economy.

The Computer Center is to be commended for the way it has expanded and supported the NUR's IT network throughout the university system. Plans to privatize the Computer Center to allow support to the private sector on a fee basis will help the NUR realize its IT goals.

Conflict Management: Conflict Management: Unlike the two other core areas, NUR's Center for Conflict Management (CCM) is a new institution struggling to establish its bona fides as a recognized research body within the academic system and to provide to Rwandan society tools to overcome its historical tendency to respond to conflict with violence. Both parties have worked hard and strived to achieve the same level of support and products that exist in distance learning and computer science, but the relationship of this aspect of the Partnership has not yielded the same results as the other two core areas. In the opinion of the assessors, the Conflict Management component has been, perhaps, overly ambitious, and needs to be a bit more focused on concrete products.

Towards that end, CIDCM and CCM have decided to focus support to CCM in four specific areas:

1. training in research methodology for Memoir students,
2. continued support for the Information and Documentation Unit (IDU),
3. a regional workshop on conflict management planned for 2002 and
4. a joint research program carried out by Dr. Christian Davenport and Dr. Simone Gisibirege.

These areas of support, if successful, should deliver concrete products as well as help to achieve the overall goal of enhancing CCM's capacity.

In addition, all partners - USAID/Rwanda, NUR and CIDCM - endorse a recommendation that CIDCM recruit a researcher/trainer to provide support at the CCM on a continuing or regular basis. The assessors believe that this longer-term CIDCM presence is essential if the Partnership is to realize success in this core area. However, this should not be implemented at the expense of the other more successful core areas.

General Observations on the Partnership: The Partnership was posited in many respects on the principle of an equal relationship, but the reality is that UMD is a larger institution with much greater capacity than NUR. The result of this reality is a delicate balancing act that can only work when UMD is attuned to the needs at the NUR and the NUR is able to analyze and articulate areas where assistance can be useful..

Where interpersonal relationships have been established on a smooth and continuing basis between the faculties of the two institutions, the Partnership has moved forward and achieved its objectives. Where communications have been characterized by misunderstandings and lack of a shared vision, progress in achieving objectives has been sporadic.

Both the NUR and the UMD have made a serious a commitment to the objectives of the Partnership. Where the foundation is strong, phase 2 implementation will also be strong. Where that foundation is weak, the Partners should focus their efforts on trying to build a solid foundation for future collaboration.

Background

On February 14, 2000, the University of Maryland's (UMD) Center for International Development and Conflict Management (CIDCM) submitted a proposal to enter into a three-year Cooperative Agreement (CA) with USAID for a Partnership between CIDCM and the National University of Rwanda (NUR) to:[1]

> "i. Expand the educational capacity of each university by utilizing information communication technologies supported with faculty exchange.

[1] From CIDCM's Unsolicited Proposal to USAID as modified February 14, 2000, p. 7

"ii. Establish and support the formation of the NUR's Department of Computer Science Information Communication Technology/Information Technology (ICT/IT) component.

"iii. Produce analyses of and research on conflict management and genocide dynamics in Rwanda and the Great Lakes region capable of identifying and implementing appropriate conflict management interventions, and develop research results on Information Technology and social and economic inequality."

The lengthy contracting process resulted in a delay in full implementation of year one's pilot phase to September 2000. The CA contains a provision for an assessment of the first-year pilot phase prior to the next, two-year full implementation phase. The CIDCM proposal explicitly divided the three-year period of the CA into these two phases, citing the necessity of evaluating the accomplishments of the pilot phase and recommending "mid-course corrections" in view of "the breadth of objectives and the importance of achieving them, the modernity of the technology, and the new territory of the Partnership". This report fulfills this evaluation requirement of the CA.

In the course of three weeks during September and October 2001, two consultants with both USAID and Rwanda experience were contracted by UMD/CIDCM to conduct an assessment of the pilot phase. Christine Hjelt and Glenn Slocum, the assessors, interviewed people associated with phase-one, including most of the UMD/CIDCM individuals who have worked on the CA. They then traveled to Rwanda and conducted interviews with all relevant administrators, researchers, professors and some students at the NUR in Butare, Rwanda. They also met with relevant staff at USAID/Rwanda in Kigali. Over 40 people were interviewed during the course of the assessment.

Introduction

In the aftermath of one of the most traumatic events to devastate a country in the twentieth century, a civil war and genocide in 1994 that killed an estimated 800,000 Rwandans, Rwanda has made impressive strides in recovery and reconstruction. The country's institutions lost most of their skilled personnel to war and exile, but Rwanda has moved to rebuild its shattered institutions and restore human capacity to manage its redevelopment. USAID/Rwanda sought help from the Agency's Leland Initiative in 1997 to help Rwanda take advantage of technology advances in information communication technology and information technology (ICT/IT).

Under the Leland Initiative, a USAID/Africa Bureau project to enhance ICT applications in Africa, USAID provided hardware and technical training in Internet connectivity at the NUR. Leland provided the NUR a "very small aperture terminal" (VSAT) which includes satellite link and other equipment required for high-speed internet connectivity. The NUR also received preliminary training in local-area networks (LANs) and wide-area networks (WANs) to connect the three campuses of the NUR, improving communications in such areas as research and administration, and among the academic departments of NUR.

This important work provides the foundation for the NUR/UMD Partnership. Information technologies are essential to work in each of the project's core areas: Distance Learning, Computer Science and the Conflict Management Center (CCM). The NUR Computer Center, with vigorous support from the Rector, continues to build an ICT infrastructure to meet the growing demands of faculty and students as they enter the information age. This ICT vision is an essential ingredient to the progress discussed in this report.

DISTANCE LEARNING

Phase One Targets	Phase One Accomplishments	Phase Two Objectives
1. Delivery of modules in support of at least two courses at NUR and one course at UMD	1. 37 modules developed for Chemistry. Lab experiments developed and videotaped. Modules are being used in pre-service chemistry classes. 8 Modules developed for Biology using AIDS as a case study and incorporating active learning strategies.	1. Test modules in pre-service classes and adapt for in-service training using distance learning techniques. Adapt as necessary. Course on African Literature developed by NUR scheduled for completion April-May 2002.
2. Delivery of connectivity to *Autonome de Butare*	2. Objective postponed or will be abandoned because computer literacy skills are taught through the NUR.	2. TBD
3. Establish internet lab with video conferencing capabilities	3. Equipment delivered for two Internet labs (8 workstations, 1 server, 1 multi-media machine, UPSs and printer, desks and chairs. NUR to provide one additional computer.) All computers connected to the Internet. Printer is unpacked and waiting to be configured by the Computer Center. Video conferencing equipment delivered and received by the Computer Center. Not yet installed.	3. Computer Center plans to complete connection of all equipment. Partnership will fund one part-time technician to train in technical areas like web site development and the use of video equipment. Additional training in the use of advanced *Blackboard* skills will be done using distance learning. Partnership will provide additional training on advanced Power Point skills. Video conferencing should be possible by the end of 2001.
4. Assess Phase I activities	4. Completed Oct 10, 2001	4. N/A
5. Develop plans for Phase II activities	5. In progress; pending input from this report	5. Courses, modules or materials for Physics and/or Math. Review impact of active learning strategies. Consider ways to overcome lack of print materials.
6. Begin Distance Education Curriculum.	6. Partially developed.	6. Underway

Background:

The distance education component of the Partnership was designed to increase the quality of student education and to support faculty development at each university. The project proposed to use distance education and short-term faculty exchange to facilitate the highest possible impact. Expected outputs included the development of courses for each university that incorporated the latest ideas in pedagogy for both traditional classroom environment as well as the distance-learning environment. The partners agreed to rely on the comparative teaching expertise of each University to improve its own students' education.

The NUR planned to develop and deliver courses to the UMD that centered on Rwanda and the Great Lakes region. These courses could focus on History, Politics, Literature or Foreign Languages. UMD planned to concentrate their efforts in the Faculty of Education with an emphasis on pre-service and in-service training in science or mathematics for secondary school teachers. This approach served the dual goals of improving basic science education in the Faculty of Science at the NUR, as well as increasing the proficiency of instruction in secondary schools.

Distance Education Core Capabilities
Updated and ongoing training of faculty
Course reading material
Expertise with distance teaching equipment
On-going instructor training/Faculty development for ICT/IT applications
Research
Coordinated curriculum with traditional education
Pedagogical approaches
Secondary school teacher training

Analysis of the Evolving Partnership:

The NUR/UMD Partnership was developed between the NUR Rector and the Director of CIDCM at the UMD, and individuals within the Faculty of Education were not involved in early planning stage. Therefore, the first task of the Partnership was to build a strong working relationship and develop a shared vision for this core area.

To build this shared vision UMD personnel initiated discussions with the entire Faculty of Education. The results of these discussions revealed a high interest within the Department of Exact Science in participating in the Partnership. Once the field had been narrowed, a Mentor/Mentee relationship was developed between Maryland based Chemistry and Biology professors and their counterparts within the Faculty of Education at NUR. These Maryland based mentees represent the University of Maryland, Prince George's Community College, College of Southern Maryland, and Howard University

Medical School. These partnerships account for much of the strong progress made in this core area during the first year of the Partnership. The most tangible evidence of this collaboration is the development and electronic transfer of 37 Chemistry modules and eight Biology modules. But many other factors contribute to the ability of the partners to move forward in this working relationship:

1. The decision to work with the Exact Science Department in the Faculty of Education was an excellent idea because it is difficult to attract and train secondary school teachers in these key subject areas. The ability of the project to improve the quality of instruction at NUR will result in improved science instruction in the nation's secondary school. In addition, the professors in this department see an important role for themselves as the developers and implementers of in-service training for secondary school teachers. Due to the loss of many teachers during the war and genocide, many science and math teachers are not well trained, and, therefore, the current level of teaching is not adequate for Rwanda's needs.

2. UMD selected experienced professionals with prior international experience to help the Faculty of Education determine how it would use project resources.

3. The professors from NUR are experienced teachers in their subject area and have a sound understanding of the course materials and the limitation of the current pedagogy used in Rwanda. Equally important, they are energized by teaching and eager to try new teaching approaches and learning strategies.

4. The NUR appointed a coordinator for Distance Learning within the Faculty of Education with personal experience using Distance Learning models.

5. Mentors were identified for Biology and Chemistry and a strong personal relationship has developed between mentors and mentees.

6. Three professors from NUR participated in a Science Institute at Prince George's Community College and received some technical training in distance learning technologies. A fourth professor joined the science team for a part of this exchange. This trip helped to increase understanding between the partners, exposed Rwandan professors to active learning techniques and provided basic training in distance learning technologies.

7. In this core area, the Partnership used a familiar technical assistance transfer methodology. It was, therefore, easier for the partners to find common ground and agree to mutual expectations during the pilot phase.

Together, these factors have helped the Distance Learning Core Area produce important results during the pilot phase of this project and lay the foundation for the implementation stage of the project.

Instructional Strategies Used under the Partnership:

One of the biggest challenges facing the teachers in Rwanda is that the students do not have books, labs, and other learning materials. In the absence of these aids, much classroom time is spent transmitting and delivering information that students write in their notebooks. Therefore, little time or energy is left to use "active learning" pedagogy that supports critical thinking, analytic questioning, and problem solving. In addition, the dearth of available laboratory equipment results in the de-emphasis of labs and other hands-on activities. However, the Partners hypothesized that if Rwandan teachers were able to provide students with concise summaries of content in the form of inexpensive, very basic workbooks, teachers would also be able to use classroom time for active learning experiences. In the same manner, the availability of simple, inexpensive lab kits would encourage better learning experiences for both teachers and students. It was decided to support both students and instructors by developing easily adaptable materials that could be used at NUR and then adapted by teachers once they were assigned to secondary schools.

Mentor/Mentee

The second step in the process was to link professors in Biology and Chemistry with mentors based in Maryland. The mentor/mentee relationship is at the heart of the Distance Learning program. Mentors visited the NUR and learned first hand about the problems and possibilities that are a part of the instructional process at the NUR and Rwanda's secondary schools. Together the professors at the NUR and Maryland developed the preliminary design for courses and modules that would provide teaching material with active learning pedagogy and an emphasis on laboratory learning. Mentors developed teaching modules based on this design and also provided books, CDs and other instructional materials for use in classes at the NUR. Mentees worked with their mentors to ensure that materials developed under the Partnership are appropriate to the Rwandan situation. Development of materials for math and physics is planned for phase II. Mentors have been chose for these areas.

Modules

The modules in Chemistry and Biology delivered by the UMD contain material in electronic format. The Faculty of Education will be able to take this content, which contains charts, diagrams and illustrations, and reshape it into a form that will serve the needs of students at the NUR. This allows for greater flexibility in modifying content for different audiences and different levels. The learning activities also include demonstrations and experiments using basic, inexpensive materials.

During the pilot phase, 45 modules were developed in Chemistry and Biology. All modules have been reviewed by independent peer assessors in the U.S. to ensure that they represent a body of material generally regarded as acceptable university-level work in the U.S. (Annex G) These Modules have already been transferred to the NUR in electronic form. Laboratory experiments are being videotaped and will complement the modules.

Some commercially produced videos have also been ordered which will supplement classroom resources. During the implementation phase, these materials will be tested at NUR and adapted based on the recommendations of professors and lecturers at NUR. Of particular interest to both partners is the way AIDS has been used as a case study in the Biology modules. HIV infection has increased dramatically since 1994 with infection rates exceeding 25% among women tested at pre-natal clinics. Because of the creative way the biology of AIDS is used in some modules, the School of Public Health at NUR is also interested in reviewing the modules as they redesign their own public health curriculum.

Science Laboratory

To address the need for laboratory equipment, the partners are trying to identify appropriate and inexpensive lab kits that can be used both at the university and by teachers in the secondary schools. Both Partners are also discussing the ways a mobile laboratory could be used to help rural secondary schools improve the quality of science education.

In-Service Training

Although the first priority of the Partnership is to improve and enhance instruction at NUR, the Partnership will also support in-service training for secondary school science teachers. Many of these teachers have not been formally trained and as such are trying to teach subjects without the proper foundation. This results in very frustrated teachers and poorly prepared students. The Exact Science Department plans to implement the first in-service training in January using Biology modules developed under the Partnership. The design of the in-service training will be determined by the results of a questionnaire that will be sent to science teachers in the Butare area. Funding for these workshops will be provided through the Partnership.

African Literature: Consortium Based Distance Course

Early in the pilot phase, Mr. Charles Karoro expressed a strong interest to join in project activities. Mr. Karoro is a language and literature lecturer at the Faculty of Education who became interested in distance learning during graduate study in the United Kingdom. The Partnership has linked Mr. Karoro with a Trainer for *The Faculty On-Line Training Consortium.* They have been working to develop a distance-education African Literature course that may be offered via *Maryland Online,* a consortium of Maryland based Universities and Community Colleges.

ICONS: Web Based Simulation

Another type of distance learning was used in the Faculty of Social Science. The UMD based International Communications and Negotiation Simulation (ICONS) course/module was incorporated into a Political Science course, *Theory and Practice of Negotiation*. The ICONS simulation involved teams from approximately 15 universities

(13 from the U.S. and two from Africa: Rwanda and South Africa). Each university represented an African government or the Organization of African Unity.

Per the design of the ICONS plan, prior to the three-week asynchronous on-line negotiation students at NUR conducted research with two main objectives: (a) to acquire general knowledge of the country they were to represent in the simulation, and (b) to acquire specific knowledge of one of the three issues to be discussed i.e., conflict, economics, or health. After three weeks of asynchronous on-line negotiation, in which groups posted messages via email, NUR students participated in six 90-minute synychronous conferencing sessions with teams from the other 14 participating universities. This course/module was well received by both students and faculty at NUR and will be used twice during the current academic year. This type of distance learning is very new to students at the NUR and provides a real challenge to students who are using simulations and computer based Internet research and communication tools for the first time. From one point of view, the "Negotiation" course and its ICONS component were successful; the students learned a great deal. However, they did not have the basic equipment listed by ICONS; in particular, there was no printer. In future simulations, a printer will be available and the professor suggested that each group be allowed to print 20 pages of information. For the assessors, this suggestion helped to underline the reality that resources taken for granted in the U.S. are precious learning tools in Rwanda.

Students and faculty identified computer and Internet skills and social science research using the Internet as more important areas of learning for the students than the negotiation skills themselves. Annex G reports these results in greater detail.

Findings and Recommendations for Continued Progress in the Distance Learning Core:

1. A strong personal relationship has developed between the mentors and mentees during the pilot phase. Books and other teaching resources have been provided to NUR through this relationship. It will be important for both partners to find ways to make these resources widely available. In the future it should be clear which contributions are personal and which are professional. **To the extent possible all contributions--whether purchased through the partnership or donated by individuals or companies as a result of partnership facilitation should be commonly identified at NUR and widely available to all professors and lecturers within the Department of Exact Science. The assessors urge the NUR to establish a resource library and a tracking system for all resource materials regardless of source and ensure that they are widely available.**

2. The Partnership has done a good job of identifying equipment gaps. Computers and related equipment have been provided to establish one distance-learning lab at the Faculty of Education, and the Partnership is beginning to identify basic lab kits that can augment science education at NUR and also be used during in-service training. However**, the Partnership should also focus on the way intermediate technologies such as overhead projectors and printed handouts can aid instruction.**

3. Equipment needs will continue to be identified during the implementation phase of the project. There is a desire on the part of NUR to use more print material, but high-speed duplication equipment is not available, let alone resources to cover the cost of paper and expendable supplies. A laptop computer has been provided along with instruction in Power Point, but the projector ordered through the Partnership has not arrived**. Although some of this equipment may be outside the parameters of the project, there should still be continued open discussion about both immediate and long-term equipment needs so that project expenditures in this area are well targeted. The Partnership should be very clear about the allocation of equipment, and the NUR needs to ensure that a specific office at the NUR receives the equipment and has a system for storing the equipment in such a way that it is freely available for the benefit of the Faculty of Education. Maintenance and expendables—such as toner cartridges and paper--should ultimately be the responsibility of NUR, and a plan for funding such expenditures should be a part of any decision to purchase expensive equipment.**

4. Although strong relations have been built with specific professors at the NUR, **the project should benefit all professors and lecturers in the Exact Science Department to avoid dissension among professors and lecturers in a particular discipline and to maximize project impact.**

5. The Faculty of Education is looking for a mentee in Mathematics **A mentor should be ready to work with this individual at the earliest possible time.**

6. There are a number of other partnerships working throughout the NUR. Some are funded by USAID/EDDI (Education for Development and Democracy Initiative) and are using distance-learning strategies to help achieve project objectives. For instance, the Payson Center at Tulane University is working with the School of Public Health to develop a new curriculum using distance-learning techniques. They have developed software similar to *Blackboard* that can be used to build distance courses. This software has two advantages over *Blackboard*. It is free, and Tulane is already planning a training workshop that could include professors from other parts of NUR. Tulane is also interested in the way AIDS has been introduced as a case study in the Biology course. These types of synergies could benefit the Partnership by saving money and human resources and building capacities that cut across Faculties and programs at the NUR. **The Partnership should develop a relationship with other USAID/EDDI funded partners at the NUR. The responsibility for such linkages rests with both NUR and UMD.**

7. The ICONS simulation is currently grouped in the Conflict Management Core Area. **Based on the experience of both the professor and the students, ICONS seems to be a better fit for the Distance Learning Core Area. When the simulation is offered again, the assessors support the idea that students be allowed to print a limited number of pages in support of each working group.**

8. Key participants in the Distance Learning Core Area, as well as the other two Core Areas, are sometimes unclear about how budget decisions are made and the current level of funding for activities. UMD has done a good job of creating flexible funding. There are many examples of where they have facilitated donations to various core areas, thus enabling the Partnership to consider funding additional activities such as the in-service workshops or a science bus. We recognize that funds need to be reserved for future expenditures as these programs evolve. However, in the absence of greater clarity, NUR sometimes feels that the decision to fund or not fund an activity, book or piece of equipment is a bit arbitrary. **The Partners needs to develop more transparent ways to deal with budget issues, and each Partner needs to be responsive to the other. It is also important that all project decisions are done with the full consultation of both parties, and that both parties continue to feel free to question plans and proposed expenditures.**

9. Although the Summer Science Institute at Prince George's Community College was a useful experience for the Rwandan professors, NUR expected the Institute to be for secondary school teachers rather than for primary school teachers. Some NUR professors identified the time at the institute as "sub-optimal**"**. **In making plans for U.S. visits, it is important to prepare participants for the experience so that expectations are realistic and training objectives are met. It is also important for the NUR to prioritize their needs so that UMD can better design these Missions.**

10. Distance learning technologies and software are new in Rwanda, and NUR partners report that basic courses do not give them the confidence they need to use the software effectively**. Additional in-depth training in the use of *Blackboard* and *PowerPoint* should be provided so that professors can develop their own distance learning materials.**

11. Critical print and software resources are needed in all core areas including Distance Learning. The Partnership has done an excellent job of identifying donations of books and equipment for the NUR. **All core areas would benefit from a clear definition, itemization, and prioritization for resource materials required to achieve objectives. Once identified, these materials may be appropriate for line-item funding.**

COMPUTER SCIENCE

Phase One Targets	Phase One Accomplishments	Phase Two Objectives
1. Implementation of ICT/IT Computer Science Curriculum	1. Revised Computer Science Curriculum approved by Faculty Senate Sept 27, 2001	1. Allocation of course development responsibilities
2. Design and Deliver four ICT/IT courses/modules	2. UNIX and C++ courses designed and delivered	2. Two courses or modules to be identified and delivered
3. Establish video conferencing capabilities between NUR and UMD	3. Equipment delivered for one Internet lab (8 workstations, 1 server UPSs) for Computer Science. Installation, configuration and networking completed by the Computer Center	3. First video conference scheduled for 2002 after NUR purchases additional bandwidth
4. Identify courses for phase II implementation	4. Preliminary draft completed.	4. 6 + 2 courses or modules to be identified after assessment
5. Assess and evaluate Phase I activities	5. Assessment completed Oct 30, 2001	5. N/A
6. Design Phase II activities	6. Preliminary design completed	6. TBD by NUR/UMD faculty team

Background:

The Computer Science Department's ICT/IT component of the Partnership was designed to develop NUR's capacity to serve Rwanda's ICT needs. NUR's Computer Science curriculum was designed in 1998 to produce graduates on an academic track. The project intended to adapt this curriculum to give it a more practical application track, thus providing graduates who would have the capabilities to immediately support Rwanda's ICT/IT sectors.

In this two-track curriculum, all Computer Science students would take common courses in the first year of the program. Then in year two, ICT/IT students would take specialized courses that would build the competency listed below:

Computer Science **ICT/IT Core Capabilities**
General system administration and operation expertise
Problem-solving orientation and capability
LAN and WAN design
LAN and WAN administration
NT expertise
UNIX expertise
TCP/IP expertise
ICT/IT applications expertise
Other software applications expertise
Data base management

This initial plan was revised as the partners began to consider the range of courses they would be required to deliver in a two-track curriculum. Therefore, the new Computer Science curriculum, which was approved by the Faculty Senate on September 27, 2001, has only the more practical track that will graduate people who can be information system applications developers, systems administrators, and network managers. (Annex B) The development and approval of a revised curriculum that transforms the Computer Science department from one based on theory and electrical engineering to a curriculum that uses theory to delivery practical applications has required a sustained collaborative effort on the part of both partners. The ability to transform this academic program is a testimony to the solid theoretical program already established by NUR and the willingness and commitment by both partners to adapt that program to the ICT/IT needs of Rwanda's private and public sectors.

Analysis of the Evolving Partnership:

As with each of the Core Areas, the Phase I agenda for Computer Science was very ambitious. Most partnerships require a considerable time to build the respect and confidence necessary to begin the task of working together effectively. The Dean of the Faculty of Science and Technology and the Department of Computer Science were not a part of the conceptual phase of the project, and there was initial concern that the program would not address the very real needs already facing the Computer Science program. Because of an established relationship between UMD and the Computer Center, there were further concerns that the Partnership was being driven by the Computer Center without the important input of the academic side of the NUR. However, the Computer Science Department and the Computer Center worked out these initial problems with the help of the Dean of the College of Science and Technology, and there is now a sound working relationship between the partners. This can be attributed to several factors:

1. The relationships between the NUR Computer Center and UMD had already been established during a previous program funded under the USAID Leland Initiative. Work spanning over 18 months had involved the delivery of Internet equipment, the exchange of personnel to facilitate training on both campuses, and the linking by email of professionals within each university's computer center.

2. The NUR and the Government of Rwanda have a clear commitment to linking the NUR to the world via the Internet and to adapt the NUR Computer Science program to meet the growing demand for systems administrators and network managers throughout Rwanda. (Annex D)

3. The UMD selected seasoned professionals with prior international experience to help the NUR establish an academic ICT/IT program.

4. The existing NUR Computer Science program was already established and in its second year of implementation. Seasoned and dedicated professors, the Dean and bright students were all interested and ready to incorporate ICT/IT competencies into the curriculum.

Without these factors, the Partnership would not have been able to proceed at such a rapid pace. Conditions were right for hard work and impressive results.

Other factors have also helped to lay the groundwork for establishing the NUR as a respected center for the development of ICT/IT academic programs and as a focal point for ICT/IT expansion into Rwanda's private and public sectors.

1. The most important factor was the NUR's commitment to the deployment of Internet-based education to support critical areas within the NUR, to link faculty and students to worldwide events and to provide access to online information resources.

2. The Computer Center at NUR was successful in attracting the first Cisco Academy in Sub-Saharan Africa to the NUR campus in Butare. This Web-based Academy, under Cisco's Least Developed Countries Initiative, provides course material that supports the revised NUR curriculum and enables students to earn Cisco Certification. As an outreach to the broader technical community, this Academy will also assist Rwandan ICT/IT professionals to update their skills using a web-based curriculum continuously updated by Cisco. The Partnership provided support during the application process and facilitated travel for the NUR staff to participate in meetings and training sessions in South Africa, Ghana and Cameroon.

3. The NUR is currently in the process of updating and expanding its Internet equipment and bandwidth so that the university can access new interactive course material available through the African Virtual University (AUV). This course

material will support the revised Computer Science curriculum and other academic programs at NUR.

4. The NUR and the Computer Center have had the foresight to privatize the Computer Center, making it a semi-autonomous unit that has as its chief client the NUR. The Computer Center can also provide services to other fee-paying clients in the public and private sectors. This enables the Computer Center to augment university salaries for its staff thereby retaining technical staff that might otherwise be lured away by higher salaries in the private sector. Based on a business plan that the Partnership will help to develop, earned income will also enable the Computer Center to cover the costs of continually upgrading its equipment.

5. The head of the Computer Center has been a key element in the development of the Rwanda Education Network (RwEdNet). This network, with centers in both Kigali and Butare, seeks to serve eleven different tertiary institutions and a network of technical schools and training centers in all twelve provinces. The network will provide the basis for sharing technical capacity and distance learning capabilities. The NUR Computer Center has recently been awarded a $55,000 planning grant from the World Bank to support the continued development of RwEdNet. The partnership provided technical assistance in this effort. This network supports one of the long-term objectives under this project: *the diffusion of ICT/IT capabilities to other educational, research and private institutions in Rwanda.*

Instructional Strategies Used under the Partnership:

UNIX: Hybrid Distance and Face-to-face

Course development during the pilot year has used two delivery methods. The *UNIX* course used a combination of teaching strategies: direct instruction at NUR by UMD Computer Science instructor Jan Plane; a textbook; print material developed by Ms Plane and made available through the web site, *Blackboard;* Email and regularly scheduled forums where students and instructor could share questions and information using *Blackboard*; and intensive interaction between Ms. Plane and an NUR teaching assistant, Mr. Michel Ndabarasa, who team-taught the course in Butare.

All course materials have now been developed and teaching responsibilities will be completely transferred to NUR over the course of the next year with Mr. Ndabarasa as the sole instructor.
Discussions with Mr. Ndabarasa and students who took this course last year confirmed that learning objectives were achieved. Ms Plane and Mr. Ndabarasa spent many hours on the Internet discussing course material prior to each class period. These required Ms Plane to be online at 5:00 AM so that discussions could happen in real time. Mr. Ndabarasa met with the students each week, helped with projects and proctored exams.

Students could also contact Ms Plane by email. The students stated that the material posted on *Blackboard* by Ms Plane was easier to understand than the textbook. They found the project-based learning very satisfying.

C++: Face-to-face and subsequent video

The second course, *C++*, was taught on site at NUR by Ms Plane and Dr. Robert Spear. These lectures were videotaped at NUR. They are being edited and will soon be available electronically to NUR. These videotaped lectures mark the beginning of a video capability within the Computer Science Program. When the course was taught last year, it combined the use of a textbook, face-to face learning and computer programming projects where students had to apply what they were learning. For the students interviewed, this was the optimal combination for effective learning.

The real challenge for this course is the manner in which the videotapes can be used as the basis for future instruction. The students have not seen the videotapes and therefore were reluctant to comment on their appropriateness as an instructional mode. They suggested, however, that these lectures will need to be combined with other teaching modalities, including: a textbook, a teaching assistant, the complementary use of *Blackboard* and periodic video conferencing with a professor at UMD. These details will need to be worked out between the two partners.

Independent peer evaluators reviewed the course content for both of these courses and found them to be of a standard acceptable in U.S. universities. (Annex G)

Cisco: Training of trainers

Although outside the specific Computer Science Program, the assessors were impressed by the class of 20 women who are participating in the Cisco Academy. Despite fears that the NUR would not be able to find women interested in Cisco training, over 60 women applied for a place in the course. Of these women, the first 20 to apply are half-way through their first semester. Their instructor reports that the women are making good progress even though few of them had any prior experience with computers. The success of the program seems to rest on three key factors. Advertisements were addressed only to women, the instructor is a woman, and the course work does not assume prior knowledge about computing and the Internet. It is clear that more women can be encouraged to enter programs in computer science if some of the psychological and sociological constraints can be reduced. When these women have completed the full program, the instructor intends to begin working with the next 20 on her list of applicants.

<u>Findings and Recommendations for Continued Progress in the Computer Science Core:</u>

1. Now that the new curriculum has been approved (Annex B), the Computer Science Department at NUR is faced with the enormous task of implementing the curriculum with only two professors. Dr. Sisodia and Mr. Singh report that the new curriculum includes at least 25% new material. They have developed a *Distribution of Workload*

Schedule for the current academic year (Annex C). The schedule notes that many parts of the new curriculum can be covered by existing faculty given the availability of time. These courses will be taught face-to-face at the NUR. Other courses will be taught through distance-learning programs provided by the Partnership, the African Virtual University or the Cisco Academy. UMD has been asked to develop a Database Design course during the current academic semester using distance learning technologies. However, the NUR has identified six additional courses that need to be developed for the new curriculum. **NUR and UMD will need to work very closely to identify the individuals who can develop and teach courses in Systems Administration, Website Design, Multimedia Applications, Principles of Programming Languages, Business Telecommunications and E-Commerce. It will be important to differentiate between those courses that can be taught through distance learning programs and those that need a face-to-face format.**

2. Dean Safari, Dr. Sisodia and Mr. Singh are all concerned that there will not be enough lecturers to teach the new curriculum this year. They have already contacted one lecturer at KIST to help meet this short-fall on a part-time basis. Even though the two full time professors at NUR have strong teaching skills in a number of areas, they are only two people, and they will be carrying a very heavy course load. **NUR will need to identify additional teaching staff.**

3. It is likely that some fourth-year students will need to be used during the current academic year as part time teaching assistants. For the following year, the NUR plans to employ some of the graduates as full time teaching assistants. This will begin the longer process of graduate education for junior faculty and the development of well-trained Rwandan faculty that can be the backbone of the Computer Science Department**. There is an immediate need to train more teaching assistants. The Partnership can play an important role in this training and in providing support for more teaching assistants. However, advanced degrees are outside the scope of the Partnership.**

4. There is an acute shortage of books and other learning materials for this expanding program. This year, there are 11 fourth year students, 18 third year students, and 30 second year students. For the future, the NUR plans on admitting 30 students to the CS program each year, so that the full complement of CS program majors will be 90 as of October 2003. In some courses, such as the UNIX course and the C++ course, the Partnership provided each class a set of textbooks. These books have been incorporated into the Department Library and can be available to future learners. However, the luxury of one book per student will no longer be possible.
The availability of textbooks means the Partnership has been successful in getting donations of textbooks for the Computer Science Department. While this is welcome and commendable, it does not begin to meet the needs of the total program. If more applied projects is a goal of the new curriculum, then more textbooks will be required so that students do not need to use excessive class time in taking detailed notes. In 2001, NUR provided $2600 so that Dr. Sisodia could purchase books in India for the Computer Science Library. According to Dr. Sisodia, books in India are much

cheaper than in the U.S., thanks to agreements between the Government of India and key publishers. Therefore, Dr. Sisodia was able to purchase and ship over 500 volumes and interactive CDs. Although these books are printed on cheaper paper, they contain the same material as their U.S. editions. According to Dr. Sisodia, Indian law stipulates that these types of books cannot be sold in Rwanda, but they can be exported for use within a library. **The Partnership should explore the possibility of providing funds for the procurement of additional books and interactive CDs from India.**

5. Support for the revised Computer Science curriculum will require diligence by both partners. Yet both partners face a similar constraint: they are trying to utilize human resources that are also engaged in their own teaching, administrative and research agendas. Project managers have shown much creativity in trying to use cost effective and mutually satisfying arrangements to achieve immediate objectives. However, sometimes creative solutions can have unexpected results. An example of this is the idea to bring Dr. David Jones from the Central Queensland University in Australia to develop and support a system administration course. In the spirit of the Partnership, Dr. Jones was donating his time, UMD was covering transport costs and the NUR was providing housing. However, at the last minute Dr. Jones was unable to travel to Butare. The Partnership is now trying to find alternative strategies to design and deliver the Systems Administration course during the current academic year**. It will be important for the partners to carefully weigh the benefits of such creative arrangements against more expensive but more dependable direct contracts.**

6. The Computer Center has done a commendable job in developing and expanding the NUR computer network, but staff is over extended, particularly for a young program. Many people noted that the NUR network functioned better when a United Nations Volunteer (UNV) was assigned to the Computer Center as its systems administrator. The head of the Computer Center, however, is reluctant to hire people who do not train the staff with whom they work. Annex E demonstrates the progress that the Center has made and their plans to extend the network to more users. **Improved systems administration and increased bandwidth are needed at NUR to support a growing number of distance programs throughout the university.**

7. The mission of this component is to "produce Computer Science graduates who are capable of contributing to the ICT/IT sector in Rwanda upon graduation." The partners in this project have gone a long way in formulating and implementing a process that can achieve this objective. However, both partners have identified a significant constraint to this objective: the lack of printed resources. The newly approved curriculum contains an impressive list of books for instruction and reference. But print material is an almost prohibitively expensive resource for the NUR. Traditionally, universities in Africa have overcome this constraint by utilizing extensive detailed lectures in a subject field that are transcribed by the students and then used as a professional resource following graduation. This model assumes a constant body of information that can be applied over the years. In the field of

ICT/IT this model presents three problems. First, the course work itself needs to be practical and project-based. Secondly, the ability to search for solutions to unique problems requires the application and adaptation of a wide array of set principles. Finally, the rapidly evolving nature of ICT/IT technology means that students need to do more than learn and retain a body of information. They need the skills and understanding to continually update and adapt their knowledge to meet the current situation. To meet these requirements, students need to learn how to use print and electronic resources quickly and accurately during their university courses, and they need to be able to refer to key references once they graduate. This assessment does not see an obvious solution to this problem. UMD has provided some books under the Partnership, but it is unlikely that full class sets can be provided for all students, let alone a set of references that students can take with them upon graduation. The electronic material developed by UMD begins to address this constraint, but for Rwandan students even the cost of paper and printing may prevent some students from developing their own resource library. **The solution to this problem lies outside the scope of the Partnership, but the assessors urge UMD to work with NUR to build models that might help address this serious constraint.**

CONFLICT MANAGEMENT

Phase One Targets	Phase One Accomplishments	Phase Two Objectives
1. Refine research methodology.	1. Two research methodology workshops delivered by CIDCM. IDU established and supported at CCM.	1. Support improved research methodology through work with Memoiré students. Develop database at IDU and design and distribute CCM newsletter.
2. Complete one pilot case study.	2. Efforts to develop Gacaca case study attempted but abandoned as joint project.	2. CIDCM Case Study completed.
3. Develop additional cases	3. Not achieved.	3. Case study activity deferred.
4. Initiate fund-raising efforts	4. Workshop on fund raising delivered by CIDCM. Model developed but not finalized by CCM.	4. TBT by CCM.
5. Initiate CCM and CIDCM research and workshops.	5. Design developed by both partners for regional conference. Joint research of prisoners planned using survey methodology.	5. Deliver at least one regional workshop on conflict management. Complete at least one joint research project.
6. Utilize and refine ICT utilization in support of CCM-CIDCM activities	6. Internet connectivity extended to Rectorate where CCM is located. Two Computers provided. Internet access in Fac. of Ed. near CCM.	6. Connect CCM offices to the NUR internet to facilitate on-line research
7. Assess and evaluate Phase I activities	7. Assessment completed Oct. 30, 2001	7. N/A
8. Design Phase II full-scale activities.	8. Preliminary re-design completed which refines objectives and implementation mechanisms.	8. Implement activities in support of amended Partnership objectives.

In 1998, NUR Rector, Dr. Emile Rwamasirabo, sought assistance from the United Nations Development Program (UNDP) for operational support for a center which would conduct research on the factors of conflict in Rwanda, both historical and present, in order to achieve better understanding of the reasons Rwandans have resorted to violent conflict in the past and to prevent future conflict. UNDP provided an initial grant of $300,000[2] to start the CCM and help it implement its program of research on conflict. With this support, plus USAID's expression of interest and the Rector's vision to enhance the NUR's ability to contribute to national reconciliation goals, the CCM was launched in June 1999, aiming to build "a culture of peace, tolerance, prevention and peaceful settlement of conflicts in Rwanda" based on a need for "an in-depth understanding of the historical, social, political and economical roots of the crisis through action-oriented research".[3] CCM has organized its work into four "axes", each headed by a qualified Rwandan researcher[4]:

1. Origins, consequences and exit strategies from crisis, with particular reference to the genocide and war of 1994
2. Techniques and strategies for prevention and resolution of conflict in the Rwandan context
3. Justice, human rights and governance
4. Economic and social dimensions of the conflict and of the reconstruction of Rwanda.

The Rector, aware of ongoing UMD/CIDCM discussions with the NUR about ICT/IT support, visited UMD at College Park, Maryland in February 1999, and as a result of discussions he had with senior UMD and CIDCM officials, asked that UMD include support to the CCM as part of its plan to assist NUR in ICT/IT enhancement. UMD agreed to include this important Rwandan initiative as part of its proposal to USAID.

In the CA, the objectives of the CIDCM/CCM partnership were described as follows (italics added):

> **"**The overall goal and end-result of the conflict management portion of the Partnership is the *mutual strengthening* of the CCM and the CIDCM. Developing CCM as a center for conflict management and conflict resolution capable of securing independent funding and generating policy relevant and applied research and data, policy options, and the know-how to implement conflict resolution technique is important for Rwandan (and other) policy makers. Without this kind of information the task of conflict resolution and conflict management is much more difficult, and given the Rwandan context, this has a direct impact on social, economic and political development.

[2] To date UNDP has provided a total of $500,000 in operational support costs.
[3] From a brochure created by CCM, undated but believed to be mid-2000
[4] Axis Four is headed by a visiting professor at the NUR who is Congolese.

> "Strengthening the CCM and the CIDCM is essentially *a two-way exchange of knowledge and experience between CIDCM and the CCM*, and more broadly, between the UMD and the NUR. Each institution has complementary interests and capabilities. The UMD can share expertise in research methods, research experience, institutional and administrative management knowledge, and fundraising. The NUR can share their national and regional expertise in the agreed upon areas of exchange, contribute to and facilitate a basis for primary research that would otherwise be unavailable to the UMD alone, and in so doing give UMD students and faculty opportunities that are currently unavailable."[5]

Analysis of the Evolving Partnership:

The assessors found that *CCM and CIDCM have encountered a number of problems operating on the same wavelength and arriving at a mutually agreed set of activities on which both Centers share a sustained sense of joint ownership*. It is important to analyze the process underlining these problems and their significance for the Partnership. While the Partnership has achieved some concrete results during the pilot year, as shown below, the record also reveals considerable debate over specific activities and their content, a recurring debate which seems to mean the two partners have continuing difficulty arriving at a *sustained* vision of the contribution of each Center to the Partnership. Interviews conducted by the assessors provided multiple examples of a "disconnect" between the partners on a variety of issues revolving around the work program.

The idea to incorporate the CCM into the Partnership actually preceded the June 1999 launching of the CCM. The original conceptualization of the Partnership's role at the CCM was developed by the Rector of the NUR and the Director of the CIDCM during meetings in 1998 and early 1999. Based on these consultations, the CIDCM developed the Proposal that forms the body of the Cooperative Agreement. In November 1999, the CCM provided input into the proposal review and affirmed its support. However, it is important to remember that the CCM had only been in existence five months at the time and was just beginning to develop an institutional structure.

In August 2000, detailed consultations in Butare among CCM acting Director Mr. Jean Paul Kimonyo and Ms. Alice Karekezi and Senior CIDCM representatives Ms. Carola Weil and Dr. Kelvin Wong yielded the first operational work plan. However, our interviews with CCM staff reveal the impression that the vision of the Partnership as presented in the CIDCM Proposal and the CA was not shared in common with all CCM researchers. The assessors believe this perception is the result of several realities: (1) By the time the first work plan was developed, CCM researchers were just beginning to engage in a number of research activities supported by other agreements. These agreements used different approaches and mechanism than those proposed in the Partnership. (2) The departure of the previous head of the CCM, Mr. Jean Paul Kimonyo who announced his departure only three and a half months after activities were fully underway, removed an historical link to the way the Partnership activities had been

[5] From the UMD Proposal dated February 14, 2000, pp 22-23

planned. (3) Research products at CCM seem to be developed between specific researchers and supporting institutions. This supports a loose institutional structure not uncommon to research organizations. However, this type of diffused institutional structure does not lend itself to the broader institutional development envisioned by the Partnership.

This situation has led the current CCM Director, whose official title is Scientific Coordinator, and some of his staff to feel that they were presented with a perceived fait accompli and told, in effect, to implement the Partnership. At the operational level, this lack of ownership has led to frequent miscommunications and misunderstandings necessitating numerous meetings and e-mails back and forth in attempts to define and redefine activities that meet both Centers' needs.

The assessors believe that the heart of this problem may rest in two underlying issues: (1) the objectives of this core area as originally defined are far too ambitious for a new and evolving institution such as the CCM; and (2) there has been a lack of consistent and predictable face-to-face contact between the two Centers. The overall project was based on a concept of "faculty exchanges". *This has proven to be insufficient to develop a shared vision and a sound working relationship between CCM and CIDCM*.

The different perceptions enunciated by representatives of both Centers and reflected in the early documentation underline the need for a reassessment at this time in order for Phase Two of the Partnership to jointly "own" a common activity agenda. The following observations demonstrate how the difference in the expectations of the partners have caused consistent problems:

- Mutual Reinforcement of the Centers—"two-way street": CIDCM and CCM presumed that the two Centers would be capable of sharing on something approaching a one-to-one basis on a two-way street with respect to joint research—with CIDCM's strength in research capability and the CCM's strength in Rwanda complementing each other. The two-way-street metaphor in the Proposal has proven to be vulnerable to multiple interpretations, and not necessarily shared in common by the two Centers. This has hampered achievement of the goal of mutual strengthening as stated in the Proposal.

- Products Expected/Produced: CIDCM has conducted seminars on quantitative and qualitative research methodology and grant-writing. CIDCM also trained research assistants for the CCM Information and Documentation Unit (IDU) and is helping CCM supervise a program of support to NUR seniors to write thesis papers (called memoires) on conflict-related topics. While these are most useful *tools* for the CCM, the CIDCM support has yet to successfully relate directly to joint research *products*, and CCM researchers have not been the direct beneficiaries of these efforts. The one serious attempt on joint research--the effort to collaborate on joint Gacaca research--has been abandoned. Based on a review of e-mail communication between the partners through January 2001, it is apparent that a fundamental miscommunication between CIDCM and CCM led to the failure of this effort.

- Complementarity: "The role of each University is to fill the need of the other." (Proposal, p. 13). As shown earlier, the pilot phase has not produced a clear consensus on how to achieve this goal. CIDCM would like to see a higher level of participation by the CCM and, possibly, other parts of NUR, in CIDCM activities at UMD. CCM would like to see more direct capacity-building support in terms of CCM's "mainstream" research agenda. This difference in perception has been the basis of conflict and suspicion between the partners.

- Capacity Building: Phase One was to set the stage for "conflict management expertise and other human resource capacity" (Proposal, p. 17). Enhanced research *tools* provided to CCM by CIDCM could support this objective, but the assessors believe that since the tools are not well understood, it is hard for CCM to see their applicability to their own research program.

- Conflict Management: Phase One was to develop approaches to conflict management and propose a selection of these for Phase Two (Proposal, p.17). This has not been achieved, even though one member of the CCM team does extensive "third-party mediation" training. It should be noted that plans are underway for a regional conference that will support this objective.

- Research Methodology and Case-Study Development: The Partnership was to revise CCM's research methodology and develop other case studies (Proposal, p. 22). The training provided has clearly contributed to better understanding of process (conducting research) but not yet to product (case-study development). This objective is unobtainable without agreement on why and how CCM would like to revise its research methodology.

- IT and Inequality: The Partnership was to have included a theme of "IT and Inequality" (Proposal, p. 20) but this subject has not been addressed in Phase One. This is a result of the series of false starts already noted. Given the panoply of issues identified in the evaluation, it is unlikely that this theme will be addressed in the Partnership under the Conflict Management component.

- Community Outreach: The Partnership was to assist CCM expand its research activities towards community applications. One false start involved a Partnership funded speaker series, which was convened twice, but was discontinued because preliminary CCM work was not completed to USAID satisfaction. Another was CCM participation in a CIDCM fully sponsored conference at UMD by the CIDCM Bahai Chair for World Peace. This was not realized because the invitee thought her participation was exploitative.

- Broadening Support: The CCM was expected to increase and broaden its sources of funding (Proposal, p. 22), and CIDCM would link CCM to other sources of support (Proposal, p. 24). Although CIDCM provided grant-writing training, the CCM is not ready to undertake the exacting and time-consuming task of seeking funding from

private foundations. To date they have only used the easier approach that relies on the generosity and good will of the donor community and the interest of the academic community in the Rwandan situation. CCM has obtained support from other donors, foundations and universities for its research agenda.

Three attempts during the year to achieve agreement on a joint work plan have not yet resolved all the operational disconnects, but the Partnership's implementers have learned some lessons:

1. It appears that the Partnership failed to take full account of the different levels of development and capacity of each Center, focusing on a partnership of equality (the "two-way-street" metaphor cited above). But the CCM, as its own staff readily attest, is a small, lightly staffed research organization (10 people total, including support staff) created only two years ago, while CIDCM has existed for 15 years and has a staff of 16 researchers. Moreover, CCM has not yet coalesced into a viable research center greater than the strengths of its individual researchers. It appears to lack cohesion as a unit, its four "axes" seeming to operate pretty independently. A change in CCM leadership in March 2001 has also hindered the CCM's development, but the new Scientific Coordinator is committed to developing a team ethos.

2. It is not clear that the Proposal fully assessed where CCM was in its stage of development, capacities, expectations and mission, given that the CCM was just starting. But without this clear understanding of what the CCM's needs and capacities were, the Partnership was bound to encounter serious problems at the operational level. This appears to have led to a failure of each Center to deal with the other at its actual stage of development.

3. Expectations were not based on a realistic assessment of what each Center could produce. CCM's other agreements have entailed donor funding of research activities. In the CA set-up, CIDCM controls the budget and with the exception of the Information Documentation Unit (IDU) has not provided any direct financial support to CCM for joint research activities. This has led to a perception within USAID that CCM has not produced much in the pilot year to show for the Partnership. But CCM, within other contracts or agreements and on its own, has produced several studies and participated in a number of national and regional meetings on conflict-related topics.[6] CCM says that these "products" have been materially supported by other partners, and, likewise, CCM would like the CIDCM Partnership to help CCM fund specific joint research activities[7].

4. There are different expectations and understandings about availability of CIDCM staff, especially the ability of CIDCM and other Maryland based scholars to provide time for CCM staff. When in Rwanda, CIDCM staff have all their time

[6] Annex B contains a list of the research publications already produced and being planned by CCM.
[7] Although CCM did not make an explicit request for CIDCM financial support to its research activities beyond the two Research Assistants, it appears clear that this is CCM's preferred mode of operating.

to devote to CCM, but while in Maryland, they are unable to, for example, provide two weeks of attention to a CCM visitor because they have their own teaching and research responsibilities.

5. Multiple (three) attempts to clear the air on a joint work program have not held for long. CCM told the assessors that it sees CIDCM as having a "secret agenda" which CIDCM does not share "transparently"—CCM's own words—with CCM. This is interpreted as meaning that CIDCM is more interested in its own agenda, whose content and dimensions are not at all clear to CCM, rather than in building CCM's capacity. Thus, many in CCM told the assessors that they do not see CIDCM as supporting mainstream CCM activities, but rather working on the margins, pursuing its own research agenda rather than supporting CCM's. A useful metaphor to describe the manner in which some CCM researchers see CIDCM's role in the Partnership is that of a house in which CIDCM does not have its foot in the door, meaning CIDCM's activities are on the fringe of CCM's own program, "not involved at all in CCM's research agenda", as one Axis head told the assessors.

Details of the Agreements Worked out in the Course of the Evaluation:

For many months, the partners have tried to reach agreement on a common agenda. The assessors were also pulled into this struggle. Much time was spent discussing each partner's concerns about a way to work together more productively. We are hopeful that the following activities will form the basis of a real partnership. These are based on earlier discussion among UMD/CIDCM, NUR/CCM, and USAID.

- Memoires: CIDCM will provide a formal course of research training to selected fourth year students for three weeks beginning in January 2002, with the details to be defined between the two Centers. Candidates will be selected by representatives of the two Centers later in October 2001.

- Conflict Management Workshop: Participants will be invited from Burundi, Uganda and South Africa to this regional workshop, to be held in March or April 2002. The agenda and content will be developed in consultation with UNHCR/Rwanda. Representatives of ministries, including local government, NGOs and others will be participating. CIDCM may provide some research expertise if it can be arranged in connection with other Partnership travel to Rwanda.

- Information and Documentation Unit (IDU): CIDCM believes that the two research assistants (RAs) hired under the Partnership are familiar with the techniques of coding. Now the RAs need to pick up the pace of coding. More time is needed to develop an adequate database in order to make the results of the coding more useful and applicable to research needs. The possibility of further assistance from the NUR computer center or the Computer Science faculty will be

explored. The RAs can now begin to work on a newsletter to keep Rwandans informed. CIDCM strongly believes that the CCM needs to take the leadership role with respect to the IDU.

- Joint Research Program: CCM will collaborate with CIDCM researcher, Christian Davenport. Dr. Simone Gisibirege will work with Dr. Davenport on this project. Dr. Davenport will provide training in survey techniques that will be available to the Memoire students on a voluntary basis; other non-memoire students and non-NUR may also participate. This training will be in addition to the planned research methods course scheduled for January 2002 noted above. Following the survey training, 1,000 to 1,500 prisoners (a reduction of 2,500 from an earlier proposal, due to input from CCM) will be interviewed by surveyors employed for this purpose. CIDCM and CCM will work out a budget and financial arrangements. Dr. Davenport and Dr. Gasibirege will agree on shared responsibilities and credit for the research.

Many hours of discussion with CCM and later with a CIDCM representative during the assessment exercise led to another agreement on specific details in which both Centers' needs could be met. These discussions served to air these perceptions and rebuild the relationship on a more realistic basis that serves to meet the needs of each institution. We believe that both Centers now have a more realistic understanding of each other's role and capacities. They understand the importance of each Center's needs being satisfied. CIDCM researchers have standards that must be met, and their work on joint Center research activities must continue to be planned jointly.

This is a healthy sign that, despite the operational hiccups, the two Centers have made progress on defining an agenda that meets each Center's needs. What is missing to date is a more direct connection to CCM's own larger agenda. As shown in Annex B, CCM has succeeded in producing a number of studies and has identified a number of topics for future studies. They are hopeful that one of these topics might interest CIDCM.

<u>Findings and Recommendations for Progress the Conflict Management Core</u>

1. Interviews by the assessors with virtually all individuals contributing to the Partnership between CIDCM and CCM at both the policy and operational levels reveal a number of issues. These include a recurring pattern of miscommunications and misunderstandings, and a failure to date to establish a common operational platform of research. This is caused by what CCM perceives as differing research agendas between the two partners. This creates a sense of suspicion on the part of CCM that CIDCM is more interested in fulfilling its own research goals than supporting those of the CCM. **CIDCM needs to clearly differentiate between training objectives and research objectives even if this means less efficient use of the budget.**

2. Another potential contributor to this dynamic, especially with regard to research, is that there has been an imbalance in the research capability and academic preparedness of research partners. **The Partnership should consider matching researchers with comparable research training when joint or collaborative research efforts are planned.**

3. CCM is a relatively small organization of 10 people, including five senior researchers, with an ambitious research agenda supported under four different agreements: UNDP, UMD, UC/Berkeley and Johns Hopkins University. CCM is managing a series of ongoing research activities among these partnerships and has already completed eight projects, and is seeking financing for five others. **The nature of the CIDCM/CCM relationship must be seen more in the context of CCM's varied research activities. The CIDCM/CCM Partnership should consider providing modest financial support to one or more of CCM's planned research activities(see Annex F). In this way, the Partnership will move from a basic *tools* approach, successful as it has been in enhancing CCM's capacity to conduct research, to include support for discrete *products*.**

4. Difficulty in achieving a smooth operational relationship is due, we believe, to a failure on both sides to have developed a common "ownership" of the research agenda early on at the working level. The challenge now is for the two partners to rebuild the relationship on a stronger footing. The partnership has been implemented through visits between the two institutions. Some of those interviewed expressed the view that *this arrangement does not satisfy the basic requirements for full collaboration*. While the support visits have been productive, they have not been sufficient to develop a fully appreciated Partnership between CIDCM and CCM. **This demands a sustained and concerted effort through a longer-term CIDCM presence at the CCM. The assessors concur with Senior NUR officials' belief that this is necessary if this core area is to have any chance of success on the research front. The two CA partners, USAID and CIDCM, should consider budgetary re-alignments and/or increases to permit recruitment of a full-time researcher/trainer at the CCM whose professional focus would be the CCM and its research agenda. This person would have the following skills:**

    - **Background and degrees in political science research orientation with a focus on conflict prevention and resolution**
    - **French-speaking and -writing capability**
    - **Some background on Africa, either academic or otherwise in the field**
    - **Having a compatible and relevant dissertation subject acceptable to CCM**
    - **Interested and capable of developing social science research skills using a variety of modes and methods**
    - **Candidacy acceptable to CCM**
    - **Strong interpersonal skills.**

    The assessors believe that this recommendation is essential to success in this core area. However even this input is no guarantee that progress can be made. This

recommendation should not be implemented at the expense of the other planned core results in the CA. If ultimately the budget cannot support this recommendation, other means of providing more constant CIDCM support *at* CCM should be undertaken if this core area continues during the life of the Partnership.

5. What CIDCM has conveyed as constructive criticism in its view has sometimes been received by CCM as evidence of a lack of professional respect. This presents a dilemma: CIDCM is an older institution, with worldwide experience in analyzing conflicts and providing conflict-management assistance in the form of analytical expertise and training. CCM is barely two years old, has a staff of 10 that has already produced eight studies, and is struggling to contribute to a small country's recovery and reconciliation from one of the three traumatic genocidal conflicts of the 20th century. These differences in institutional focus, development and maturity make the nature of the relationship inherently unequal. CCM readily recognizes this, but **no partnership can succeed without a strong mutual understanding of purpose and shared results. CCM needs to be more precise about the ways CIDCM can support CCM's development.**

6. The objectives for this core area are overly ambitious and have consistently led to frustration and suspicion. **The objectives should be jointly determined by the partners. We recommend that the objectives be practical, concrete and achievable over the life of the project and be built around the set of activities approved by USAID. The revised objectives should be submitted to USAID for their approval.**

7. Due to the problem this core area has encountered, **the Partners should establish a time line and define tasks to implement the four activities— memoire students, conflict management workshops, the Information Documentation Unit (IDU), and the joint research project. These activities have been in planning since June 2001. Other new activities should not be started prior to successful progress on these four items. If the partners cannot make significant progress on each of these items by May 2002, then the partners should seriously consider re-programming the remaining resources allocated to this core area to other areas that have demonstrated success.**

CONCLUSION

Under a Cooperative Agreement with USAID, the University of Maryland's Center for International Development and Conflict Management (UMD/CIDCM) is assisting the National University of Rwanda (NUR) in three core areas: computer science and information technology applications; distance learning; and research on conflict factors. The assessors found that the individuals associated with the activities being implemented in the pilot phase have worked very hard to contribute to the Partnership's overall success. Progress in the first two of the three core areas of this Partnership between the two Universities is such that the goals outlined for computer science and distance

learning are meeting or exceeding the achievements planned in the first-year pilot phase of this three-year program. This assessment endorses the directions of the two cores, and offers some suggestions to enhance the planned results in the next two-year implementation phase. This progress has been enhanced by UMD's prudent management of the CA budget in addition to its facilitation of extensive material donations from outside the CA budget to core areas.

The assessors have identified a number of problems encountered in achieving a smooth partnership between CIDCM and the NUR's Center for Conflict Management (CCM). Although these problems are significant, the assessors believe that both institutions can benefit from this Partnership. The will to continue is strong, and this can be the basis for rebuilding an enduring relationship. The two Centers share a common commitment to identify and reduce the sources of conflict within societies and between countries. Surely they can find a way to support each other in this important task.

ANNEXES

Annex A: List of Persons Interviewed

National University of Rwanda

- Dr. Emile Rwamasirabo, Rector
- Dr. Jean-Bosco Butera, Vice Rector for Academic Affairs
- Dr. Bonfils Safari, Dean, Faculty of Science and Technology
- Dr. Sosodia, Professor, Department of Computer Sciences
- Mr. Singh, Professor, Department of Computer Sciences
- Innocent Mugisha, Distance Learning Core Coordinator
- Dr. Jean Ntaganda, Instructor, Chemistry Department
- Dr. Jean-Paul Kabuyenge, Instructor, Biology Department
- Dr. Gerard Rwagasana, Instructor, Physics Department
- Charles Kororo, Language and Literature Instructor, Faculty of Education
- Albert Nsengiyumva, Director, Computer Center
- Michel Ndabarasa, Technician and Teaching Assistant, Computer Center
- Clementine Nsanzineza, Computer Technician and Teaching Assistant, Cisco Academy
- Sylvie Mboyo Mukunde, student, Department of Computer Sciences
- Didier Nkurikiyumfora, student, Department of Computer Sciences
- Antoine Sebera, student, Department of Computer Sciences
- Claude Hakizimana, student, Department of Computer Sciences
- Eugene Ntaganda, Coordinator, Center for Conflict Management (CCM)
- Beatrice Biyoga, Administrator, CCM
- Dr. Faustin Rutembesa, Researcher and Head, Axis One, "Origins, consequences and exit strategies from crisis, with particular reference to the genocide and war of 1994"
- Dr. Gisibirege Simon, Researcher and Head, Axis Two, "Techniques and strategies for prevention and resolution of conflict in the Rwandan context", CCM
- Medard Runyange, Researcher, Axis Two, CCM
- Alice Urusaro Karekezi, Researcher and Head, Axis Three, "Justice, human rights and governance", CCM
- Severin Mugongo (sp?), Researcher and Head, Axis Four, "Economic and social dimensions of the conflict and of the reconstruction in Rwanda", CCM

- Alphonse Nshimiyimana, CCM/CIDCM Research Assistant
- Beth Mutamba, CCM/CIDCM Research Assistant
- Susan Mutoni, CCM/CIDCM Administrative Assistant
- Dr. Thomas Turner, Professor, Department of Political Science
- Augustin Museruka, Student, Prof. Turner's ICONS Course

USAID

- Richard Goldman, USAID/Rwanda Mission Director
- Joan Larosa, Program Officer
- Kim Pease, Democracy and Governance Office
- Kaya Adams, D/G Office
- Angelina Allen-Mpyisi, D/G Office

University of Maryland

- Dr. Ernest Wilson, Director, Center for International Development and Conflict Management (CIDCM)
- Dr. Kelvin Wong, Cooperative Agreement (CA) Co-Principal Investigator and Senior Associate, African Telematics Program, CIDCM
- Carola Weil, former CA Coordinator, CIDCM
- Dr. Christian Davenport, Professor of Political Science, CIDCM
- Dr. Anne Pitsche, Professor, Department of Political Science, CIDCM
- Dr. Jan Plane, Professor, Department of Computer Sciences
- Dr. Miranda Scheurs, Professor, Department of Government And Politics
- Dr. Robert Spear, Professor, Computer Sciences, School Of Business and at Prince Georges Community College
- Dr. Mary Helen Spear, Professor, Distance Learning, Prince Georges Community College

Other

- Laura McGrew, Protection Officer, UNHCR/Rwanda

Annex B: Computer Science Curriculum

NATIONAL UNIVERSITY OF RWANDA
Faculty of Science and Technology
B.P.117 BUTARE(Rwanda)
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ACADEMIC YEAR 2001-2002

REVISED CURRICULUM
OF
THE DEPARTMENT OF COMPUTER SCIENCE

DOCUMENT ADOPTED BY THE EXTRAODINARY ACADEMIC SENATE OF SEPTEMBER THE 27TH 2001

INTRODUCTION

Bachelor of Science (B. S.) Program

The National Government of Rwanda has adopted an ICT based plan that is VISION 2020 to achieve the needed economic growth rate and sustain it for socio-economic development. The plan focuses on development of ICT based growth-engine as an alternative to agro-based growth engine for the economy. Realization of the Rwandan Government's near term objectives for Information and Communication Technologies (ICT) can only be achieved by the rapid increase of ICT-trained professionals (see the GOR report entitled "An Integrated ICT-led Socio-Economic Development Policy and Plan for Rwanda (2001-2005) [abridged version]"). These professionals will come primarily from the country's higher educational institutions, especially the NUR, and, within the NUR, from the Computer Science Programme.

To help build the knowledge-based economy, NUR's CS graduates will need to be able to implement business solutions for both public and private enterprises. Graduates will need to fill three primary roles upon graduation: *system administration, network administration, and software development.*

The purpose of this curriculum revision is to insure that the CS curriculum is meeting the programmatic objectives, has adequate resources, and is preparing students to help the country meet the objectives for Rwanda's ICT initiative.

This undergraduate degree program includes theoretical computer science and mathematics, along with practical applications of computer technology to the world of information systems, telecommunications, and networks. The curriculum prepares the student for immediate employment upon graduation as a systems analyst/programmer, network administrator, systems administrator, Web developer, or business applications developer. The curriculum also provides the necessary foundation for advanced specializations in information technology, information systems, technology management, and related disciplines.

The B. S. Program is divided into two distinct but compatible parts: the Core Curriculum (two semesters) and the Professional Curriculum (six semesters). The Core Curriculum, covered during the first two semesters, consists of a package of compulsory courses in Technical English, Physics, Chemistry, Mathematics, Engineering Sciences and Technical Arts. The Professional Curriculum consists of courses and Project Work. The details of courses of the professional curriculum are given below and will also be published periodically by the department.

The Professional Curriculum

YEAR 2, SEMESTER 3
CSCS 0706205
Introduction to Computer Science: (45H –0 0 –30H) 75H

Objective:

An introductory course designed to provide students with a fundamental understanding of computers. The course familiarizes students with the interaction of computer hardware and software. This course is presented during the first half of the semester.

To develop an understanding of historical, current, and future trends in computing that will enable one to comprehend better and react to new applications and technologies as they evolve in the coming years.

To develop an understanding of the use of computing as an intellectual tool in the solving of problems, the manipulation of information, and the enhancement of learning.

Course Contents:

1. Introduction to computers
2. Block diagram
3. Concepts of hardware and software
4. Input and output units
5. General operating system principles
6. Overview of Microsoft Windows:
   Graphical User Interface - Windows - Features of Windows
7. Algorithms and flowcharts
8. Classification of different languages and packages
9. Introduction to programming with Visual Basic

Lab

Students work on projects with the Windows operating system and with Visual Basic.

Books and References:

1. Computers, by Long and Long. Prentice Hall, 2001.

2. Computing Today by David R. Sullican, T.G. Lewis, Curtis R. Cook

3. Introduction to Computers by V. Rajaraman,

4. Manuals for Windows 98 and NT

5. Introduction to Computer Programming in Visual Basic 6.0 by Spear and Spear, Harcourt College Publishers, 1999.

CSIT 0706205
Introduction to Information Technology with Applications: (30H -0 0 –45H) 75H
Objective:

The objectives of this course are:

1. To provide laboratory and theoretical instruction on how to use software in the categories of operating systems, word processing, spreadsheets, database management systems, email, and Web browsers.

2. To develop an understanding of historical, current, and future trends in computing that will enable one to comprehend better and react to new applications and technologies as they evolve in the coming years.

3. To develop an understanding of the use of computing as an intellectual tool in the solving of problems, the manipulation of information, and the enhancement of learning.

Course Contents:

1. Computer terminology and concepts.

2. Introduction to database management systems, spreadsheets, and word processors.

Word Processing:

a. Concepts and applications
b. Skill development
c. Command structure
d. Creation and manipulation of text

Spreadsheet:

a. Concepts and applications
b. Skill development
c. Command structure
d. Creation and manipulation of spreadsheets

Database Management:

a. Concepts and applications
b. Skill development

c. Command structure
d. Creation and manipulation of databases

3. Interconnecting Computer Resources:

a. Introduction to Networks and to the Internet in particular.
b. Electronic mail/bulletin boards
c. Electronic database retrieval systems
d. Importing information from a network to a local application.
e. Navigating the web; basic file operations; understanding large distributed network file
structures; using on-line help to solve problems.
f. Creating web pages.
g. IP addresses resolution

Books and References:

1. Grauer and Barber, Exploring Microsoft Office 2000, Volume I (Revised), Prentice Hall, 2001.
2. Gretchen Marx, Exploring the Internet with Internet Explorer 5.0 and Front Page 2000, Prentice Hall, 2000.
3. Manuals of WIN 98/NT/ME/2000/XP.
4. Edward G. Martin and Charles S. Parker, Mastering Today's software, Windows 98/Office 2000. Harcourt College Publishers, 2000.

CSCP1 0706204
Computer Programming I (using Java) (15H – 15H – 30H) 60H

Objective:

To understand general programming concepts, as well as a modern programming language which illustrates those concepts. Students will design, implement and test Java programs to solve problems. This course is presented during the second half of the semester.

Contents:

Introduction to programming, JAVA syntax, operators, castings, and control flow statments. Introduction to OO programming . Overloading and recursion. Access control, inheritance, Abstract class, Packages and Interface. Exception handling. Multithreading, Applet Programming, Advanced JAVA classes, Streams, JAVA foundation classes. GUI development. More specifically, this will include:

1. The Microsoft Visual environment
2. Problem Specification and Program Design
3. Java Program Structure

4. Primitive Type Variables and Constants
5. Objects, Methods and Functions
6. Input and Output
7. Conditional Statements
8. Iterative Statements

Books and References:

Wu, C. Thomas. An Introduction to Object-Oriented Programming with Java. McGraw Hill, 2001.

Deitel & Deitel. Java: How to Program. Prentice Hall, 1996.

Savitch, Walter. Java: An Introduction to Computer Science & Programming. Prentice Hall, 2001.

Patric Naughton and Herbert Schildt - The Ccmplete Reference JAVA. TATA McGraw-Hill Publishing Company Ltd.

Laboratory:

The students will design and implement programs in a Microsoft Windows environment with which they are already familiar from the Introduction to Information Technology Course. There should be several smaller projects developed for each class period plus at least one larger project that covers several weeks of development and implementation.

MAAN 0706207
Analysis – II: (60H – 45H – 00) 105H

Course offered by Mathematics Department

MAAL 0706204
Algebra – II: (30H – 30H – 00) 60H

Course offered by Mathematics Department

MNGT 0706205
Business Organization and Management (45H – 30H – 00) 75H

Objective:

To enable the student to have an understanding of basic industrial organization and management process focussing on the role of computer scientist.

Contents:

Introduction to Business organization, types of industries, organization types, and their comparative outlook-structure of business-public sector and private sector-size of industry-small, medium and large scale enterprises-structure of enterprise, entrepreneur and entrepreneurship-factors influencing entrepreneurship- entrepreneurship in Rwanda.

Introduction to management-nature, scope and significance-History of management development-Management process-Planning-Organizing-Staffing-Leading and controlling

Management in Action-Human Resource Management-Marketing Management-Production and operations Management-Financial Management-Information Management highlighting computers for Management

Synthesis of management for computer scientists with a specific focus on Rwandan situation.

Discussion:

(1) Understanding of business and industry types in Rwanda
(2) Understanding of industry size and structure in Rwanda with a focus on legal aspects
(3) Understanding of the extent of use of computers in management in Rwanda
(4) Understanding of the role and significance of management for computer scientists

Books:

1. Martin W. Buckley (1994) The Structure of Business.(3e) Longman
2. Robert C. Apply by (1994), Modern Business Administration (6e), Financial Times/Pitman publishing, London
3. Richard Petting (1997), Introduction to Management, (2e), Macmillan Business, London
4. Harold Koontz and Heinz Wehirich (1999), Essentials of Management, Tata-Mcgraw-Hill, New Delhi.

Year 2, Semester 3 Totals: (225H – 120H – 105H) 450H

YEAR 2, SEMESTER 4

CSUO 0706206
Introduction to UNIX Operating System: (45H -0 0 –45H) 90H

Objective:

This course introduces modern concepts in computer use to students from all disciplines. Upon successful completion, the student will be able to use the unique capabilities of the UNIX operating system to solve a wide variety of day-to-day computing problems. The primary objective of this course is to learn principles of problem solving using UNIX. Particular emphasis will be placed on the concepts underlying the construction and integration of software tools. Specific tasks, such as sorting, report generation, and data analysis will be studied as examples.

Course Contents:

1. Introduction to UNIX Operating System
2. The history of UNIX; logging in; passwords
3. The shell
4. The file system; files; directories; navigating
5. Text editing - the vi editor
6. I/O redirection; standard input; standard output
7. Filters
8. Filter examples
9. Pipes; constructing new tools
10. Pattern matching: grep
11. File name pattern matching
12. Stream editing: sed
13. Shell scripts: motivation, basic concepts
14. Shell scripts: variables
15. Shell scripts: control flow
16. Shell scripts: examples
17. Programmable filters: awk
18. Text processing: find
19. Basic document formatting: creating a paper

Lab Objective:

This lab aims at providing students with a sound working knowledge of the Unix operating system and also introduces them to the C programming language. The later introduction is deliberately kept to minimum as in the absence of advance knowledge on data structures and algorithms courses, the students are likly to pick up bad programming habits if they attempt to do large software development in C at this stage. More specifically, any detailed discussion on pointers is avoided. However, essential basic features are covered.

Lab Contents:

Introduction to the UNIX operating system, vi and emacs editors, concept of shell, environment variables, notion of UNIX processes and memory management, pipes.

UNIX file system and directory structure, regular expression, basic UNIX commands, Stream editor sed, utilities like, cut, paste, sort, etc.

Shell programming language, AWK, PERL and other tools

Program development and maintenance tools, MAKE.

Books and References:

1. B.W. Kernighan and R. Pike. The UNIX Programming Environment. Prentice-Hall, 1984.
2. AT & T. UNIX System User's/Programmer's manual.
3. M.J. Bach. Design of the UNIX operating system. Prentice Hall of India.
4. R. Thomas. Advanced Programmer's Guide to UNIX System V. McGraw Hill,1989.

CSCP2 0706206
Computer Programming II (using Java) (30H – 15H – 45H) 90H

Objective:

This course will directly follow from the content of the Computer Programming I course. The content and project difficulty level should pick up directly where that course finished. The students should develop in this course the ability to create their own classes. The data storage should become more complex to include arrays. Sorting and searching within those arrays should also be a major topic.

Contents:

Swing programming, JAVA beans, JAVA networking, JDBC, remote method invocation. Introduction to COM and CORBA, JAVA IDL. Servelet Programming, JAVA server pages. JECF, Java security. Introduction to EJB. More specifically:

1. Emphasis on User Defined Classes
2. Static methods and variables
3. Characters and Strings
4. One-dimensional Arrays
5. Multi-dimensional Arrays
6. Algorithms for Sorting and Searching Arrays
7. Composition of Classes (one class having another as a member)
8. Inheritance
9. Recursion

Textbook (continuing the book from the previous semester):

Wu, C. Thomas. An Introduction to Object-Oriented Programming with Java. McGraw Hill, 2001.

Deitel & Deitel. Java: How to Program. Prentice Hall, 1996.

Savitch, Walter. Java: An Introduction to Computer Science & Programming. Prentice Hall, 2001.

Patric Naughton and Herbert Schildt - The Ccmplete Reference JAVA. TATA McGraw-Hill Publishing Company Ltd.

Laboratory:

The students will design and implement programs in a Microsoft Windows environment with which they are already familiar from the Introduction to Information Technology Course. There should be several smaller projects developed for each class period plus at least one larger project that covers several weeks of development and implementation.

MANA 0706205
Numerical Analysis: (45H –0 0 –30H) 75H

Course offered by Mathematics Department

MAPS 0706204
Probability and Statistics: (30H –30H –00) 60H

Course offered by Mathematics Department

ACCS 0706206
Accounting for Computer Scientists (45H – 15H – 30H) 90H

Objective:

To introduce the financial accounting concepts, principles and practice of record keeping, journalising and preparation of financial statements using computers.

Contents:

Introduction to accounting-basic concepts-accounting equation double entry book-keeping journalising, ledger preparation, trial balance- treatment of fixed assets, stock, cost of goods sold-sales-purchases-debtors and creditors-owners equity, debt and working capital-

Preparation of trading account, income statement and balance sheet using computers spreadsheet application relating to accounting practice.

Use and application of Peach Tree or Tally or Pastel Accounting software in the preparation of journals, ledgers and final accounts.

Practice/Lab:

2. Preparation of manual accounts, Journal, ledger, trial balance and final accounts.
3. Understanding of spreadsheet applications
4. Use and practice of at least one Accounting Software package from among Peach Tree, Pastel and Tally.

Books:

1. Dale H. Klooster and warren W. Allen, (1990) Integrated Accounting on Micro-Computers, South-Western Publishing Co, Ohio.
2. John Page and Paul Hooper (1985) Microcomputer Accounting and Business Application Restore Publishing company, Inc., Restore.
3. Arthur Hindmarch and Mary Simpson (1991) Financial Accounting: An Introduction, Macmillan, London
4. Jill Hussey and Hussey, (1999) Business Accounting, Macmillan Business, London

Year 2, Semester 4 Totals: (195H – 60H – 150H) 405H

CSTR 0706204 Vocational Training/Internship – 4 weeks

YEAR 3, SEMESTER 5

CSDM 0706304
Discrete Mathematics: (45H – 15H – 00) 60H

Course offered by Mathematics Department

Objectives:

A systematic study of mathematical concepts including their applications that are fundamental to Computer Science and Engineering.

Course Contents:

Set theory:Basic concepts, subset, set operations, power set, Methods of proof for sets - using definitions, using previously proven results and proof by Contradiction method. Relations: Basic concepts, Graph and matrix of a relation, properties of a relation. Functions: Definition and notation, 1-1 onto and 1-1 and onto, composition, Identity and Inverse, related results.

Peano's axioms, Mathematical induction (simple and strong), Pigeonhole principle. Algebraic structures - properties, Semi group, Monoid; Group and Sub group - examples and standard results.

Cyclic groups - Application - Fast adders, Cosets, Factor Groups, Permutation groups, normal sub groups, Homomorphism and Isomorphism of groups, examples and standard results. Rings and Fields (only definition and examples).

Propositional calculus - propositions, logical operators, truth tables and propositions generated by a set recurrence relations - partial and total recursion - problems.

Generating functions, Graph theory - Basic concepts and definitions, Matrix representation, storage representation, incident matrix and adjacency matrix - standard results.

Books and References:

1. J. P. Tremblay and R. Manohar, Discrete Mathematical structures with Applications to Computer Science, McGraw Hill, 1975.

2. C. L. Liu , Elements of Discrete Mathematics, McGraw Hill,1987.

3. M. A. Arbib, A. J. Kfowry and R. N. Moul , A Basis for Theoretical Computer Science, Springer Verlag,1988.

4. S. Sahni, `Concepts in Discrete Mathematics' Narosa, Delhi, 1989.

5. N. Biggs `Discrete Mathematics;, Oxford/Clarendon Press, 1985.

6. F.R. Norris, Discrete Structures: An Introduction to Mathematics for Computer Science, Prentice Hall, 1985.

7. A Gill, Applied Algebra for Computer Sciences, Prentice Hall, 1976.

CSSA 0706306
Computer Systems Architecture: (45H – 15H – 30H) 90H

Objective:

This course introduces the basic concepts of computer architectures. It starts with the structure of subsystems and covers the organization of the overall system.

The student will develop an instruction set for a computer, and convert it to specifications for building the corresponding digital system, and experience how computer simulation can verify functional behavior of a system of significant complexity.

Course Contents:

Basic structure of Computers: Stored program concept - Basic operational concepts - Functional units - Machine language - Concept of memory locations, addresses - Addressing modes, Instruction formats - Instruction execution.

Case Study: Motorola 68000 - features - Addressing modes - Assembly language - I/O programming - Stacks - Subroutines. Processing Unit: Internal BUS structure (Single bus, Two bus & Three bus) - Execution of instructions - Control step sequence.

Control design: Hardwired control - design methods - multiplier control unit - CPU control unit. Microprogrammed control - microinstructions - Sequencing – Prefetching – pipeline architectures.

Arithmetic operations in a computer - addition & substraction of positive & negative numbers - fast adders - multiplication of positive numbers - signed operand multiplication - fast multiplication - integer division - floating point numbers and operations. Design of Arithmetic unit.

Memory organization: Basic concepts - Semiconductor RAM, ROM memories - Memory interleaving - Cache memories - virtual memories.

Input-Output organization: I/O addressing - Data transfer - Synchronization - Interrupt handling - I/O interfaces - I/O channels.

Books and References:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne. Operating System Concepts, 6th Edition. John Wiley & Sons, 2001.

2. V. C. Hamacher, Z. G. Vranesic and S. G. Zaky, Computer Organization, Second Edition, McGraw Hill, 1988. (Text book)

3. J. P. Hayes, Computer Architecture and Organization, Second Edition, McGraw Hill, 1988. (Text book)

4. William Stalling, Computer Organization and Architecture, Principles of Structure and Function, Second Edition, William Stalling, Macmillan, 1990.

5. A. S. Tanenbaum, Structured Computer Organization, Third Edition, Prentice Hall of India, 1983.

6. Rafiquzzaman and Chandra, A modern Computer Architecture, Galgotia.

CSCP 0706306
C++ with Elementary Data Structures (30H – 15H – 45H) 90H

Objective:

To continue the study of computer programming from the Java course by exposing the students to a new (but similar) programming language through the level of the implementation of elementary dynamic data structures.

Contents:

1. Syntactic and Conceptual Differences between Java and C++
2. Arrays as used to implement Stacks and Queues
3. Using Classes and Encapsulation to Emphasize the Abstract/Concrete Data Structures Distinction
4. Pointers and Dynamic Memory Allocation and De-allocation
5. Dynamically Allocated Arrays
6. Dynamic Data Members within a Class
7. Dynamic Instantiation of an Object
8. Linked Lists as used to implement Lists, Ordered Lists, Stacks and Queues

Textbook:

Model, Mitchell -- Data Structures/ Data Abstraction: A Contemporary Introduction Using C++, Prentice Hall, 1994.

Langsam, Yedidyah, et al. -- Data Structures Using C and C++, Prentice Hall, 1996.

Decker, Rick & Stuart Hirshfield -- Working Classes: Data Structures and Algorithms using C++, PWS Publishing Co., 1996.

Laboratory:

These projects should emphasize both the change in language and a change to using the UNIX system as an environment for development (so the students become comfortable in both). There should be one project for each of the major types of concrete data structures. These should be relatively large projects as is appropriate for the number of lab hours associated with this course.

CSNT1 0706306
Networking I (30H – 00H – 60H) 90H

Objective:

The students will be able to understand and apply the basic networking concept in assessing and designing a network based solution.

Contents:

1. Basics of Networking
2. Contrasting OSI and TCP/IP Models
3. Local Area Networks
4. Layer 1 - electronics, signals, media, connections and collisions
5. Layer 2 - LAN standards, naming, Token-Ring, FDDI, Ethernet, Data Flow
6. Design and Documentation
7. Structured Cabling Project
8. Layer 3 - Routing, Addressing and Protocols
9. Layer 4 - Transport Layer
10. Layer 5 - Session Layer
11. Layer 6 - Presentation Layer
12. Layer 7 - Application Layer

Textbook:
Cisco Networking Academy Program - Semester I

Laboratory:

Lab Activities as described by the Cisco Networking Academy

CSBT 0706304
Business Telecommunications (30H – 15H – 15H) 60H

Objective:

This course will provide system administrators and network administrators with the basic knowledge and techniques needed to effectively manage all of the telecommunications components of an organization's ICT functions.

Contents:

Concepts of business data communications and data processing. Application of these ideas in computer networks, including basic principles of telecommunications technology, computer network technology, data management in distributed database systems, and management of the technical and functional components of telecommunications technology.

Textbook:

Goldman, James (1995). *Applied Data Communications.* John Wiley & Sons.

Laboratory:

Working in small teams, students will prepare a telecommunications requirements analysis and strategic plan for a medium-size distributed public or private organization. This plan will include the integration of telephone (POTS), videoconferencing (on ISDN), and IP technologies (for Internet or Intranet connectivity), along with local or wide area networks, as appropriate. The plan must be realistic for the Rwandan environment and realizable within three years.

Year 3, Semester 5 Totals: (165H – 60H – 165H) 390H

YEAR 3, SEMESTER 6

CSDB 0706306
Database Design (30H – 30H – 30H) 90H

Objective:

Students will be able to create a data model of a business function, design relational tables from that model, and implement a database application using a commercial database management system.

Contents:

Introduction to basic concepts and techniques of database management systems, including data modeling, E-R diagrams, relational databases, table designs, normalization, entity and relational integrity constraints, and Structured Query Language. Also includes examination of current issues in large database implementation: on-line analytic processing, data warehouses, data marts, database administration, data administration, distributed databases, concurrent processing, database security, database recovery, and databases on the Internet. Discussion of alternative database models: hierarchical, inverted, network, and object-oriented.

Textbook:

Kroenke, David. (2001). *Database Processing: Fundamentals, Design, and Implementation*. 8th edition. Prentice-Hall, 2001.

Laboratory:

Practical exercises using a modern database management system (DBMS software, such as Microsoft Access, SQL Server, or Oracle). Exercises designed to develop and practice student skills as budding database designers will be accomplished in conjunction with a small group. Active participation in the group is a critical aspect of the learning process, since almost all professional database analysts work in project teams. Each student group will prepare a complete set of data models, and will then design and implement a

database application, including tables, table constraints, table relationships, forms, reports, macros, code modules, and Web pages.

CSAA 0706304
Analysis of Algorithms: (30H -3 0 – 00H) 60H

Objective:

This course emphasizes on algorithms at a level above the programming level and without emphasis on software module development. Emphasis will be placed on matching the appropriate data structures and algorithms to application problems: analysis of algorithms is crucial to making proper selections, so analysis is important in the course. The course is closely tied to CS 621 (Implementation of Dynamic Data Structures).

Course Contents:

Introduction: best-case, worst-case, and average-case analysis; why asymptotic complexity is important

Asymptotic notation: definitions of big-O, big-Omega, big-Theta, little-o, little-omega

Summation formulas and properties: arithmetic series, geometric series, harmonic series, operations on series, putting bounds on summations

Solving recurrences: induction, iteration, and the three cases of the Master Theorem

Graphs and Trees

Heaps: Heapify, Build-Heap, Heapsort, and their complexity analyses; priority queues using heaps

Quicksort: the Quicksort, Partition, and Randomized Quicksort algorithms; complexity analyses for special cases

Sorting in linear time: counting sort, radix sort, and bucket sort, and their complexity analyses

Finding medians and order statistics

Hash tables: direct-address tables, hash tables, hash functions

Quick review of binary search trees

Dynamic programming: the shortest-path problem and the matrix-chain multiplication problem optimal substructure, overlapping subproblems, memorization

NP-Hard and NP- complete problems: Basic concepts- Reducibility - Cook's theorem (without proof) - Turing Machines - NP-Hard Graph Problems

Books and References:

1. E. Horowitz and S. Sahni. Fundamentals of Computer Algorithms, Galgotia, 1991. (Text book)

2. Cormen, Leiserson, and Rivest. Algorithms, MIT Press, 1990.

3. V. Aho, J. E. Hopcroft, and J. D. Ullman. The Design and Analysis of Computer Algorithms Addison Wesley, 1974.

4. Thomas Cormen, Charles Leiserson, Ron Rivest, Introduction to Algorithms, McGraw Hill and MIT Press, 1990.

CSPL 0706306
Principles of Programming Languages: (45H – 15H – 30H) 90H

Objective:

Upon successful completion of this course, the student will be able to compare major features of programming languages and methods to define, implement and translate computer languages. The student will study methods of data and sequence control, the design of modern programming languages from software engineering perspective, with stress on advanced programming language features.

Course Contents:

Introduction, Role of structure in programming, Elements of a programming language, Programming with assignments, Type names and Type equivalence, Run time organization, Parameter passing methods.

Object-oriented programming - Data Encapsulation, Classes in C++, Derived classes and Information hiding, Inheritance and Polymorphism in C++.

Functional Programming - Introduction to LISP, Lists, some useful functions, ML - Static type checking, Exception handling in ML, Storage allocation for lists.

Logic programming - Computing with relations, Introduction to Prolog, Data structures in Prolog, Programming techniques, Control in Prolog, Cuts.

Parallelism - Synchronization - Concurrency - deadlocks - mutual exclusion - monitors. Concurrent programming - communicating sequential processes: introduction, concepts

and notation, parallel, input-output commands, guarded commands, alternation, classical problems.

Students will accomplish one project in each of the language families: a procedural language, an object-oriented language, and a functional language, as well as one project dealing with concurrent processing.

Books and References:

1. R. Sethi, Programming Languages - Concepts and Constructs, Addison Wesley, 1989.
2. E. Horowitz , Fundamentals of Programming Languages, Galgotia, 1983.
3. D. A. Watt. Programming Languages and Paradigms, Prentice-Hall, 1990.
4. J. LLoyd. Foundations of Logic Programming, Springer Verlag, 1984.
5. M. Hennessey. The Semantics of Programming Languages, John Wiley, 1990.
6. Luca Cardelli and P. Wegner. On Understanding Types, Data Abstraction and Polymorphism, Computing Surveys, 17(4), pp. 471, 1985.
7. C. Reade. Elements of Functional Programming, Addison Wesley, 1989.
8. L. C. Paulson. ML for Working Programmer, Cambridge University Press, 1991.
9. B. Stroustrup. The C++ Programming Language, Addison Wesley.

CSDS 0706306
Implementation of Dynamic Data Structures (30H – 00H – 30H) 60H

Objective:

To Continue the Elementary Data Structures Course in such a way that the students are able to implement the data structures and the algorithms to deal with those structures. The algorithms will be analyzed in the Analysis of Algorithms course (CS 611).

Contents:

1. Binary Trees
2. Binary search trees
3. AVL trees
4. Hash Tables
5. Graphs

Textbook (continuing the book from the Elementary Data Structures Course):

Model, Mitchell -- Data Structures/ Data Abstraction: A Contemporary Introduction Using C++, Prentice Hall, 1994.

Langsam, Yedidyah, et al. -- Data Structures Using C and C++, Prentice Hall, 1996.

Decker, Rick & Stuart Hirshfield -- Working Classes: Data Structures and Algorithms using C++, PWS Publishing Co., 1996.

Laboratory:

These projects should emphasize the larger dynamic data structures and continue the language and environment of the elementary data structures course. This course should not cover the analysis or comparisons of the algorithms, but should instead concentrate on the selection and implementation of these structures. There should be one project for each of the major types of concrete data structures - even if the abstract data structure implemented is the same. These should be relatively large projects as is appropriate for the number of lab hours associated with this course.

CSSA 0706306
System Administration and Low Level Programming (30H – 15H – 45H) 90H

Objective:

To introduce the students to the lower level of computer systems administration including UNIX tools and the C programming language. After this course, students will be able to detect system attacks, know what common risks are (DOS attacks, worms, etc.), and know where to go for information (eg: CERT).

Contents:

System administration topics such as drivers, system files, and tools are important for the future system administrator. The level of the C programming language needed for system calls would also be important. This would include things like the abilities to fork multiple processes, handle interprocess communication, and control signals.

Students will also use available scripts to break into a system to see how easily it can be done and observe the activity from both sides.

Textbook:

Brian W. Kernighan, Dennis M. Ritchie. C Programming Language, 2nd Ed. Prentice Hall, 1988.

Jack Dent and Tony Gaddis. Guide to UNIX Using Linux. Course Technology, 2000.

Laboratory:

CSNT2 0706306
Networking II (30H – 00H – 60H) 90H

Objective:

The student will be able to manage the service and the trafic on the network.

Contents:

1. Examine Router Elements (RAM, ROM, CDP, show)
2. Describe Connection-oriented network service and connectionless network service and identify their key differences
3. Define Flow Control (3 basic methods)
4. Identify the functions of the TCP/IP transport layer protocols
5. Manage Configuration Files from the privileged exec mode
6. Identify the functions performed by ICMP
7. Control router passwords, identification, and banner.
8. Identify the main Cisco IOS software commands
9. IP addressing
10. RIP and IGRP routing
11. Configure, Monitor, Verify and Filter IP traffic

Textbook:

Cisco Networking Academy Program - Semester II

Laboratory:
Lab Activities as described by the Cisco Networking Academy

Year 3, Semester 6 Totals: (195H – 90H – 195H) 480H

CSTR 0706308 Vocational Training/Internship – 8 weeks

YEAR 4, SEMESTER 7

CSOS 0706406
Operating Systems: (45H – 15H – 30H) 90H

Objective:

This course basically introduces the fundamental concepts of operating systems, and also provides some experience in implementation.

Upon successful completion of this course, the students will be able to write a simple operating system that performs
1. interrupt processing
2. spooling and unspooling
3. multiprogramming
4. storage management

and compare several schemes for
1. memory management
2. storage (disk) management
3. file management
4. processor management

The Students will also be able to solve a problem requiring the synchronization, via semaphore operations, of processes/threads executing within a shared memory. Depending upon the computing platform chosen, the implementation of the correct solution should execute on a Unix or Windows NT computer.

Course Contents:

Introduction.

Process management: process synchronization and mutual exclusion, two process solution and Dekker's algorithm, semaphores, examples (producer-consumer, readers-writer, dining philosophers, etc.).

CPU scheduling: multiprogramming and time sharing, scheduling approaches (SJF, FIFO, round robin, etc.).

Input/Output: device controllers and device drivers, disks, other devices.

Memory management: with and without swapping, virtual memory - paging and segmentation, page replacement algorithms, implementation.

File systems: FS services, disk space management, directory and data structure.

Deadlocks: modeling, detection and recovery, prevention and avoidance.

Example Systems: Unix, MSDOS.

Books and References:

1. J. Peterson, A. Silberschatz, and P. Galvin. Operating System Concepts, Addison Wesley, 3rd Edition, 1989.

2. M. J. Bach. Design of the Unix Operating System, Prentice Hall of India, 1986.

3. Silberschatz and P. Galvin. Operating System Concepts, Addison Wesley, 4th Edition, 1994.

4. L. Bic and A. Shaw, The Logical Design of Operating Systems, Second Edition, Prentice Hall, 1988.

5. B.W. Kernighan and D.M. Ritchie, The C programming language, Prentice-Hall Inc., Englewood Cliffs, 1978.

6. M. J. Young, Systems Programming in Turbo C, Sybex, 1988.

7. Turbo C and PS/2 manuals, available in the WAM labs.

CSMM 0706406
Multimedia Applications Design (30H – 15H – 45H) 90H

Objective:

This course will serve to develop the understanding of the concepts and related tools used in creating applications supported by graphics, animations, audio and video features. Creation and integration of the modules developed at various levels of production of the software will enable the students to develop understanding of different stages in production and publication of a multimedia title like content generator, text and graphic manipulation, audio and video delivery etc.

Contents:

The students will start with effective integration of the MS Office component in producing meaningful presentations. Fundamentals of Design: Elements of Art, Principles of Art, Spatial Representation, 3D Forms, Colors and Visual Analysis. Conceptual understanding of the Media: Browsers, CD-ROM, Players and Plug-ins, overview of constraints, interactivity level and compatibility.
Understanding of Image formats, acquiring and format conversion, dimensioning and scaling of images. Sound and Video file types and formats, encoding, compression and storage of data (audio and video).
A brief introduction of the tools available and using of

1. Illustrator 9.0: Creating, Drawing, Modifying and Painting of Objects. Creation of free hand and precise path.

2. Director 8.5 Shockwave Studio: 3D features, scaling, importing models, textures and animations.
3. Macromedia Flash 5: Action script, debugger and smart clips, vector graphics, database integration through Macromedia Generator. Integration of MMF5 with Dream weaver, Fireworks etc.
4. GIF Construction Set: Creation, compilation and sizing of animated GIFs. Optimization methods.

Integration of object to web pages.

Laboratory:

The lab work will involve creation of MM based object and their integration. The last 15 or 20 HRS of the lab work must be assigned on group basis so that students are able to create small but meaningful projects of e-Learning, e-Merchandizing, e-Demonstrations and illustrations.

Textbook:

(1) John. F. Koegelbuford, Multimedia systems, 1994
(2) Multimedia Madness by Ron Wodaski. SAMS PUBLISHING.

The tools mentioned in the contents have the text material support with the titles.

CSWD 0706406
Website Design and Development Tools (30H – 15H – 45H) 90H

Objective:

To build on the Java programming language learned at the beginning of the program and to introduce the tools needed for the e-commerce class which follows the next semester.

Contents:

These tools include HTML for web page text layout, JavaScript for interactive web pages, and the continuation of the Java language for the creation of applets to allow movement on the web pages. Also includes XHTML and ASP.

Textbook:

(1) Wille, Kohler, and Archer (1999). *Sams Teach Youself Web Development with ASP*. Sams Publishing Co.
(2) Musciano and Kennedy (2000) *HTML and XHTML: The Definitive Guide*. O'Reilly and Associates.

Laboratory:

[to be submitted by Jan Plane]

CSAD 0706403
Systems Analysis and Design (30H – 15H – 45H) 90H

Objective:

Students will be able to conduct a requirements analysis and both logical and physical system design for a business information system, resulting in a set of system specifications and a project management plan.

Contents:

Techniques and tools applicable to the analysis and design of computer based information systems. Using the system development life cycle (SDLC) methodology, students learn how to create requirements analyses; dataflow diagrams, decision tables and trees; logical database designs; feasibility studies, cost-benefit analyses, risk analyses, and hardware and software performance evaluations; system and component prototypes; designs of screens, forms, and reports; and project management plans. Emphasis on case studies.

Textbook:

Marakas, George (2001). *Systems Analysis and Design: An Active Approach*. Prentice Hall.

Laboratory:

Group project required that involves the analysis of an existing system and the design of an improved information system for a small retail business or government entity, based on one of the case studies presented in class, as applied to the Rwandan environment.

CSBS 0706403
Proposal Writing and Design for B.S. Project (15H – 30H – 00H) 45H

Year 4, Semester 7 Totals: (150H – 90H – 165H) 405H

YEAR 4, SEMESTER 8
CSSE 0706405
Software Engineering: (45H – 00 – 30H) 75H

Objective:

This course will serve to broaden the student's understanding of the issues and latest developments in the area of software development and maintenance.

Course Contents:

Introduction, definition, objectives, Life cycle - system engineering: Hardware, software and Database considerations, system analysis. Software Project planning: scope of the software, resources, cost estimation, productivity, project scheduling.

Analysis: Principles, specification, analysis methods, overview of analysis tools - Data flow oriented Design: Transform centered design, Transaction centered design. Analysis of specific systems like Inventory control, Reservation system etc.

Software Design: Structured Design - top down and bottomup design - software design fundamentals: Modular design, qualitative tools: coupling, cohesion etc. - Data structure oriented Design: JSD, LCP - comparative study of various design methods.

Implementation and Testing: Programming language characteristics, fundamentals, languages, classes, coding style efficiency. Testing: Objectives, black box and white box testing, various testing strategies, Art of debugging.

Maintenance: Characteristics, controlling factors, maintenance tasks, side effects, preventive maintenance - Re Engineering - Reverse Engineering - configuration management – Concurrent Versions System. Maintenance tools and techniques. Reliability: Concepts, Errors, Faults, Repair and availability, reliability and availability models.

Books and References:

1. Pankaj Jalote. Integrated Approach to Software Engineering, Narosa Publishing House, 1990.

2. R. S. Pressman, Software Engineering - A practitioners approach, Third edition, McGraw Hill International editions, 1992.

3. E. Yourdon and L. L.Constantine, Structured Design, PHI, 1979.

4. R. Fairlay, Software Engineering Concepts, McGraw Hill, 1985.

5. S. L. Pfleeger. Software Engineering, MacMillan Publishing Company, 1987.

6. Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, Fundamentals of Software Engineering, Prentice Hall, 1991.

7. Bryan and Siegel, Software Product Assurance: Techniques for Reducing Software Risk, Elsevier, 1988.

8. Barnes, Programming in Ada, Addison Wesley, Third Edition, 1989.

CSWC 0706405
Web applications development/e-commerce (30H – 00H – 45H) 75H
Objective:

In response to a stated business problem, students will be able to create a complete Web-based solution, bringing together all of the knowledge and tools developed in earlier semesters.

Contents:

Develops understanding of the fundamental principles of usability as they apply to electronic commerce applications. Aspects of Web site evaluation are examined. Course will also cover the design of usable business Web sites using current tools and techniques.

Textbooks:

[to be provided by Bob Spear]

Laboratory:

Working in small student teams, students will build a complete e-commerce application, using commercially available tools, such as HTML (Hypertext Markup Language), DHTML (Dynamic HTML), XHTML (Extended HTML), ASP (Active Server Pages), ADO (Active-X Data Objects), CSS (Cascading Style Sheets), Java, JavaScript, and VB Script (Visual Basic Scripting Language).

CSPS 0706402
Project Seminar (30H – 00H – 0H) 30H

CSST 0706405
Special Topics Elective (45H – 15H – 15H) 75H

CSBS 0706410
B. S. Project: (00H – 00H – 150H) 150H

Year 4, Semester 8 Totals: (150H – 15H – 240H) 405H

Annex C: Computer Science Faculty Workload Distribution

	DISTRIBUTION OF WORKLOAD FOR ACADEMIC YEAR 2001-2002		
code*	**course name**	**hrs.**	**Instructor**
	Year 2 Semester 3		
C	CSCS 0706205 Introduction to Computer Science	75	Singh
C-I	CSIT 0706205 Introduction to Information Technology with Applications	75	Sisodia +MIT
C	CSCP1 0706204 Computer Programming I (using JAVA)	60	AVU
M	MAAN 0706207 Analysis II	105	Maths Dept
M	MAAL 0706204 Algebra II	60	Maths Dept
B	MNGT 0706205 Business Organization and Management	75	Rama Rao
	Year 2 Semester 4		
C-S	CSUO 0706206 Introduction to the Unix Operating System	90	J. Plane
C	CSCP2 0706206 Computer Programming II (using JAVA)	90	AVU
M	MANA 0706205 Numerical analysis	75	NUR
M	MAPS 0706204 Probability & Statistics	60	Maths Dept
B	ACCS 0706206 Accounting for Computer Scientists	90	Visiting
	Year 3 Semester 5		
	CSCP 0706306 C++ with Elementary Data Structures		
	CSCP 0706306 C++ with Elementary Data Structures	90	Sisodia
	CSNT1 0706306 Networking I **	90	CC
	CSUO 0706306 Introduction to the Unix Operating System	90	J. Plane
	CSDM 0706304 Discrete Math	60	Singh
	CSDB 0706306 Database Design	90	Singh
	Year 3 Semester 6		
	CSSA 0706306 Computer System Architecture	90	Sisodia
	CSDS 0706306 Implementation of Dynamic Data Structures	60	Sisodia
	CSAA 0706304 Analysis of Algorithms	60	Sisodia
	CSSA 0706306 System Administration and Low Level Programming	90	David/ ?
	CSPL 0706306 Principles of Programming Languages	90	J Plane/?
	CSBT 0706304 Business Telecommunications	60	Rwandatel/?
	CSNT2 0706306 Networking II **	90	CC

Year 4 Semester 7		
CSDB 0706406 Database Design	90	Bob Spear
CSSA 0706406 System Administration and Low Level Programming	90	David/ ?
CSWD 0706406 WebSite Design and Development Tools	90	KIST/Singh/?
CSMM 0706406 Multimedia Applications Design	90	KIST/?
CSSA 0706405 Software Engineering	75	Singh
CSBS0706403 Proposal Writing and design for B.S. Project	45	Singh
Year 4 Semester 8		
CSNT2 0706406 Networking II	90	CC
CSWC 0706405 Web applications development/e-commerce	75	KIST/VISITING/?
CSAD 0706406 Systems analysis and design	90	Singh
CSPS 0706402 Project Seminar	30	Singh+Sisodia
CSBS 0706410 B. S. Project	150	Singh+Sisodia+BOB+CC

N.B.:- ? Indicates that it is not yet finalized.

COURSE_DISTRIBUTION CHART FOR THE ACAD. YEAR 2001-2002

Co-ordinator	Subject	Total Hrs
Sisodia	CSIT 0706205 Introduction to Information Technology with Applications	75
	CSCP 0706306 C++ with Elementary Data Structures	90
	CSSA 0706306 Computer System Architecture	90
	CSDS 0706306 Implementation of Dynamic Data Structures	60
	CSAA 0706304 Analysis of Algorithms	60
	CSPS 0706402 Project Seminar	30
		405
Singh	CSCS 0706205 Introduction to Computer Science	75
	CSDM 0706304 Discrete Math	60
	CSDB 0706306 Database Design	90
	CSSA 0706405 Software Engineering	75
	CSBS0706403 Proposal Writing and design for B.S. Project	45
	CSAD 0706406 Systems analysis and design	90
	CSPS 0706402 Project Seminar	30
		465
UMD+ CC	CSCP1 0706204 Computer Programming I (using JAVA)	60
	CSUO 0706206 Introduction to the Unix Operating System	60
	CSCP2 0706206 Computer Programming II (using JAVA)	90
	CSNT1 0706306 Networking I **	90
	CSNT2 0706306 Networking II **	90
	CSDB 0706406 Database Design	90
		480
Internal Visitors	MAAN 0706207 Analysis II	105
	MAAL 0706204 Algebra II	60
	MNGT 0706205 Business Organization and Management	75
	MANA 0706205 Numerical analysis	75
	MAPS 0706204 Probability & Statistics	60
	ACCS 0706206 Accounting for Computer Scientists	90
		465
External Visitors	CSSA 0706306 System Administration and Low Level Programming	90
	CSBT	60
	CSWD 0706406 WebSite Design and Development Tools	90
	CSMM 0706406 Multimedia Applications Design	90
	CSWC 0706405 Web applications development/e-commerce	75
		405

Annex D: NUR's ICT Policy and Implementation Plan

not received in time for inclusion

Annex E: Rwanda Education Network Proposal

PROPOSAL ON

ESTABLISHMENT OF

RWANDA EDUCATION

NETWORK

(RwEdNet)

KIGALI, September 2001

RWANDA

Table of Contents:

1. Introduction

Vision for Rwanda and ICTs in education

Rwanda is a land-locked rural country in the Great lakes region. It is a country with an income per capita of us$ 258 ranking it between the poorest countries in the world. Rwanda is recovering after the genocide of 1994.

The country is implementing an ambitious Vision 2020 of transforming it into an information-rich, knowledge-based economy and society in 20 years. The Vision 2020 is an ICT-led socio-economic vision, meaning that ICT is set to be the engine for accelerated development and economic growth, national prosperity and global competitiveness.
The Government is fully committed to the realization of that vision for Rwanda.

The Government of Rwanda firmly believes that human resource is the ultimate resource – more so for a nation like Rwanda without key natural resources. The development of people to support the process of moving Rwanda into an information society and economy is therefore top priority of the Government and the crucial role that ICTs can play in this area is fully recognized and promoted by the Government.

One of the most important channels of developing and harnessing the human resources is the **education system**. The Government is aware of the key role that ICTs can play in educational delivery and training and the need for ICT training and education in schools, colleges and universities. Furthermore, the Government recognizes the role that ICTs can play in literacy education and need to improve the educational system as a whole.

Therefore, as part of its strategy to speed up the process of the deployment of ICT's in the society and economy, to develop an IT literate nation and to support the development of human resources in ICT's and other key professional skill areas the Government of Rwanda is committed to the rapid deployment, utilization and exploitation of ICT's within the educational system from primary school upwards.

RwEdNet background

A workshop on ICT in education titled “Improving education through the use of Information and Communication Technology” was held in Kigali in November 2000 in

which participated the Government of Rwanda, Imfundo team, institutions of higher education and the Rwanda Information Technology Authority (RITA).

It was agreed by the participants that a Rwanda Education Network – RwEdNet - should be developed. The Network should support the Rwandan Government's plans for the development of ICT aimed at increasing access to information throughout the country, improving educational standards and building a knowledge-based society, as core elements of their poverty reduction strategies.

2. Aim of RwEdNet

RwEdNet is Rwanda network serving education. Its main aim is to promote the use of IT within Rwandan academic, scientific, and educational institutions and provide the stakeholders with access to Internet-based information resources in support of expanded teaching, learning, and research within the country and abroad on a not-for-profit basis. It is crucial to the development of Rwanda's human resources and the country's integration within the emerging global information structure. RwEdNet will play a key role in the national effort towards bridging the digital divide.

3. Objective of the proposal

The consensus achieved in the Workshop on "ICT in education" is to set up a network connecting only stakeholders from education sector, with tariffs and subsidies set to suit this sector. However, considerations of internetworking with other networks imply that RwEdNet should be built in a way, which is standard, scaleable, and consistent with plans for other networks in Rwanda.

The objective of the current proposal is to come up with a workable solution for that network.

The solution is built around a number of evidences and assumptions:

- In the RwEdNet, the main traffic-generating locations of interest are Kigali and Butare. Thus it is obvious that there should be a "high-speed" digital trunk between these locations. At present KIST in Kigali and NUR in Butare are likely to generate most of the Internet traffic in these cities.
- In the area around Kigali and Butare there are a number of research labs, specialized Institutes, and other organizations that need connection. In particular there are MINEDUC, KIE, KHI, ISAE, ULK, Adventist University in Kigali and IRST, ISAR in Butare. Most of locations in Kigali and Butare can be easily connected to the backbone.

- The other nodes of the network are to be found mainly in the province capitals. There are 12 provinces with schools for secondary teacher training (1 per province), secondary technical schools and health education schools. Treating Kigali and Butare as one "lump" at the centre, then the rest of the network looks like a star network of long lines radiating out from the centre.
- There is one further line radiating out from the centre, namely the satellite link to the International Internet.

The proposed network solution is a culmination of a long process of consultations and extensive work aimed to attain a solution customized to the needs of Rwanda education and research system integrated in national, long-term socio-economic perspective.
The proposed solution is presented in the next chapters.

4. RwEdNet Stakeholders

Key stakeholders and drivers of RwEdNet are:

a. Higher Education Institutions and Research Centres

These are eight existing such institutions, five in Kigali and three in Butare.
1° Kigali Institute of Science, Technology and Management (KIST) – Kigali
2° Kigali Institute of Education (KIE) – Kigali
3° Kigali Health Institute (KHI) – Kigali
4° Institute of Agronomy and Animal Husbandry (ISAE) – Kigali
5° Central Hospital of Kigali (CHK) – Kigali
6° National University of Rwanda (NUR) – Butare
7° Institute of Agronomic Science in Rwanda (ISAR) – Butare
8° Institute of Science, Technology and Research (IRST) – Butare

b. MINEDUC

9° the Ministry of Education including links to province capitals and school's inspectors

c. Private Higher Education Institutions

10° Adventist University – Kigali
11° The Free University of Kigali (ULK) – Kigali

d. The core schools system

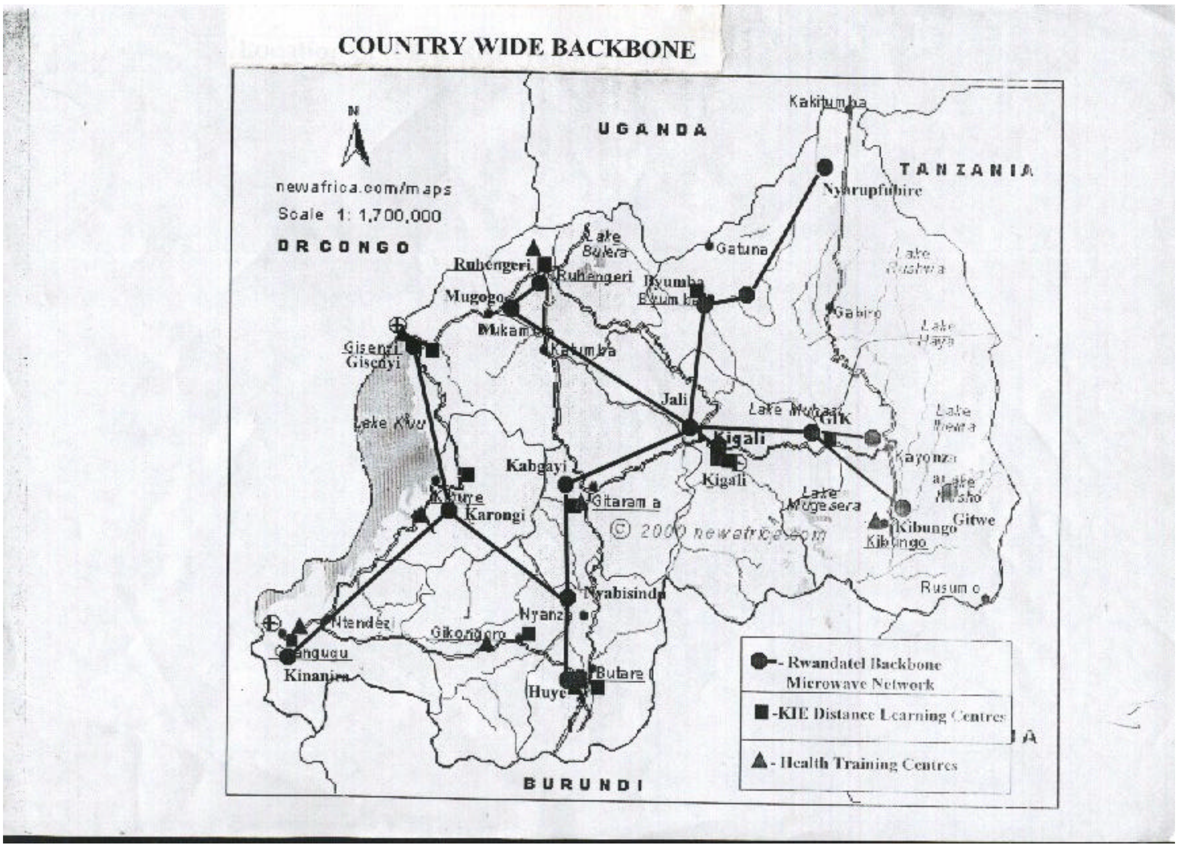
12° The secondary teacher training centres
13° The secondary technical schools
14° The schools for health education.

5. The RwEdNet core backbone infrastructure

As it was described earlier in the proposal, the National Education Network (RwEdNet) will cover all the institutions of higher learning and 10 telecentres (training centres) countrywide. A technical committee composed by all the major stakeholders taking into account the institution's ICT infrastructure has determined the choice of the equipments and links. The telecentres, which are non-existent currently, will be focusing on distance learning; therefore, they shall be equipped with multimedia equipments and a number of computers to start with. A mode of management of the telecentres will be defined later as all the stakeholders will use them.
Rwandatel will provide an Internet access (2MBPS) to the institutions and will use its existing infrastructure to link them (networking). All the institutions will be connected to the CISCO 7000 series (central access point) located at the Rwandatel premises. In this manner, all the institutions are independently connected to the internet and within themselves. Most of them will be connected through leased line terminated with a RAD Modem ASM40 both end (Rwandatel and remote user). KIST and NUR will be connected through a CISCO 3600 while the rest will use the 2600. Note that the routers have provision of an ISDN port, in case of failure of the other link. The calculation of the cost implication for this project is pictured into different categories, namely: The cost of the bandwidth, Rwandatel equipments (access router), user equipments, accessories, internet access, connection fee and terrestrial link. The administrative charges and any other charges involved in the daily running of RwEdNet will be taken care by the government through the ministry of education.

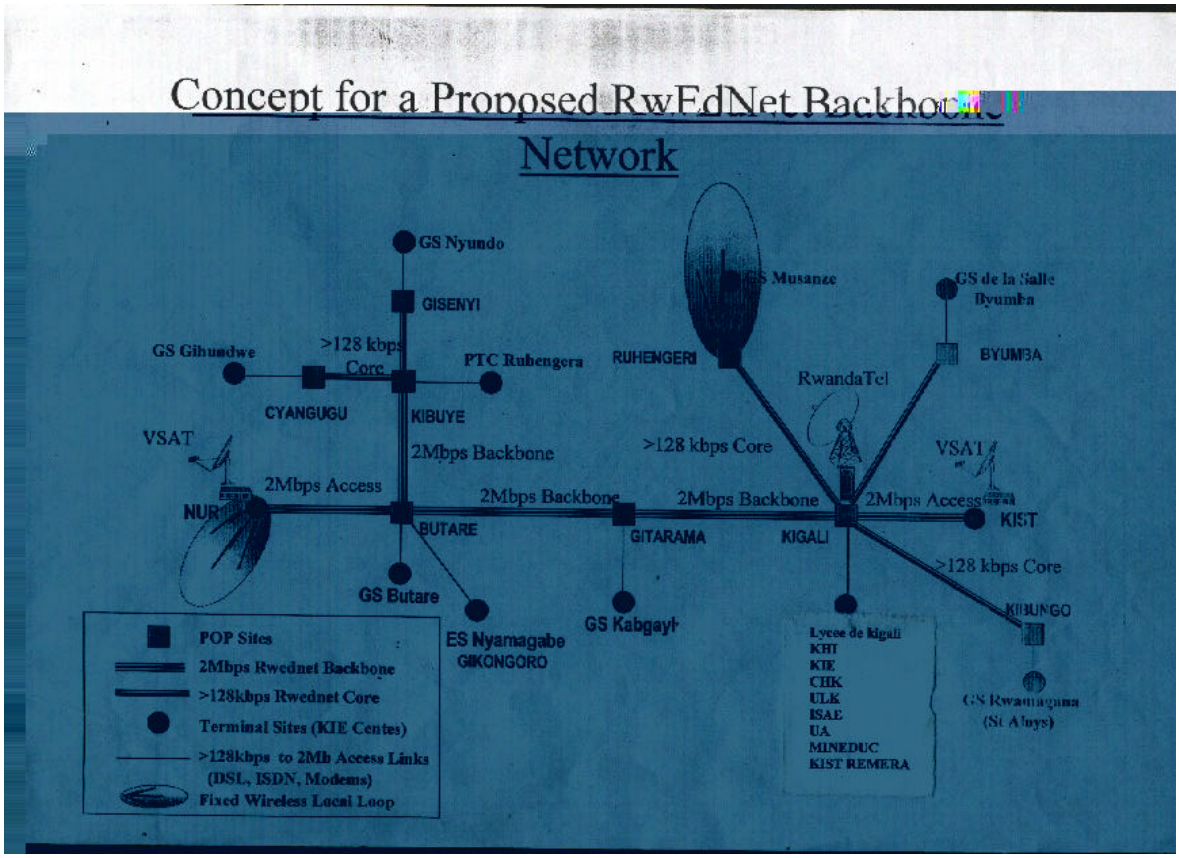
5.1. Location of stakeholders on the map

The figure below shows the area covered by the RwEdNet backbone through out the country. It is specifically representing the towns where the telecentres and other institutions are located.


COUNTRY WIDE BACKBONE
UGANDA
TANZANIA
DR CONGO
BURUNDI
newafrica.com/maps
Scale 1: 1,700,000
Kakitumba
Nyarupfubire
Gatuna
Gabiro
Lake Bulera
Lake Rushwa
Lake Hago
Ruhengeri
Mugogo
Mukamba
Katumba
Byumba
Gisenyi
Lake Kivu
Jali
Kigali
Lake Muhazi
GIK
Lake Ihema
Kayonza
Kabgayi
Gitarama
Kibuye
Karongi
Lake Mugesera
Kibungo
Gitwe
Rusumo
Nyabisindu
Nyanza
Ntendezi
Gikongoro
Cyangugu
Kinanira
Butare
Huye
© 2000 newafrica.com
- Rwandatel Backbone Microwave Network
- KIE Distance Learning Centres
- Health Training Centres

5.2. RwEdNet Backbone layout

The figure below depicts the concept of connectivity (type of link and speed) to different sites.



5.3. RwEdNet technical set up

Figure (III)

The chart below describes the actual network setup and the equipments portrayed in the chart are defined as follows:

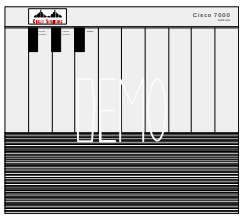
ISDN:

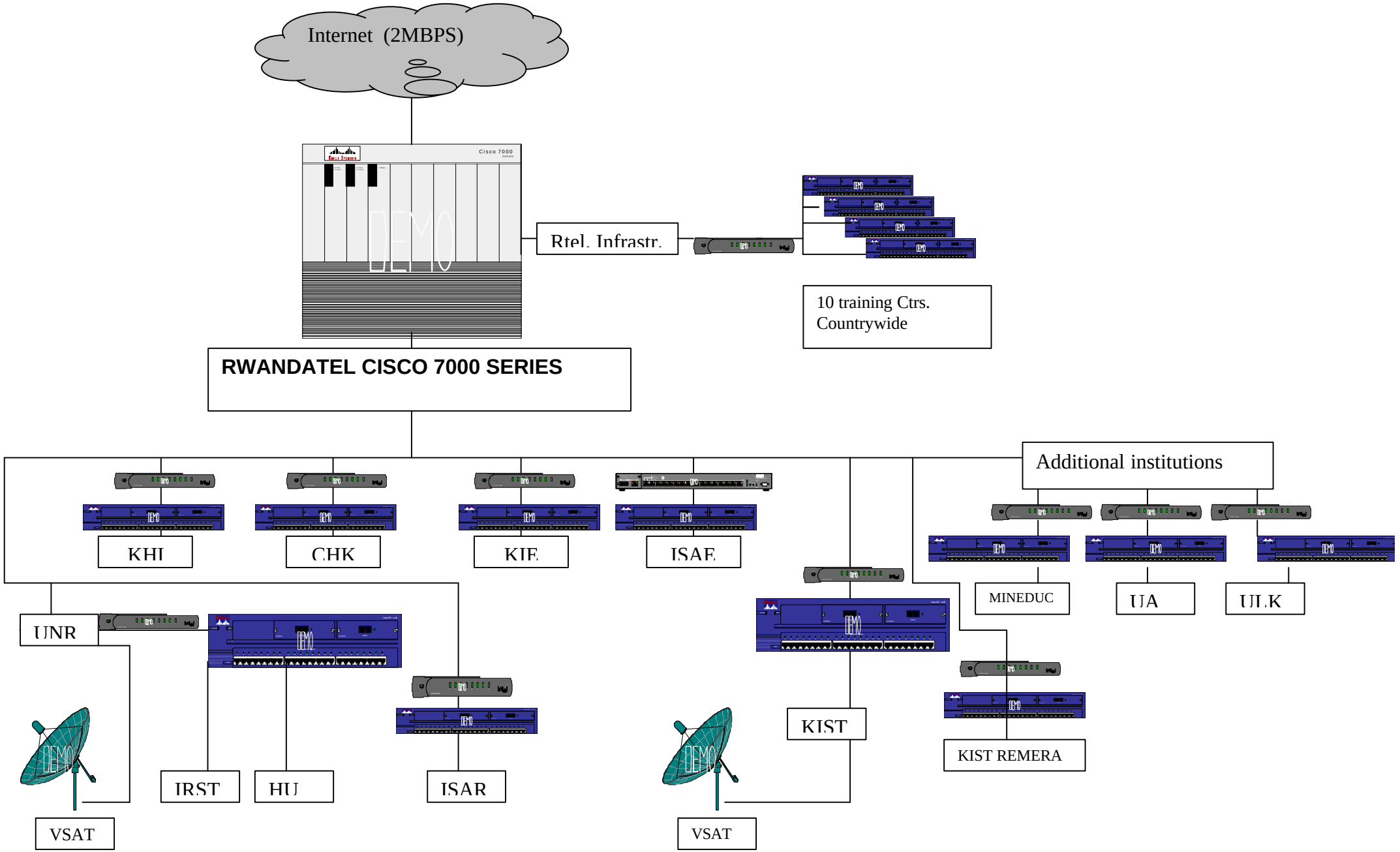
RAD MODEM ASM40:

CISCO 2600:

CISCO 3600:

CISCO 7200:




Internet (2MBPS)
Rtel. Infrastr.
10 training Ctrs.
Countrywide
RWANDATEL CISCO 7000 SERIES
Additional institutions
KHI
CHK
KIE
ISAE
MINEDUC
UA
UL.K
UNR
IRST
HU
ISAR
KIST
KIST REMERA
VSAT
VSAT

6. Costs of equipments and description

RWANDATEL SIDE ROUTER (Cisco 7206) // NO RADIUS NEEDED

Product	Product Description	Quantity	Prices	Price
C7206VXR/400/2FE	7206VXR with NPE-400 and I/O Controller with 2 FE/E Ports	1	$17,500	$17,500
CD72-CH-12.0T	Cisco 7200 Series IOS IP/FW/IDS	1	$5,000	$5,000
MEM-NPE-128MB	128MB Memory for NPE-200/NPE-150/NPE-100 in 7200 Series	1	$1,800	$1,800
MEM-NPE-400-256MB	256MB Memory for NPE-400 in 7200 Series	1	$4,200	$4,200
PA-8T-V35	8-Port Serial, V.35 Port Adapter	2	$8,000	$16,000
PA-MC-8E1/120	8 port multichannel E1 port adapter with G.703 120ohm interf	1	$11,600	$11,600
PA-8B-S/T	8-Port BRI Port Adapter, S/T Interface	2	$2,000	$4,000
CAB-OCT-V35-MT	8 Lead Octal Cable and 8 Male V35 DTE Connectors	16	$750	$12,000
PWR-7200-ACE=	Cisco 7200 AC Power Supply With European Cord	1	$3,000	$3,000
PWR-7200/2	Cisco 7200 Redundant AC Power Supply Option, 280W	1	$3,000	$3,000
CAB-ACE=	AC Power Cord, Europe	1	$50	$50
TOTAL				$78,150

KIST & NUR SIDE ROUTER (Cisco 3660)

Product	Product Description	Quantity	Prices	Price
CISCO3662-AC	Dual 10/100 E Cisco 3660 6-slot Modular Router-AC with IP SW	1	$11,700	$11,700
NM-2CE1B	2-Port Channelized E1/ISDN-PRI Balanced Network Module	1	$4,200	$4,200
WIC-1B-U	1-Port ISDN withNT-1WAN Interface Card(dial and leased line)	1	$700	$700
NM-4T	4-Port Serial Network Module	1	$3,000	$3,000
NM-4A/S	4-Port Async/Sync Serial Network Module	1	$1,300	$1,300
MEM3660-2X64D=	128MB DRAM for the Cisco 3660 (2x64 MB DRAM SIMMs)	1	$5,760	$5,760
MEM3660-32FS=	32 MB Flash Field Upgrade for the Cisco 3660	1	$1,900	$1,900
ACS-3660RM-19=	19 inch Rack Mount Kit for the Cisco 3660	1	$100	$100
CAB-V35MT	V.35 Cable, DTE, Male, 10 Feet	8	$100	$800
LL366CH=	Cisco 3660 Series IOS IP/FW/IDS	1	$2,500	$2,500
CAB-ACE=	AC Power Cord, Europe	1	$50	$50
TOTAL				$32,010

KIE, KHI, CHK, ISAE, ULK, UAAC, MINEDUC, ISAR, KIST REMERA, TELECENTERS

Product	Product Description	Quantity	Prices	Price
CISCO2621	Dual 10/100 Ethernet Router with 2 WIC Slots & 1 NM Slot	1	$3,095	$3,095
WIC-1B-U	1-Port ISDN withNT-1WAN Interface Card(dial and leased line)	1	$700	$700
WIC-2T	2-Port Serial WAN Interface Card	1	$700	$700
CAB-V35MT	V.35 Cable, DTE, Male, 10 Feet	1	$100	$100
CAB-ACE=	AC Power Cord, Europe	1	$50	$50
MEM2650-64D=	64MB DRAM DIMM for the Cisco 265x only	1	$3,800	$3,800
TOTAL				$8,445

6.1 Cost factors per Institution

RWEDNET EQUIPMENT LIST AND COST

Description	Quantity	Unit price	Total Price
RWEDNET MAIN ROUTER	1	78150	**78150**

KIST

Description	Quantity	Unit Price	Total Price
Rad Modem ASM40	2	2000	4000
Cisco 3600 Series	1	32010	32010
Total			**36010**

UNR

Description	Quantity	Unit Price	Total Price
RAD ASM40	3	2000	6000
Cisco 3600 Series	1	32010	32010
Total			**38010**

KIE

Description	Quantity	Unit Price	Total Price
Modems RAD ASM40	3	2000	6000
Modems Repeaters	3	2000	6000
Cisco 2600 series	1	8445	8445

Total			**20445**

KHI

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

KIST Remera

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

ULK

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

CHK

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

UA

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

MINEDUC

Description	**Quantity**	**Unit Price**	**Total Price**
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

ISAR

Description	Quantity	Unit Price	Total Price
Modems RAD ASM40	2	2000	4000
Cisco 2600 series	1	8445	8445
Total			**12445**

ISAE

Location of Site requires either Microwave link or ISDN connection

Description	Quantity	Unit Price	Total Price
Cisco 2600 series	1	8445	8445
Total			**8445**

Telecentres

Description	Quantity	Unit Price	Total Price
Modems RAD ASM40	12	2000	24000
Cisco 2600 series	12	8445	101340
Computers (10 PC's per site)	12	15000	180000
Multimedia Equipments	12	10000	120000
Total			**425340**

Site	Cost
Rwdnet Main Router	78150
UNR	38010
KIST	36010
KIE	20445
KHI	12445
CHK	12445
ULK	12445
KIST Remera	12445
UA	12445
MINEDUC	12445
ISAR	12445
ISAE	8445
Telecentres	443340
Studio (x2)	
Accessories (Cables, Hub, spares, etc)	100000
Total cost of equipment	**811515**

Internet Access	Month	Year
	US$	US$
2048 KBPS	10282	**123384**

Connection fees	Unit	Total
	US$	US$
Speed 0 to 256 KBPS	2500	**52500**

Terrestrial links	Month	Year
Kigali	FRW	FRW
128 KBPS	124732	**1496784**

Gitarama, Byumba	FRW	FRW
64 KBPS (2 sites)	313938	**3767256**

Butare, Cyangugu, Gisenyi, Kibuye, Rwamagana, Kibungo, Gikongoro,Ruhengeri

	FRW	FRW
64 KBPS (8 sites)	1823272	**21879264**
128 KBPS (2 sites)	660930	**7931160**

6.2 Estimated total financial requirements

The total cost of the project was calculated taking into account the fixed cost (e.g equipments, connection fees and training) and the recurrent cost calculated in a yearly basis (e.g. the bandwidth and terrestrial link).

TOTAL COST OF RWEDNET PROJECT

Description	Cost ($)	Yearly ($)
Equipments	811515	
Internet		123384
Connection Fee	52500	
Terrestrial link		76248.83
Training	79727	
Administration Cost		
Total cost	**943742**	**199632.83**

GRAND TOTAL	$	1143374.83

7. Management structure

RwEdNet Constitution provides for a 3-tier structure:

- Steering Committee
- Technical Committee
- Secretariat.

Steering Committee

Each stakeholder from the user community should nominate a member to represent them on the RwEdNet Steering Committee.

Members of the Committee are also representatives of the main network providers and major government agencies/ministries:

a. Rwandatel
b. Rwanda TV
c. Tender Board
d. Regulatory Body
e. RITA
f. President's Office
g. Prime Minister's Office
h. MINITRACO.

The duties of the Committee are:

- determine RwEdNet's policies and orientation
- amend the constitution
- approve activity and financial reports
- designate members of the Technical Committee
- approve membership applications
- take all the necessary measures to ensure RwEdNet's good organisation
- allocate the running costs of the Network.

Technical Committee

Members of the Technical Committee are representatives from RwEdNet stakeholders appointed by the steering Committee.

It is tasked to:

- ensure there is effective connectivity from the service providers
- ensure that stakeholders have got optimal operation
- collect contributions from member institutions
- draft regular reports on the financial and technical status of the network and submit them to the Steering Committee

- provide advice to RwEdNet members on how to improve service, equipment, Internet service provider's connectivity
- advice on issues of tenders
- direct and supervise the Secretariat
- formulate and propose policy issues and plans relating to the RwEdNet
- provide technical expertise and advice to the Ministry of Education on matters related to the Rwanda Education Network
- Design procedures for disaster recovery
- Advise on allocation of running costs of the network.

Secretariat

Its duties are:

- run the day to day business of RwEdNet
- service the Technical Committee
- assist with the formulation of the plans relating to RwEdNet
- Keep up to date with any network developments in Rwanda and beyond.

Annex F: CCM-CIDCM Documents

Questionnaire following the CIDCM-CCM Methods workshop

What organization are you from:

1. Rwanda Agricultural Research Institute (ISAR)
2. CCM (3)
3. English Department, NUR
4. Institute of Research in Science and Technology
5. College of Medicine, NUR
6. Political Science Public Administration, NUR (2)
7. Faculty of Agronomy, NUR
8. Faculty of Law, NUR
9. Mass Communications and Journalism Department, NUR (2)
10. Faculty of Arts (History, NUR)

Is this the first research methods course you have taken?

yes: 4
no: 10

Which sessions did you attend

theories, dependent variables: 9
surveys: 11
interviews: 10
research grants: 7
applying to universities: 10
focus groups: 11
participant observation: 13

Which sessions did you find most useful? (some people indicated more than one category)

all: 2
theories, dependent variables: 2
surveys: 6
interviews: 2
research grants: 3
applying to universities: 1
focus groups: 1
participant observation: 2

Which of the sessions did you find least useful?

applying to universities: 1
participant observation: 6

What is your own research and how might you use the information from this seminar in your own research?

- agricultural research: conduct surveys to get information on production constraints and to access the impact of technologies
- media and conflict management in Rwanda; root causes of conflict; how effective gacaca will be; wants to do a pilot study using the delphi method
- literature; might use the information from the seminar for more interactive research....for example, study whether traditional forms of literature contribute to conflict resolution or escalation (case study)
- research on plants in Rwanda that have insecticidal or medicinal properties; might help in getting information from people about plants
- HIV/AIDS research; seminar can help in making surveys and questionnaires better
- psycho-social research
- processes involved in soil erosion and fertility depletion; seminar gave a whole lot of information that might be implemented in future research
- intellectual property law, especially copyright; survey methodology might be useful in discovering attitudes in developing countries regarding intellectual property rights (especially why they are not given priority)
- missionary history in southern Rwanda; surveys and interviews (example is interviewing old people in villages who worked with some of the first missionaries in the country)
- conflict related to governance; seminar has given a basic foundation upon which to carry out research...important to fit the correct methodology to the kind of research we are interested in so that the results may be considered valid
- what is a suitable political model for Rwanda after the second transition period
- how can gacaca obtain efficiency ; how to choose methods of collective information, defining questions of research and determining the variables will be important
- media research; help in choosing methods for different research projects

Other comments

- next time we should have some practical sessions in which people will be given a chance to apply the knowledge derived from the seminar and for you to find out whether your efforts have not been wasted
- more information on doing research involving archival methods
- more of the same
- useful information, but also it is useful just to have the opportunity to speak with researchers from other cultural backgrounds and experience
- good information for beginners in the field; clear delivery of the materials; participatory method of the seminar was good even if the students were shy and not as responsive as desired
- follow-up on content analysis methodology

Contact information for future seminars:

- Elie Rene Gasore, Director of Research, ISAR, POBox 138, Butare ergasore@hotmail.com (phone: 250 158)
- victo27@usa.net (NUR)
- Joseph Muyanyo, CCM muyanse@yahoo.fr (phone: 08530535)
- Beth Mutamba, CCM, mutambab@usa.net
- karongwaj@yahoo.fr
- buranga@hotmail.com
- guillaume_ngagatare@yahoo.com
- Alphonse Nshimiyimana (phone: 516113 or 516115)
- nyepoly@yahoo.fr (phone: 08501188)
- Ntaganda M. Francis, Faculty of Arts, Department of English (phone 530011) POBox 117, Butare
- fbuchenga@hotmail.com or gasana22g@hotmail.com

August 2000 Workplan

Item Number	Date	Task Description	Action	Status	responsible
1	Sept 00	CCM sends CIDCM Research Designs for current and proposed research	Write, Send Material	1. 5 page draft in preparatory phase	CCM: Kimonyo
2	Sept 00	CIDCM reviews and returns CCM research designs	Analyzes Send Material	1. pending receipt by CIDCM	CIDCM: Pitsch
3	Sept 00	CIDCM sends CCM literature on research methods	Locate, Send Material	1. CCM sent CCM Research Methods syllabi Sept 28 pending arrival of #1	CIDCM: Pitsch
4	Sept-Oct 00	Methodology Seminar Planning. Overview content and identification of specific technical subjects, including: 1. Interview methods 2. Survey methods 3. Focus group methods 4. Participatory action research 5. Comparative case studies: a. Structured focus comparison b. Single case study c. Functionalist approaches 6. Large n-studies: a. Data gathering, coding, database building b. Parametric and non-parametric techniques 7. general research design: a. Hypothesis development both H1 and H0, especially in the context of policy relevance and existing academic literature b. Specific research methods (1-6	1. Discuss priorities 2. Overview 3. Specialized areas 4. write out curriculum 5. set dates for workshop 6. set participants for workshop 7. identify indented outcome and related to CCM research	1. Preliminary methods experts Dr. Miranda Scheurs and Dr. Christian Daveport identified and recruited for methods workshop and research activities at NUR for Dec 2000 2. planning draft, including topics, research focus 3. meeting with UMD Dept of Anthropology schedule for week of Oct 02	CIDCM: Pitsch, Wong. Weil, Davenport/ Scheurs CCM: Kimonyo

		above) 8. Research nesting (how one research project/program fits into the CCM's strategy) These three activities will: 1. Familiarize CIDCM with CCM research methods capabilities; 2. Provide increased methodological rigor in current CCM research; Contribute to the development of a more appropriate and comprehensive methodology seminar			
5	Oct 00	Pilot case study identified 1. Gacaca in the context of other conflict revolution methods and techniques _____ 2. Information monitoring unit: this would initially track and code two Kinyarwanda news sources and one foreign news source	1.1 Complete Gacaca Paper 1.2 Complete Overview of Conflict Resolution methods and techniques 1.3 Input results from Item #7 CCM gacaca paper. _____ 2.1 identify news sources 2.2 identify NUR based research personnel 2.3 identify product frame work 2.4 discuss research associated with UNIT's output	1. Case identified 2. CIDCM completing review of conflict resolution overview Currently a 15 page draft is available 3. CCM PROGRESS _____ 1. Case identified 2. CIDCM key personnel identified (Davenport, Pitsch, Wong)	CCM: Kimonyo, CIDCM: Pitsch, Davenport
6	Oct 00	Equip Procurement order completed. The CA calls for PCs and video conferencing equipment. In discussion with the computer centre, this equipment will be identified. Particular attention needs to be paid to the needs, especially if the information unit is a primary focus of the partnership.			CCM, Kimonyo, Albert CIDCM Wong, Hurley
7	Oct 00	CCM completes 20 pages paper on what Gacaca is. This is a descriptive essay. (feeds into			CCM: Kimonyo CIDCM: Pitsch

		funding request and conflict resolution workshop). This should also include a guide of other gacaca related activities in Rwanda. CICDM in support.			
8	Nov 00	Methodology Seminar Planning draft completed			
9	Nov 00	Develop plan for monthly speaker series. Series will focus on both Rwandan and regional aspects of conflict and conflict management. (Note: sparkers will also work on specific areas within their areas of expertise as part of their activities, areas such as, for examples, research methodology, conflict management techniques, case study development, constitutional formats and their impact on politics. The speaker will give their presentation in both Butare and Kigali.)	1. identify scope of topics 2. identify and recruit potential speakers 3. schedule 4. identify additional research work to be conducted by speakers		
10	Nov 00	CCM completes fellowship support for 1-2 CCM fellows to CIDCM—e.g. Fullbright, Watson, SSRC, and others. CIDCM will assist in development of proposals and identifying funders.	1. identify CCM scholars to submit funding application 2. identify activity to be funded 3. identify funding sources to submit funding application 4.		CIDCM Weil CCM Kimonyo
11	Nov-Dec 00	Conflict resolution overview (feeds into pilot case study, methodology issues, and conflict resolution workshops). This will be a presentation of the types of conflict resolution techniques that have been used and their respective components.	1. Prepare presentation based on results of #5.1 and #7	1. Base on result of 5.1	CIDCM: Pitsch, CCM Kimonyo
12	Dec 00	Speaker series to commence.			CIDCM Pitsch CCM Kimonyo
13	Dec 00	ICONS course students identified. Primary CIDCM and CCM responsible parties identified. Course material delivered by CIDCM to CCM.	1. identify and confirm CCM ability to host course 2. receive authorization form NUR to host course 3. identify students 4. confirm ICONS ability to provide course 5. assign NUR course teams		CIDCM Pitsch CCM Kimonyo

			6. preliminary content preparation for NUR ICONS team		
14	Jan 01	Video link Operational. Planning for ICT based support begins.	1. Identify topics and scope for distance support 2.		CCM Kimonyo, Albert CIDCM Wong Hurley
15	Jan 01	Fundraising workshop follow-up, Academic-policy unit administration workshop.	1. Plan		CCM Kimonyo CIDCM Weil
16	Dec 31-March 01, or as deadlines approach	Fundraising proposal draft completed.	1. Identify subject topics for funding 2. identify key personnel from CCM and CIDCM or other involved proposed activity 3. identify how the activity ties in with CCM and CIDCM interests		CIDCM Weil CCM Kimonyo
17	Feb 01	Evaluation planning. This will be a mid-point stock taking exercise with an emphasis on the activities undertaken to date and a discussion of how to proceed in the remaining months of phase I.	1. recruit evaluators 2. establish scope of evaluation 3. set schedule for evaluation 4. plan for on-site visit(s)		CCM Kimonyo CIDCM Pitsch, Wong
18	Feb 01	ICONS Course from UMD to NUR, hosted by CCM.			CCM Kimonyo CIDCM Pitsch,

CCM-CIDCM Workplan March 01-December 01

Legend for Task Description:

SS = Speakers Series
IDU = Information Documentation Unit
GR = Gacaca Research
MISC = Miscellaneous
MS = Memoire Students
GW = Grant Writing
TR = Travel

Item Number	Date	Task Description	Status/Completion	Responsible
18	Feb 01	ICONS Course from UMD to NUR, hosted by CCM.	Scheduled to begin at the start of the NUR spring semester 2001	CCM Tom Turner CIDCM Pitsch
19	March 01	Strategy meetings CIDCM-CCM	Discussions at CCM took place and a plan of action for the coming 6-9 months is being implemented	All members CCM and CIDCM
20	25 March 01	IDU: Order subscriptions to newspapers for delivery to Butare; begin coding of newspapers on a weekly basis	In process	CCM: Biyoga and RAs
23	26 March 01	IDU: RAs begin weekly coding of newspapers	In process	CIDCM: Pitsch CCM: Ntaganda
21	30 March 01	SS: Title for Series is "Conflict, Reconciliation and Peace: Research and Policy Perspectives" Write TOR for speakers	Completed	CIDCM: Pitsch
22	30 March 01	GW: Draft proposal written	Completed	CIDCM: Weil CCM: Ntaganda
23	April 01	SS: Lecture #2		CCM: Kerekezi and Biyoga
24	1 April 01	IDU: begin to identify the availability and location of gacaca related research materials; identify radio broadcasts for future coding (broadcast schedules)		CCM: Kerekezi and RAs
25	2 April 01	MS: Define core themes of CCM research that Memoire students can participate in to support CCM research and complete their memoires	To Pitsch by 4/2; return to CCM with comments by 4/9	CCM: Ntaganda
26	4 April 01	MS: Establish administrative requirements for NUR to supervise Memoire students; cost associated with memoires needs to be determined	To Wong by 4/4	CCM; Ntaganda and Biyoga CIDCM: Wong
27	5 April 01	MS: Write TOR for memoire students including level and type of support	Draft to CCM by 4/5	CIDCM: Pitsch

28	5 April 01	MS: ID faculty members and their research interests in the following faculties: Law, Political Science/Public Administration, Journalism, Education (Psychology), Economics		CCM: Biyoga with RAs
29	6 April 01	IDU: complete codesheets for newspaper coding and summary	Draft completed 3/21	CIDCM: Pitsch
Item Number	**Date**	**Task Description**	**Status/Completion**	**Responsible**
30	6 April 01	SS: Identification of potential speakers		CCM: Kerekezi
31	9 April 01	SS: develop a schedule of speakers; advertising will be the responsibility of the RAs with guidance from Bea Biyoga		CCM: Kerekezi CIDCM: Pitsch
32	9 April 01	MS: Recruit Faculty Advisors for memoire students		CCM: Ntaganda and Mutoni
33	9 April 01	MS: Complete advertisement for CCM memoire support for posting at NUR		CIDCM: Pitsch
34	10 April 01	IDU: identify NGOs, embassies, ministries, etc for inclusion on distribution list of newspaper summaries		CCM: RAs with Ntaganda
35	10 April 01	GW: Develop list of foundations to target for research money (CCM: European foundations; CIDCM: US foundations)		CCM: Ntaganda CIDCM: Weil
36	10 April 01	MS: Development a strategy for recruitment of memoire scholars (incl. TOR, deadlines, criteria for selection of candidates)	Draft from Wong to CCM by 4/10; Ntaganda reply to CDICM by 4/17	CCM: Ntaganda CIDCM: Wong
37	15 April	GW: Complete draft letter of inquiry to foundations (CCM research with CIDCM as partners)		CCM: Ntaganda CIDCM: Weil
38	16 April 01	MS: Post advertisement of CCM memoire support		CCM: Mutoni
39	20 April 01	SS: Develop the budget for the speakers series MISC: Alice draft of a lecture to be presented at CIDCM/USAID when traveling to US in May (see entry below)	Draft to Anne Pitsch for comments by 4/20	CCM: Biyoga, Kerekezi CIDCM: Wong, Pitsch
40	24 April 01	GW: Send letter of inquiry to foundations; CCM should inform CIDCM of all responses to the letter and proposals		CCM: Ntaganda
41	30 April 01	IDU: First bi-montly news summary issued…draft, not for public distribution		CCM: RAs CIDCM: Pitsch
42	30 April 01	IDU: Issue preliminary memo on availability and distribution of gacaca related materials		CCM: Kerekezi

43	30 April 01	IDU: Establish a bibliography of CCM research papers already completed and works in progress		CCM: RAs with Ntaganda
44	30 April	GW: complete grant for IDU; send to foundations		CIDCM: Weil
45	May 01	SS: Lecture # 3		CCM: Kerekezi and Biyoga
Item Number	**Date**	**Task Description**	**Status/Completion**	**Responsible**
46	1 May 01	MISC: CCM distributes the monthly bulletin of on-going work and events of note to NGO, embassy, ministry communities		CCM: Ntaganda, Kerekezi, Biyoga
47	15 May 01	MS: Budget completed		CCM: Biyoga CIDCM: Wong
48	15 May 01	MS: Begin interviews for potential memoire scholars Begin initiating summer work for memoire scholars		CCM: Ntaganda and Kerekezi; Biyoga and Mutoni CIDCM: Wong
49	21 May 01	TR: Kerekezi, Biyoga to US for women's conference and training; 2-3 weeks (the Partnership will cover travel costs for one person, and we are seeking additional funding for another)		CCM: Kerekezi and Biyoga CIDCM: Pitsch
50	28 May 01	IDU: First news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
	Late May-early June 01	MISC: Lecture by Alice Kerekezi at CIDCM and/or USAID while on Partnership travel		
51	June 01	SS: Lecture #4 TR: Christian Davenport and Carola Weil to NUR for research		CCM: Kerekezi and Biyoga
52	1 June 01	MISC: CCM distributes the monthly bulletin of on-going work and events of note to NGO, embassy, ministry communities GR: Gacaca policy paper completed and distributed; research paper outline completed		CCM: Ntaganda and Biyoga w/ RAs CIDCM: Pitsch CCM: Kerekezi
53	11 June 01	IDU: Second news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
54	25 June 01	IDU: Third news summary distribution to NGO, embassy, ministry communities MISC: Identify CCM/NUR staff to contribute to fall 01 UMD course on the great lakes;		CCM: Ntaganda and Biyoga w/ RAs

		identify technology needed		CIDCM: Pitsch
55	July 01	SS: Lecture #5		CCM: Kerekezi and Biyoga
56	1 July 01	MS: Summer research begins MISC: CCM distributes the monthly bulletin of on-going work and events of note to NGO, embassy, ministry communities		CCM: Ntaganda and Kerekezi and Biyoga
Item Number	**Date**	**Task Description**	**Status/Completion**	**Responsible**
57	9 July 01	IDU: Fourth news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
58	15 July 01	GR: Gacaca academic paper completed and submitted to appropriate journals; second research paper design completed		CCM: Kerekezi CIDCM: Pitsch
59	23 July 01	IDU: Fifth news summary distribution to NGO, embassy, ministry communities; include survey of users asking for feedback and suggestions for improvement		CCM: Ntaganda and Biyoga w/ RAs
60	August 01	SS: Lecture # 6 IDU: begin coding radio broadcasts for inclusion in bi-monthly summaries		CCM: Kerekezi and Biyoga; RAs CIDCM: Pitsch
61	1 August 01	MISC: CCM distributes the monthly bulletin of on-going work and events of note to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga w/ RAs
62	6 August 01	IDU: Sixth news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
63	20 August 01	IDU: Seventh news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
64	September 01	SS: Lecture #7		CCM: Kerekezi and Biyoga
65	1 Sept 01	MISC: CCM lectures for UMD course identified MISC: CIDCM support for CCM course on conflict management identified		CCM: Kerekezi and Ntaganda CIDCM: Pitsch
66	3 Sept 01	IDU: Eighth news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
67	Sept-Dec 01	MISC: CIDCM Course "Deadly Conflict and the Promise of Development in		CIDCM: Pitsch

		Central Africa"		
68	17 Sept 01	IDU: Ninth news summary distribution to NGO, embassy, ministry communities		CCM: Ntaganda and Biyoga with RAs
69	Jan-Mar 02	MISC: CCM course on conflict management		

IDU

ITEM	ID	STATUS	REF	COMPLE-TION DATE	TASK	RESPONSIBILITY
IDU	1			22-Jun-01	RAs @ complete & send to CDICM40 coded articles	RAs to Eugene and Anne
IDU	2	drafted	2	22-Jun-01	input from CIDCM re: coding	Anne to Eugene and RAs
IDU	3	drafted	2	25-Jun-01	coding format finalized	Anne to Eugene and RAs
IDU	4	drafted	2	25-Jun-01	Feedback from CCM re: coding format	Eugene
IDU	5			27-Jun-01	CCM determines regulatiy of coded information available on its web site	Eugene to Anne and Kelly
IDU	6			01-Jul-01	RAs commence use of finalized coding format	RAs
IDU	7			06-Jul-01	RAs each complete & send to CDICM 80 (120 minimum total) coded articles	RAs to Eugene and Anne
IDU	8			20-Jul-01	code sheets and coded material sent via Bob Spear to UMD	RAs to Bob via Eugene
IDU	8			20-Jul-01	RAs each complete & send to CDICM 80 (200 minimum total) coded articles	RAs to Eugene and Anne

IDU	10	27-Jul-01	RAs each complete & send to CDICM 80 (280 minimum total) coded articles	RAs to Eugene and Anne

IDU	11	03-Aug-01	RAs each complete & send to CDICM 80 (320 minimum total) coded articles	RAs to Eugene and Anne
IDU	12	05-Aug-01	code sheets and coded material sent via Jan Plane to UMD	RAs to Jan via Eugene
IDU	13	10-Aug-01	CIDCM complete evaluation of RAs ability to code autonomously	Anne to Eugene
IDU	14	17-Aug-01	Analytic structure from data, begin design	Anne to Eugene and Ras
IDU	15	07-Sep-01	Complete first analytic structure	Anne to Eugene and Ras

CONFERENCE

Conf	1	Completed	15-Jun-01	first draft of Concept paper	Eugene to Anne and Kelly
Conf	2	Completed	22-Jun-01	Preliminary Budget	Bea and Anne to Eugene
Conf	3		03-Jul-01	Begin collecting background materail for confernce: gacaca, reconsiliation, and other such items	Alphonse & Moffson
Conf	4		07-Jul-01	Preliminary Indentification of Additonal funders	Eugene to Anne

					and Kelly
Conf	5		07-Jul-01	Call for participants announcement	Eugene
Conf	6	drafted	07-Jul-01	Prelimary program produced	Eugene and Anne
Conf	7		12-Jul-01	Potential participants identified (also institutions)	Eugene and Anne
Conf	8		12-Jul-01	Second draft of of conference concept	Anne
Conf	8		13-Jul-01	Planning Committee established, review preliminary porgram	Eugene and Anne
Conf	10		15-Sep-01	Planing committee approved program	Anne and Eugene and Bea
Conf	11		30-Sep-01	Addtional funding secured	Eugene and Anne
Conf	12		05-Oct-01	Conference planing consulatant on duty	Eugene and Anne
Conf	13		10-Oct-01	Final Particiapants list confirmed	Eugene and Anne
Conf			15-Jan-01	Target for Conference to be held	

Memoire Scholars

Mem	1	Completed	1	20-Jun-01	complete and post preliminary advertisement	CCM
Mem	2	Completed	1	20-Jun-01	complete draft memoire themes	CCM and CIDCM
Mem	3	drafted	1	22-Jun-01	approve Memoire Program elements as discussed in memoire.all.doc	Anne and Eugene and Kelly
Mem	4	drafted		27-Jun-01	complete selection criteria and process, selection committee	Anne and Eugene and Bea
Mem	5	drafted		27-Jun-01	post completed advertisement including Themes, conditions ect.	CCM
Mem	6			16-Jul-01	complete selection criteria and process, selection committee	Eugene
Mem	7			01-Aug-01	begin to review student proposals	CCM
Mem	8			14-Aug-01	2 day interview time period	Eugene (CIDCM via tel conf)
Mem	9			17-Aug-01	finish review of proposals, chose scholars	Eugene and Anne
Mem	10			20-Aug-01	announce results to applicants 20 Aug.	Eugene

Mem	11		01-Sep-01	on or about start methods training phase I	Eugene and Christian
Mem	12		30-Sep-01	on or about complete methods training phase I	Eugene and Christian

Notes

1	see memoire.all.doc
2	see coding_*.* docs

June 2001 CCM Meeting results

Based on

(1) Eugene, Susan Moffson, Susan Mutoni, Kelly June 5, 2001.
(2) Rector, Eugene, Susan Mutoni, Kelly June 06, 2001
(3) Kaya Adams, Eugene, and Kelly June 06, 2001.

The meetings resulted in general agreement on three activities by NUR, USAID, and UMD:

1. The IDU including the IDU coding and the IDU Gacaca archives
2. The memoire students
3. The Regional Conflict Resolution Workshop

We discussed and recognized the importance of and the critical need for generating concrete results in each of the three areas in order to insure the continuation of this element of the partnership.

We also discussed the need for additional supervision of the two existing RAs. However, we were unable to reach consensus on this due to lack of time and the priority of other areas. We agreed that no existing CCM staff had time to adequately supervise these two RAs.

Among the tasks that remain is further definition of personnel and responsibility. I have noted responsibility, objectives, and personnel below, but this may need to be discussed further. Further more complete budgetary analysis will need to be completed.

1. IDU

Two items were discussed for IDU activities. First is the coding of newspapers. Second is the Gacaca archive.

IDU: Coding
Responsible: Primary CCM with CIDCM support as needed and requested
Supervisor: Eugene and Anne
Personnel: Beth and Alphonse (time commitment to be determined).
Objective: Develop coding capacity at the CCM

(1) Have RAs completed a minimum of 300 articles and be able to code with out supervision by 15 August, and begin coding on a regular basis thereafter.
(2) The RAs will code a minimum of 40 articles a week
(3) The coding format and protocol will be regularized by June 15
(4) Define a date to or number of coded articles at which point the coded material will be made available on the CCM website by June 20

(5) RA supervision will be tasked to Eugene and Anne. Each is equally authoritative with respect to the RAs and the IDU.

We agreed that the IDU activities would be pursued. The focus of the IDU will be on coding news articles concerning

a. economic,
b. social, and
c. conflict resolution and reconciliation

stories and events. Further we agreed that the training period for the 2 CCM based partnership RAs should last until about 300-400 articles were coded. During this period the CCM will send to CIDCM about 40 coded articles each week per RA. These will be sent every second week. Anne Pitsch and other CIDCM staff will provide verification of coding and provide input into the method of coding. After this training period the RAs should be able to code without regular verification from CIDCM.

Further we agreed that this would be a priority for the two existing RAs.

When the RA coding training is complete after about 300-400 articles per NUR RA, the CCM will assume responsibility for coding. During this time there may be periodic verification of coding accuracy, but that this will be determined in the future. Further we agreed that the results of the coding in the post-training phase will be made available to the public on the CCM web site and the CCM newsletter on a regular bases. The regularity of the posting of this IDU data has not yet been determined, but will be determined by 20 June.

The basis for the coding will be the code sheet developed by Christian Davenport during his March 2001 methods training at the CCM. The coding format will be regularized by June 15. If additional items need to be added to the code sheet Anne and Eugene will make this determination in consultation with each other.

Regarding office space and computers, all efforts will be made to secure as soon as possible two PCs for the RAs as well a two desks and two chairs and other office supplies and furniture. At present time the faculty of Education has agreed to temporarily release two PCs to the RAs with the understanding that these can be reclaimed. It was agreed that this material or more permanent material would be for the use of the RAs and that they would always have priority for its use. Further any such material will remain for the exclusive use by the partnership.

Further is discussion with the Rector he suggested that an ealrier discussed plan to code newspapers from the 1990s also be uncluded a s sub-activity for the IDU coding. CCM and CIDCM agreddn to this but will need to develop the parameters for this. Not deadline was established for this set of codings.

IDU: Gacaca Archive

Responsible: Primary CCM with CIDCM support as needed and requested
Supervisor: Senior Consultant (half time, TBA)
Personnel: New RA (third RA)
Objectives

(1) hire three personnel to support his activity
    a. Legal expert FTE 0.25 (10 hrs/week)
    b. Librarian or Achieve expert FTE 0.25 (10 hours/week)
    c. RAs FTE 1.00 (40 hours/week)
(2) identify all material on Gacaca
(3) Draft TORs for personnel (CCM and CIDCM responsible to the supervisor, then supervisor will draft TOT for other 2 with CCM and CIDCM input)
(4) use or modify the frame work developed by CCM during the Bear's visit to archive material
(5) set a date for the preliminary release of the archive listing
(6) define the implementation of securing material available in Rwanda or on the Internet.
(7) Identify space in the Library and CCM for the archive materials
(8) Identify date for public launching of the archive
(9) Identify date for action-plan work-plan for the
(10) Identify date for access to achieve material in NUR Library catalogue

We agreed that the partnership will pursue the establishment of a Gacaca achieve under the umbrella of the IDU. In order to facilitate this CCM determined that they needed a full time RA as well as a half time Senior research assistant with a MA/MS level training with training is legal/juridical matters. Further it was agreed that the estimate for the cost of the RA should be the same as the existing RAs (RwF 200,000), and that for the senior people the salary be a maximum of RwF 125,000 per month for an average of 10 hours of work per week. Per the suggestion of the CCM the senior person would be hired as a consultant. Kelly noted that if the consultant mechanism is chosen the consultant would have to submit a report on work activities and associated time allocation. The length of time for the senior person and the RA has yet to be determined.

The recruitment will begin as soon as possible. The positions will be advertised and a joint CCM CIDCM committee whose composition has yet to be determined will select the incumbent. One of the senior people (lib or law expert) will be the supervisor. This person will be tasked with drafting TORs for the other two and will manage the hiring process. The composition of the hiring committee has not yet been determined.

The items in the archive should include

a. articles
b. books
c. Rwanda legislation (laws)
d. NGO reports
e. Donor reports
f. Other Government of Rwanda reports

g. Judicial decisions and case material
h. A Gacaca bibliography for material not contained in the archive and the location of these items.

2. MEMOIRE STUDENTS
Responsible: Primary CCM with CIDCM support as needed and requested
Supervisor: Eugene and Anne in conjunction with Memoire Directors and Joint CCM CIDCM Memoire Committee
Personnel: TBA
Objective: Provide research training and support for about 10 NUR memoir students in fields of interest to the CCM and CIDCM.

(1) Complete advertisement by June 14,
(2) review proposals Aug 01-Aug20,
(3) announce results to applicants 20 Aug.

Good progress has been made for the memoire students. The CCM has drafted subjects for the students, as well a Terms of Reference, and a guide for proposal submission. We set a deadline for June 14 for the notice advertisement for the Memoire students. The CCM-CIDCM evaluation team composition has yet to be determined. The deadline for proposal submission is Aug 01, and decisions should be made by 20 Aug.

At the suggestion of the CCM a maximum budget for the memoire students is RwF 3,000,000 or about US$7,200, but the anticipated budget is about 2,000,000 RwF or about US$4,800. We have estimated that the ten students be supported by these funds. Student research activities will be supported, such as expenses for field research, paper printing, use of computers, Internet use, and other items.

It was agreed, and the Rector confirmed, that the RwF100,000 support usually provided by the NUR to Memoire students will continue to be funded by the NUR and that the support from the partnership will constitute support for logistical and material research support. Funding will be made on a case by case basis depending on the research proposal and the budget in the applicant's research budget. Thus while we anticipate funding a target of ten student the actual amount may be more or less, but an average of about RwF150,000. Further we also agreed to compensate the Memoire Director up to RwF50,000 per, and the Rector suggested that this will be in addition to amount the NUR currently and traditionally provides to the Memoire Director.

It was also agreed when Kaya Adams, Eugene, and Kelly met that the Memoire Scholars Program will be funded for a two-year period.

The selection process will begin with a request for research proposals. The CCM has identified the following elements for each proposal:

a. the problematic of the research
b. the theoretical underpinning for the research
c. the research methodology

d. the importance of the research and results for CCM
e. a calendar or time line for the research
f. a budget for the research
g. the submission of a draft survey or questioner is one is to be utilized
h. indication of support from a faculty member
i. proposal also submitted in an electronic format

The above noted CCM CIDCM evaluation team will decide on the proposals to be funded.

It was also noted in our discussion that each funded proposal should have at least one member form CCM or CIDCM who will be involved in the memoire. Further, it was also noted that the CCM and CIDCM would have input into the research proposal.

In addition,

1. the memoire students agree to submit with their Memoire a bibliography of all research material
2. that an abstract of the memoire be provided in English, French, and Kinyarwandan
3. that internships with local Egos be planned at some point
4. that the memoire student (and memoire directors also) should if possible benefit from a research methods workshop to be provided by UMD
5. That CCM will forward to CIDCM the draft texts of the memoire themes and TOR for input before these are finalized
6. That UMD personnel including Christian Davenport and Miranda Schreurs will have the opportunity to add to the existing list of memoire topics
7. That a listserve be established the link Memoire students and UMD students
8. That we think about the possibility of having memoire students present their research after a successful memoire defense.
9. That the gender balance target be 50% men and %50 women, and that if this representation is not available the valid candidacy will be opened up to non-memoire students.

3. REGIONAL CONCLFICT MANAGENMENT WORKSHOP

Responsible: Primary CCM with CIDCM support as needed and requested (Eugene will draft concept and Bea and Kelly and Anne will work together at UMD).
Supervisor: Eugene and Kelly
Personnel: TBA and logistic support from Mutoni and Moffson.
Objective: Provide a forum for diverse lesson learned on success and impediments to conflict resolution in the Great Lakes.

(1) Complete concept and draft agenda June 20.
(2) Define budget requirements
(3) Seek additional funding

(4) Set agenda
(5) Identify participants/panelist
(6) Identify audience esp vis Foundation in NBO (Ford, Win-Rock)
(7) Identify sources of additional funding
(8) Secure logistics
(9) Establish planning committee
(10) Time line will be completed by 01 Aug
(11) Target date of Dec-Feb for the workshop
(12) Draft TOR for consultant to assist with the workshop planing

Per the input of the CCM the partnership agreed to organize and fund a Regional Conflict Management Workshop in Dec 2001- Feb 2002. The objective of the workshop is to articulate lessons on and insight into impediments on conflict resolution in the Great Lakes. The concept, draft agenda, objectives for the conference, target audience, and types of participants will be completed by June 20. CCM has agreed to take responsibility for the first drafting, and it was agreed that work on this

Further we agreed that invitees would include people from the Rwanda, Burundi, Uganda, South Africa, and the Congo. We also discussed that experts in other regions such as Ireland and the Middle East should be included but that we would need financial support external to the partnership. The format of the workshop will be an opening session and a plenary session open to the public. The interim period will be closed to a working group that will provide conclusion and recommendation in the public plenary session.

The partnership agreed at the suggestion of the CCM that US$10,000 be committed to this workshop. We also agreed that additional funds would be sought in order to support workshop logistics such as facility rental, transportation and other expenses for participants. We also anticipate that the total cost for the workshop will exceed the allocated amount of US$10,000, but the CCM is confident it can find funding from donors for the balance of the total cost.

4. OTHER ITEMS

We also discussed the importance of joint research. We did not however identify specific topic or personnel for these projects.

We also discussed the importance of more direct linkages between CCM and CIDCM but did not discuss this with any specificity.

Speaker series

The speaker series was discussed with Kaya Adams, Eugene, and Kelly.

Eugene reported that the CCM considered the second speaker series to be a recent conference. However, given that there was not recognition of a speech as one in the

speaker series at the time of the utterance, and that this was in the context of another organized event this, Kelly noted that it is difficult to claim this a one in the series.

Per the suggestion of Kaya, we agreed that the preliminary sparker series would focus on local speakers. Further, we agreed that the CCM would provide a plan of action including but not limited to:

1. plan of action
2. subjects fort the series
3. suggested presenters
4. budget
5. mechanism for dissemination and diffusion of the speaker's presentation (audio, video)
6. that this will be completed by July 15.
7. that the CCM needs to notify USAID if meeting this deadline is feasible or not by 25 June
8. that the school of Journalism will be included in this activity
9. that there would be a speaker every 2-3 months
10. USAID suggested that is any of the above items are not respected the speaker series should not be funded.

Annex G: Product/Peer Evaluations

Evaluation form for Course Modules

1. Background

The National University of Rwanda, Butare (NUR) and the University of Maryland, College Park (UMD) Partnership is essentially a capacity building project focused on strategic objectives in three core areas:

Computer Science: Establish and support the formation of the Information Communication Technology/Information Technology (ICT/IT) component at the NUR's Department of Computer Science. This activity will support all aspects of the Computer Science Department, but will focus on the ICT/IT component of the curriculum. The mission of the ICT/IT component is to produce Computer Science graduates who are capable of contributing to the ICT/IT sector in Rwanda upon graduation.

Distance Education: Expand the educational capabilities of each university by utilizing information and communication technologies and supported with faculty exchanges. Each University endeavors to assist the other University with expertise that will contribute to the improvement of student education at both universities through increasing the number of courses offered, strengthening teaching capabilities, and increasing the enrollment capacity in targeted academic departments at the NUR.

Conflict management: Produce analyses of and research on conflict management and genocide dynamics in Rwanda and the Great Lakes region, provide training in carrying out research, and identify and implement appropriate conflict management interventions.

Pursuant to these objectives, activities and interventions, a two-phased implementation strategy was developed. Phase I is the pilot activity phase. Phase II is the full-scale activity phase. The implementation of activities in support of each objective may proceed at different rates in each of the three core areas. That is, for example, we may be prepared to implement Phase II activities in the Conflict Management area before the Distance Education Area. While Phase I (pilot activities) began in May 2000, the Cooperative Agreement was not in force until September 2000. Phase II (full-scale activities) was scheduled to begin in May 2001, but given the late-release funding and the timing on the academic year at the NUR, which is just ending in June 2001, the evaluation of Phase I activities and a discussion of mid-course corrections for Phase II will be targeted for August September 2001.

Given the breadth of the objectives and the importance of achieving them, the modernity of the technology, and the new territory of the Partnership, flexibility and the ability to

respond to changing circumstances and needs, this evaluation is critical to fully achieve the objectives of the Partnership and in insuring maximum efficiency and impact.

The objective of the mid-term evaluation is to assist in and provide input for the Partnership's
determination of how to proceed in Phase II. Attention will be given to each core area of activities, and recommendations will be made to improve the efficacy of each core activity area based on input from each Partner and lead personnel in each core activity area.

Given the broad range of activities, from UNIX, C++, and ICONS courses to AIDS/HIV and Chemistry modules, and the need to evaluate these products, and the need to identify a strategy for Phase II implementation and concomitant foci that each of the three partners concurs with, we have designed a two-track evaluation process. One will be a technical review of the work-product conducted by area experts, and the other will be a strategic review and assessment conducted by development implementation and strategy experts.

Objective
The objective of this evaluation is to provide technical expertise to vet and determine whether modules and course content in biology, chemistry, UNIX, C++, conflict management and other areas reflect mainstream teaching content in each field. *Consideration of the appropriateness of the content for the NUR is not an objective.*

Tasks
For each evaluator /set of course modules:

a. review and evaluate assigned course/module
b. discuss products with the creators/implementers
c. consider recommendations for increasing the effectiveness of the product reviewed

Deliverables
For each evaluator/set of course modules:

1. Preliminary report using the attached form including:

a. Description of the Product

b. Assessment of the quality of the product including
   - is the content reasonable (is the science in the Chemistry and Biology modules mainstream, accepted science);
   - is the content appropriate for the particular discipline

c. Recommendations including
   - what modifications can and should be made
   - why modifications can and should be made
   - what level of effort would be required to make these modifications

- what benefit would be achieved with the suggested modifications

2. Reply to requests for clarification from Phase II evaluators for the final report.

Directions:
Please use a separate evaluation sheet for each course/module evaluation. There are a number of open ended questions in MS Word Text Boxes. Please use these boxes for you response. Please return the evaluation to kwong@cidcm.umd.edu and cc apitsch@cidcm.umd.edu.

Evaluation Sheet

Evaluator Name:

_____

Evaluator Title/Position:

_____

Date: _____

Evaluator telephone contact: _____

Evaluator e-mail contact: _____

Module/Content Evaluated:

_____

Description of the Module/Content:

Assessment of the Module/Content (please **BOLD** yes or no for the first three questions):

a) Is the module/content recognizable as mainstream content for the discipline? Yes No

Which discipline?_____

b) Is the module/content an appropriate teaching/learning tool within the discipline? Yes No

What is your general assessment of the course/module?

c) Would you recommend any changes to be made to the module/content? Yes No

Please include your recommended changes here:

d) Why do you feel these changes should be made?

e) What level of effort or how much time would be required to make the modifications you recommend?

f) What would be the resulting benefits of making the modifications you recommend?

g) Other comments:

Evaluation Sheet

Evaluator Name: Terrence Lyons

Evaluator Title/Position: Assistant Professor, Institute for Conflict Analysis and Resolution, George Mason University, Fairfax, VA

Date: 18 August 2001

Evaluator telephone contact: 703/993-1336

Evaluator e-mail contact: tlyons1@gmu.edu

Module/Content Evaluated: Conference, "Rethinking Peace in Africa: Lessons from the Great Lakes

Description of the Module/Content: A five-day conference to provide a regional forum for civil society in Central Africa to discuss conflict resolution and techniques.

a) Is the module/content recognizable as mainstream content for the discipline? **Yes** No

Which discipline? Conflict analysis and resolution

b) Is the module/content an appropriate teaching/learning tool within the discipline? **Yes** No

What is your general assessment of the course/module? The proposed conference is well-designed and will address a significant need in the region. The format demonstrates a good balance between plenary sessions and small group break-out discussions and has a good balance between theory and practice. The regional focus on the Great Lakes will provide opportunities for contrasts and comparisons and may serve to initiate a regional network. CCM is as well positioned as any institution to play a convening role in Rwanda and the Great Lakes (although as noted below some question remains regarding whether certain actors from Burundi and DRC will travel to Rwanda).

c) Would you recommend any changes to be made to the module/content? **Yes** No

Please include your recommended changes here: I believe that some further thinking is needed on the balance between public and closed sessions. I believe (as detailed below) that one of the most important outcomes of this conference is the potential to launch a working network among scholars and practitioners of conflict management and peacebuilding in the region. Too many open sessions may inhibit discussions toward that goal and lead discussions to focus on what governments or donors can do.

As with any conference, selection of participants will be critical. In addition to the people at CCM, I recommend linking up with some of the main civil society organizations in Rwanda (IBUKA, AVEGA, Kanyarwanda, CLADHO, church groups), similar organizations in Burundi, DRC, Kenya, and Uganda (on-going efforts with which I am acquainted include the Acholi Religious Leaders Peace Initiative in Uganda, the Wajir Peace and Development Committee in northern Kenya, the Company of Apostles for Peace in Burundi), and some of the main international NGOs (International Alert in Burundi, Search for Common Ground, Institute for Multitrack Diplomacy). I wonder if some important groups from Burundi and DRC working with groups in conflict with the government of Rwanda might not travel to Kigali in order to attend the conference. There may be nothing that can be done about this, because any other site will have the same problems. But if the initiative is perceived as a gathering of pro-Rwanda conflict resolution groups, that will damage the potential of the conference to serve as the launching of a region-wide consultative process.

In addition, I believe the Handbook deserves some attention conceptualization. If it is merely a collection of rapporteur reports, it will only serve the purpose of providing a record of the discussions. If some of the important presentations are included along with some other documents (perhaps a keynote presentation?), then it may serve to begin a process of exchange among the academics and practitioners engaged in conflict management.

The budget seems very tight to me (although difficult to assess without knowing more about the potential for in-kind contributions from local partners on things like translation). If the Handbook has the potential to serve as a statement of the art and practice of conflict resolution in the region, then honoraria may be necessary to commission papers that survey the region and lay out some of the main forms of practice.

d) Why do you feel these changes should be made? I believe these changes would make the more of a framework for launching a ongoing network and dialogue among academics and practitioners and would better set the stage for future collaboration.

e) What level of effort or how much time would be required to make the modifications you recommend? Some more time would be required to identify and recruit the most important participants and presenters possible and to do the preparatory work on the Handbook to make it an important statement on the status of the field in the Great Lakes. Additional resources may be required to commission papers for the Handbook.

f) What would be the resulting benefits of making the modifications you recommend? I believe these changes increase the potential that the Conference will serve as the launch of a regional network for ongoing collaboration and will position CCM as the organization that helps set the agenda for research, theory-building, and practice relating to conflict resolution in Rwanda and the Great Lakes.

g) Other comments: Three possible techniques that have been used in the Great Lakes/East Africa that may serve as the focus of the trainings on days 2-4 include 1. Traditional methods and institutions, developing lessons from the Acholi Religious Leaders Peace Initiative in northern Uganda and the Wajir Peace and Development Committee in northern Kenya and making comparisons to the gacaca process in Rwanda; 2. The use of dialogue as an instrument of conflict management, building on the lessons of the Company of Apostles for Peace and International Alert's work in Burundi, along with the techniques developed by the Institute for Multitrack Diplomacy; 3. The use of media, developing the lessons of peace radio as sponsored by Search for Common Ground and Fondation Hirondelle in Burundi, Rwanda, and Liberia.

Evaluation Sheet

Evaluator Name: Evan Golub

Evaluator Title/Position: Lecturer

Date: August 24th, 2001

Evaluator telephone contact: 301-405-0180

Evaluator e-mail contact: egolub@cs.umd.edu

Module/Content Evaluated: C++ course

Description of the Module/Content:
An introduction to the C++ language and concepts of object-oriented programming and polymorphism.

Assessment of the Module/Content (please **BOLD** yes or no for the first three questions):

a) Is the module/content recognizable as mainstream content for the discipline? **Yes** No

Which discipline? Computer Science

b) Is the module/content an appropriate teaching/learning tool within the discipline? **Yes** No

What is your general assessment of the course/module?
The course looks very good on paper. However, I have concerns about some of the methods and approaches in the first half of the course. It is my understanding that the students have already been introduced to programming, but the opening slides about computers did not reflect this. Additionally, in the materials I was shown, there are things I feel reflect a lack of depth. I will discuss specifics below.

c) Would you recommend any changes to be made to the module/content? **Yes** No

Please include your recommended changes here:
On the syllabus, one of the topics is "understand the software life cycle". I do not think that this is the topic which is actually intended (this would be a more appropriate topic for the software engineering course). I think this is referring to the process of developing a program as a student or individual programmer. If this is the correct assumption, then the syllabus should reflect that.

If this is not the correct assumption, then I think that this is too early to discuss the life cycle of a piece of software.

In the slides for "Program Development Cycle", the following are given as the steps:

(Step 0) – Understand the Problem
Step 1 – Design the Program
Step 2 – Code the Program
Step 3 – Enter the Program; Check Syntax
Step 4 – Compile and Link the Program
Step 5 – Execute the Program
(Step 6) – Test and Debug the Program
(Step 7) – Complete the Program Documentation

Having the testing of the program be at the end is a very bad suggestion. While this works for a trivial program, for a program of any true interest, you want to test things as you implement your program. To imply that you should do it after you've implemented the entire thing leads to habits that are very hard to reverse. The disadvantages might not be noticeable in early, small programs, but by the end of even this course, students would not be able to reasonably follow this guide. Additionally, suggesting that you document **after** the program is done is bad. Documentation is better to be done during the design stage for high-level documentation, and while coding for comments about code blocks. Two of the reasons to document your code are to have an opportunity to double-check your logic and to make it easier to walk through your code while debugging. I'm also unsure as to why you would flowchart your program and write pseudocode as part of completing the program rather than as part of the design. The same holds true for input and output descriptions that should be part of the program specification used to design the program.

Most of the exercises are from the book, but one of the ones written by the instructor and given to me as an example (the "Motorcycle Time Trials" example) has several problems. First, it is labeled as an algorithm when it is not really an algorithm, but rather the pseudocode for an entire program. There are several algorithms implemented within this pseudocode, but they really aren't presented as algorithms. The program appears to be too large if it was presented before functions were introduced. If functions had already been introduced, then there are blocks of code that should have been done as functions. There are several places where constants should have been used (eg: 60 * 60). Most of the comments are short and do not do a very good job of explaining the logic behind many of the code segments
(eg: fast_time=24*60*60 should have its logic explained more). The while loops written of the form
while (invalid_time = yes) also demonstrate a poor style – it should simply be **while (invalid_time)** especially in pseudocode.

The programming project exams are trivial problems and do not have enough depth and complexity to fully evaluate the students' abilities. These problems should be more complex and should be designed by the instructors rather than taken from the book so that they can be tailored to the evaluative needs of both the course and the group of students. Also, I wasn't sure if these exams were in-class. If they are not, they should be and the exams should be designed to test the ability to think under time pressure since that is a significant issue in industry.

d) Why do you feel these changes should be made?
Students need to see examples that are as refined as possible – if they see poor style early (even if it is not seen as poor in small scale) it will be more difficult to correct later in the course or program.

e) What level of effort or how much time would be required to make the modifications you recommend?
I think that a certain amount of time needs to be put into the firming up of the examples and presentation materials for this class. This should be similar to the time it takes to create examples and presentation materials in general (which varies from person to person). Also, since it appears that this class is going to be done in Java in the future, this work becomes a natural part of switching over.

f) What would be the resulting benefits of making the modifications you recommend?
The students would be better prepared for the later courses and would not have to unlearn things that may have worked in small settings but do not work in larger ones.

g) Other comments:
I am not sure how the material is going to be redistributed in the new curriculum, so some of these comments might apply to earlier courses in a different language now.

Evaluation Sheet

Evaluator Name: Evan Golub

Evaluator Title/Position: Lecturer

Date: August 24th, 2001

Evaluator telephone contact: 301-405-0180

Evaluator e-mail contact: egolub@cs.umd.edu

Module/Content Evaluated: Overall computer science curriculum

Description of the Module/Content:
This curriculum covers the last three years of a four year program. The goal of the program appears to be to prepare students for career paths in the information technology industry.

Assessment of the Module/Content (please **BOLD** yes or no for the first three questions):

a) Is the module/content recognizable as mainstream content for the discipline? **Yes** No

Which discipline? This is not a straight-forward question to answer. I have said "yes" because I think that the content does match one of several tracks in the "informatics" family. While this is not a typical "computer science" curriculum, it is also more in-depth than I find most "information systems" curriculums to be. This depth is a good thing in my opinion.

b) Is the module/content an appropriate teaching/learning tool within the discipline? **Yes** No

What is your general assessment of the course/module?
The curriculum appears to give a solid foundation in both system-wide concepts as well as programming fundamentals. I think that both are key in graduating successful students. For example, system administrators often need to understand the issues and challenges behind projects that they are overseeing, so although they might not be programming things, they are better prepared if they can visualize the task of the programming team.

c) Would you recommend any changes to be made to the module/content? **Yes** No

Please include your recommended changes here:

Semester 3:

Introduction to Computer Science: The listing for this class mentions using Visual Basic at the end of the class. I think that if the goal is to introduce the students to a language that allows for the easy creation of graphical applications so they can do some very simple programs, this is a good choice. However, I did notice that the first two programming courses are to be done using Java. If the decision is made to use Java in this class as well, it will be very important to set things up within Java to allow students to create some basic programs without getting overwhelmed by its vastness. The Visual Basic environment naturally provides this, where Java environments don't appear to. Also, if there is a time overlap between the end of this class and the beginning of Computer Programming I, it will be important that the projects in this class are well coordinated with the presentation of topics in the other class.

Introduction to Information Technology with Applications: It will be important to teach concepts but to balance that with demonstrating the concepts within specific applications. I will also recommend introducing the basic concept of IP names –vs- hostnames when discussing interconnecting computers.

Semester 4:

Introduction to UNIX :

remove nroff/troff

add – find, looking at /etc/password, /etc/hosts, /usr/adm logs

replace SCCS with RCS or CVS

Semester 5:

Database Design: Having a database course at this time is too early. Students should have discrete math and elementary data structures first. Also, it will be important to see a large system by the end of this course with a non-trivial ER diagram where the advantages of a well-designed system become noticeable. I would suggest swapping this course with CS623 in the semester sequence.

Computer Systems Architecture: Pipeline architectures should be added to the topics list as they are a non-trivial concept to grasp and provide for an interesting piece of modern systems.

Semester 6:

Analysis of Algorithms: They should either do an empirical project within this course (where they implement some problem and count comparisons) or CS621 should have at least one project that is well timed to tie into this course. While 611 and 621 each deserves to be a course on its own, it is important for students to see the relationship between the two courses.

Principles of Programming Languages: Make sure that students implement programs in each of the language families.

System Administration and Low Level Programming: After the class, students should be able to detect system attacks, know what common risks are (DOS attacks, worms, etc…) and know where to go for information (eg: CERT). It also might be useful for students to actually be able to use available scripts to break into a system to see how easily it can be done and observe the activity from both sides.

Semester 7:

Multimedia Applications Design: This course was not defined, but I wanted to comment that it will be important to implement a project in one of the major packages for multimedia design (such as Flash, Premiere or Director) to get a sense of the complexity and flexibility of these systems.

Website Design and Development Tools: This course should cover a wide range of topics- XML, DHTML, the xScript family (Jscript, JavaScript, ECMAScript), ASP, JSP, Python, Perl and discuss the similarities, differences and how to know which to use when.

Semester 8:

Software Engineering: Add CVS explicitly and look to large industry examples for large source trees, multiple versions, dealing with the ability to release patches for older versions, etc. Using a revision control system as an individual is trivial – using it as part of a large project team is not.

d) Why do you feel these changes should be made?
The above changes are meant to help ensure a wider sense of scope for the students as well as more vision towards how things will appear in industry. Very often students encounter a type of culture shock as they move from the classroom to the workplace. Several of the above recommendations will soften this. Other changes are meant to reflect the current set of standards and/or prepare the students to deal with the changes that regularly happen in this field.

e) What level of effort or how much time would be required to make the modifications you recommend? Most of these modifications should be a natural part of course development and refinement. However, the changes to each course could take a few weeks to properly research and integrate into the course. It is highly dependant upon the style of the faculty.

f) What would be the resulting benefits of making the modifications you recommend?
The net benefit is that the graduating students would be better prepared for tasks they will encounter immediately, but also will prepare them for the changes in their positions as well as in the technology in the coming years.

g) Other comments:

The **Introduction to Computer Science** and **Computer Programming I** classes need to be offered sequentially within the term. I under understand that this is often done with classes in this curriculum, but wanted to make sure this is done with these two courses since it would not make sense to do them concurrently. If there is an overlap, then careful coordination should be done between these two courses.

It is important to use a mainstream Java environment rather than Visual J++. I mention this because from other things I've seen, I think the plan might be to use Visual J++ - this is not standard and has not been supported in several years. There is a core language SDK available from Sun, and several different Integrated Development Environments exist that work with that SDK (and can be easily updated when new SDKs are released).

Evaluation Sheet

Evaluator Name: Randi Mack

Evaluator Title/Position: Project Coordinator, Minorities at Risk, Doctoral Student, UMD

Date: August 26, 2001

Evaluator telephone contact: 703-914-1106

Evaluator e-mail contact: rmack@gvpt.umd.edu

Module/Content Evaluated: IDU Coding

Description of the Module/Content: Newspaper codesheets.

Assessment of the Module/Content (please **BOLD** yes or no for the first three questions):

a) Is the module/content recognizable as mainstream content for the discipline? **Yes** No

Which discipline? conflict resolution, comparative politics

b) Is the module/content an appropriate teaching/learning tool within the discipline? **Yes** No

What is your general assessment of the course/module? Adequate. Addresses the following purposes of coding (identified in Anne Pitsch memo 6/19/01): teaching analytic research skills, summarizing Rwandan press, and identifying "hot topics" in press. However, less useful in carrying out following goal of conflict management module (identified in evaluation form): produce analysis of and research on conflict management and genocide dynamics in Rwanda and Great Lakes region.

c) Would you recommend any changes to be made to the module/content? **Yes** No

Please include your recommended changes here:

Add a third step to the coding process that is theoretically based in conflict studies. Rather than just coding what is covered in the news, pick a substantive area for coding from which analysis of conflict dynamics can be made. I would recommend a Minorities at Risk approach as the codesheet is a proven commodity. Modify the current MAR codesheet, especially but not limited to those variables dealing with protest and rebellion, intragroup conflict, intergroup conflict, organization and government repression. Code weekly based on information gathered in the first two steps.

More specifically, Minorities at Risk (MAR) explains ethnic conflict from both a resource mobilization and relative deprivation perspective. In other words, a sense of grievance is the reason conflict manifests itself and the ability to mobilize resources dictates the form that conflict will take. The unit of analysis is the ethnic group. Relevant independent variables include those for discrimination, grievances, repression, organization, and transnational support. Dependent variables include those for protest, rebellion, and intergroup conflict. In Rwanda, additional variables based on current analysis of the situation could be added as necessary. Researchers could then run statistical tests of the relationships between variables over time to determine what is significant. The model could be refined over time, and perhaps eventually serve as an early warning system for the outbreak of conflict in addition to a source of explanation for its occurrence.

d) Why do you feel these changes should be made? Simply reporting on what is in the news will only be of limited value to research on conflict management and genocide. A more theoretically driven approach will allow further analysis of the issues. Since coders are reading the articles anyway, it makes sense to gather data that can be used to explore a research agenda.

e) What level of effort or how much time would be required to make the modifications you recommend? Agreeing on which substantive areas to explore is a political question, so I can't guess how much time it will take. If a modest research agenda is agreed upon, it should only take a few days to determine the variables to be coded and another few days to train the coders.

f) What would be the resulting benefits of making the modifications you recommend? You will be able to test hypotheses with the information you gather. In the long run, you might be able to produce an early warning system for the outbreak of violent conflict.

g) Other comments: It seems like the variable “target” is ambiguous and coded inconsistently. In addition, the length of the summaries varies widely and in level of detail. A standard might be useful. Furthermore, the “other” codes should be reviewed periodically to see if a category is missing. It also seems like the time given to code an article (30-45 minutes) is excessive.

Module/Content Evaluated: ICONS at the NUR

National University of Rwanda
Faculty of Social Science, Economics, Management
Department of Political Science
Prof. Tom Turner

[NOTE AN EDITOR HAS SHORTEN THIS REPORT AND MADE OTHER MINOR CHANGES]

EVALUATION OF 'ICONS' AT N.U.R.

I incorporated the ICONS Simulation on African International Relations into my course, "Theory and Practice of Negotiation" (syllabus attached). Before being offered the opportunity to participate in ICONS, I was searching for an activity to provide the practical component. I considered showing the video "Missiles of October" (on the Cuban missile crisis), and following that up with role-playing. As it happened, Anne Pitsch informed me of the availability of ICONS (in which I had participated years before) and it filled the bill very well.

The course was successful. The students learned a good deal about current problems in Central Africa, about negotiation, and about experiential learning. A summary of their final exam answers is appended; it supports these generalizations.

The ICON Simulation

Project ICONS at the University of Maryland conducts simulations over the Internet. My students participated in a three-week exercise called "International Relations of Africa." ICONS staff summarized this exercise as follows:

> *Negotiations on the International Relations of Africa bring together diplomats from a collection of African states. They will engage in a dialogue centered on three issues of importance to the future of the region: conflict (prevention and resolution), economics (growth and integration), and public health (infectious diseases and contamination). The most important question that these diplomats must try to answer is whether Africa will continue its current pattern of reliance on external actors (state and non-state) or whether it will try to forge a regional alternative.*

Teams from approximately 15 universities (mostly in the U.S, but also including NUR and a South African University) took part. Each represented an African government or the Organization of African Unity.

During the three weeks, two sorts of exchange take place: (1) posting messages and responding to messages from other groups, via email (rather like an online "list" or discussion group); (2) real-time conferencing (90 minutes per day, six sessions in all, in which all teams are supposed to be connected at the same time).

Prior to the three-week exercise, students conduct research with two main objectives: (a) to acquire general knowledge of the country they are to represent in the simulation, and (b) to acquire specific knowledge of one of the three issues to be discussed i.e., conflict, economics, or health. After the three weeks of negotiation, students should have the opportunity to discuss the experience with the professor and with one another, in order to draw conclusions.

The role of the professor is primarily one of "facilitator," although I had to present introductory material on negotiation theory and practice in the form of lectures. The fact that I was familiar with ICONS was a great help. I had heard Prof. Wilkenfeld, founder of ICONS, speak on the subject about ten years earlier, and my students in "International Organization" at Wheeling Jesuit University had participated in an early ICONS simulation.

Student Comments

I gave two examinations. A mid-term (examen partiel) tested the quality of the students' preparation for the negotiation. The final examination was designed to test active learning and critical thinking. The students did a good job on the final and their comments highlight strengths and weaknesses of the course. Some of the most interesting comments follow. (See a more complete summary, appended.)

I asked the students to tell what group they had been in, what were the aims of the group, and whether they had been able to accomplish those aims.

The strongest student in the "conflict" group was able to distinguish preparation from participation, and to evaluate the different stages of the ICONS participation:

> *...the objectives of our group were to find solutions to the problem of conflict in DRC. Absorbing the theory given in class based on the principles of Fisher and Ury and those of Zartman, we were able to prepare messages on the causes of the conflict in DRC and possible solutions that we proposed to resolve the conflict. We also did our best to respond to most of the messages that attacked us, coming from the other "conflict" groups of other countries taking part in the simulation. Next, we participated in two conferences, to which we suggested that an African solution to African problems was not easily imaginable and that we should seek the support of the major Western powers, especially material and financial support. At the second conference we suggested that one should create another organization of African Unity or else strengthen the existing one by giving it new means of action for resolving conflicts in Africa. ..*

There were two interesting responses from the "economics" group:

One of the strongest students summarized Congo's economic problems, then wrote, "*the aims of the development group were to discuss whether sub-Saharan Africa in particular and the whole Africa in general was to remain in such economic situation. Whether African would continue to depend on international institutions like World Bank, International Monetary Fund (IMF) and foreign countries like USA, France and others."*

Or could Africa build sustainable development by strengthening her financial institutions like the African development bank as well as regional organizations as such as SADC, ECOWAS, and the East African Community? This student was able to recall the terms of reference set by ICONS to a greater extent than his colleagues were.

Another member mentioned that the economics group wanted to discuss Rwanda's involvement in the Congo conflict; the group wanted to show that Rwanda's justifications were baseless and that Rwanda was interested in Congo's minerals.

The best answer from the health group began by listing various diseases rampant in Congo, mentioned also the economic crisis, then stated that *"the objective of our group was to see how we could, with other countries of the continent, fight against these diseases... and then see how, with the aide of resolution of the conflicts we would come to fight against the diseases related to the conflicts."*

Playing the role of DRC

My students participated in the ICONS simulation as a country team representing the Democratic Republic of Congo (DRC). This was not their choice, but mine. I figured that the effort to "put themselves in the skin" or "in the shoes" of the adversary regime in the war that has been raging since 1998 would require a considerable effort. It did, and by and large the students succeeded in adopting this perspective. At least two other countries might have offered interesting tests of the students' capacity for empathy: Uganda and Burundi. These represent interesting mixes of interests that are complementary to and opposed to those of Rwanda. But the obvious choice was DRC and it worked, in my opinion.

Readings

Using ICONS in my "Negotiation" course raised the question of what readings to use to provide theory and to introduce the simulation. I did not have the Starkey, Boyer, Wilkenfeld book (Negotiating a Complex World) at the time that I was preparing the course outline. The book provides a good introduction to negotiation, and leads up to ICONS. If I had had this book earlier, I might have used it more systematically.

I used two books that I had brought with me: Fisher and Ury's Getting to Yes and Zartman's Ripe for Resolution. The Fisher book provided the "theory" while Zartman gave an introduction to negotiation in Africa as well as a case study concerning an earlier

stage of the Central African problem (Angola-Congo in the late 1970s-early 1980s). I used the Starkey's Afterword, "Entering the World of Virtual Diplomacy," to introduce ICONS. As the answers to question three on the exam suggest, the students liked Getting to Yes and were able to apply some of the suggestions. Some of the better students noticed the gap between the two-sided conflicts in Fisher (customer and shop owner, renter and landlord) and the multi-party negotiations they were asked to take part in. Starkey would have been helpful in this respect.

I touched on the question of cultural factors in negotiation, drawing on Zartman's chapter in Harbeson and Rothchild. In April i.e., after completing ICONS, I purchased G. O. Faure, L. Mermet, et al. (2000), La Négociation: situations, problématique, applications. Paris, Dunod. This book would have been useful in several respects. First, it offers theory and examples, in French. Second, it calls attention to alleged cultural bias (American ethnocentrism) in Fisher and Ury.

I am relatively satisfied with the readings I used, but could have done much better in this respect. In particular, it would have been useful to have a small budget so that books and/or photocopies were made available to the students in a timely manner.

Student Expectations

NUR students are accustomed to the "cours magistral" where the professor lectures (often, s/he dictates) and they transcribe. They are not very used to discussion and do not always understand that useful information is being transmitted in that format.

They are even less accustomed to "experiential" learning such as ICONS. Courses at the SESG faculty often include "travaux pratiques" but these assignments rarely are useful. When I assigned such a project in my course "Movements and Ideologies," students went to the library, located what they thought was an appropriate mémoire de licence, and copied sizable chunks of it. Few of them understood the material. They could not provide access to the sources listed in the notes or bibliography. One hapless individual chose a literature thesis about "realism," apparently thinking that all "isms" were ideological.

My "Negotiation" course, in which the T.P. was central rather than peripheral, was something new to them. Some were slow to get the point. This shows up in the exam answers, where some suggested as a "change" that the instructor explain more clearly the purpose of the simulation. I explained it, or tried to, on numerous occasions, but some did not get the point until they were doing the simulation (if then).

For the most part, however, the students adapted fairly well. They did the preparatory work, and learned something about the substantive problems (disease, poverty, and war) and the linkages among them. It appears to me that there was some difference from group to group, as to the extent to which they were able to translate the background information into policy proposals.

Groups

I asked students to list a first and a second choice as to which group they wanted to join, and assigned them to groups on that basis. I also tried to take into account gender, language, and academic performance (as I understood it, from the one course they had completed for me at that point). That is, I wanted each group to have one or two Anglophones and several of the strongest students. Rather than spread the women evenly, I clustered them in two groups, figuring that they would be more likely to participate actively if there were several present than if there were only one or two.

The statistics collected in Maryland apparently show that two groups were quite active (in terms of messages posted) and one rather inactive. I do not know which is which. In any case, it is likely that material problems (such as power outages) influenced output as much as group composition.

I did notice some differences in group performance. The health group was able to collect a lot of information on disease in Central Africa. The group understood that neighboring countries had much the same pattern of diseases. They also understood that health and disease were closely related to poverty and war. But it seemed to me that they had some difficulty formulating a negotiating position and in particular, in promoting an African solution. They wanted to rely on the WHO.

The group on economics/development did reasonably well in gathering information on Congolese problems. This group apparently understood, better than the health group, what an African solution might be.

The conflict group (which may have had better leadership) quickly learned to use the Internet to identify positions both of Congo and of Rwandan opposition groups, that differ from the official government line on the Congo war. Perhaps modeling itself on the real-life behavior of Joseph Kabila's government, this group urged compliance with the Lusaka accords. They understood that this would mean trading disarmament of the Interahamwe for withdrawal of Rwandan troops from eastern Congo.

Work-load

The work I assigned, and that actually executed, is more than the quantity assigned or executed in other NUR courses, at least in the Social Science (SESG) faculty. I suggest that the credits awarded be changed to reflect that fact. Sixty credits would be fairer.

Cultural Factors

The various difficulties my students and I encountered may have been offset by some cultural factors. Here in Butare, as previously in Congo, I notice that work in small

groups comes easier to African students than to Americans. They don't have to spend much time deciding who is going to do what, but instead get to work.

The students claim to have engaged in "brain-storming," a concept they got from Fisher and Ury. I don't know how open this was, as I was not involved in their group discussion. There is a strong tendency to impose a consensus. This can lead to bad results, as in my course on "Electoral Sociology," where 15 students gave me the same wrong answer. In "Negotiation" it seems to have been a positive factor.

Practical Problems

From one point of view, the "Negotiation" course and its ICONS component were successful; the students learned a great deal. From another, that of facilities, it was a nightmarish experience. We did not have the basic equipment listed by ICONS; in particular, we had no printer. A major problem arose when our classroom, the former UVA, was taken away and assigned to the Computer Science Department in the middle of my course.

The students express their frustration as regards lack of books, problems of scheduling, limited computer access, slow Internet connection, and power cuts.

I asked the students what changes should be made -- If NUR participates in the ICONS simulation again in 2001-2002 -- to maximize the educational value of this activity?

More than half the respondents mentioned the need to increase and improve computer facilities at NUR: the number of machines, the hours of access to the machines, the number of rooms with computers, the reliability and speed of Internet connection, and not least, the reliability of electrical current. Several suggested purchase of a generator specifically connected to computer facilities so that events like being cut off in the middle of an ICONS conference would not recur. One mentioned the need for more technicians, so that technical problems could be resolved rapidly.

Much of this was sound. I disagree with the idea that each Icons participant should have a computer or monitor in front of him; working in pairs is preferable.

Several students stressed the problem of coordinating room assignment or reserving a room for Icons. Many times, they arrived only to find some other students using the facilities.

Several students mentioned a need for better preparation on computer and Internet use. They said they were handicapped by slow typing or inadequate knowledge of Internet research.

Several students discussed teaching materials. Some said the library should have newspapers and books that they could use to prepare their position papers. I think this is

valid; Internet research will not take the place of hard copies, particularly when the students do not have access to a printer.

One said that NUR should recognize the importance of ICONS in the university program, by buying "Getting to Yes" (or other textbooks).

Some said there should be more than one simulation per year. ICONS should be made available to more students, through other appropriate courses. Some saw that this would require training more professors and assistants in direction of ICONS simulations.

Staffing

I was able to conduct this course alone, partly because I had done ICONS before. In principle, there should always be two faculty members (perhaps a professor and an assistant) assigned to such a course. The Assistant Charles Kiiza was of some help at the beginning, but was no longer available by the time we reached the simulation.

Jean-Baptiste Ntirushwa of the Centre de Calcul was very helpful in introducing my students to research on the Internet.

Summary of Exam Question Responses

I. Short answers

I asked two true-false questions, to see if students had been paying attention during the run-up to the negotiation.

1. "Getting to Yes" deals mainly with foreign policy. 23 of 29 answered correctly, i.e. "false."

2. The organizers of "ICONS" encouraged development of inter-African solutions to African problems. Three gave the incorrect answer "false." Curiously, one of the three was the best student in the class.

II. Essays (they had to choose 3 out of 5)

1. Which group did you belong to (conflict, health, or development)? What were the aims of your group? Did you achieve your objectives? What obstacles did you encounter?

Comment: Some students misunderstood. I should have asked, "what objectives did your group set for itself, to pursue in the negotiations? Did you achieve these objectives? What obstacles did you encounter in pursuing these objectives?"

a. Answers from the Conflict group (N=6)

The strongest student wrote (my translation):

> *...the objectives of our group were to find solutions to the problem of conflict in DRC. Absorbing the theory given in class based on the principles of Fisher and Ury and those of Zartman, we were able to prepare messages on the causes of the conflict in DRC and possible solutions that we proposed to resolve the conflict. We also did our best to respond to most of the messages that attacked us, coming from the other "conflict" groups of other countries taking part in the simulation. Next, we participated in two conferences, to which we suggested that an African solution to African problems was not easily imaginable and that we should seek the support of the major Western powers, especially material and financial support. At the second conference we suggested that one should create another organization of African Unity or else strengthen the existing one by giving it new means of action for resolving conflicts in Africa. Finally, we responded to a sort of questionnaire.*

No other student so clearly distinguished preparations from participation, and dealt separately with the different stages of the ICONS simulation.

Another interesting response linked problems within Congo and in the region:

We took into account the conflicts in DRC and in the Great Lakes region. We aimed at the following objectives:
a) To fight against warfare in our region, whether inter-ethnic, coups d'Etat, or interstate warfare;
b) To improve the leadership of international organizations that are incapable of fighting against wars or other conflicts among nations, above all in our Great Lakes region;
We also decided that it was necessary to promote reconciliation within Congo, among political parties, among leaders, among ethnic groups, and also between Congo and other countries.

Other students answered as follows:

Our objective was to assemble the ideas of the group members, to choose among them, and to arrive at a common position, in order to be able to discuss with our colleagues in the simulation, on the question of conflict in Central Africa in general and in DRC in particular.

The objectives of our group were:
a) To search for the crux of the problem among the countries of the Great Lakes;
b) Sovereignty and territorial integrity;
c) Suggestions on management of the conflicts in the region;
d) Democracy in the countries of the Great Lakes, the problem of refugees.

.
Finally, a weaker student wrote that one of the aims of the conflict group "was to find ways of bringing an end to the conflict in DRC through proposing different endeavors or resolutions. Another aim was that of trying to bring together the opposition groups or those fighting for power to come for round table negotiations. For instance we proposed the implementation of Lusaka peace accord."

Members of the group claimed to have accomplished their objectives, in part, in that the Congo team reached agreement with the others on implementing the Lusaka accord, trading disarmament of the Interahamwe for withdrawal of Rwandan and other foreign troops.

As for obstacles, members of the "conflict" group stressed technical problems: electricity cut off (once in the middle of the "conflict" conference) and difficulty of Internet connection. The strongest student also mentioned a psychological obstacle:

"At the very beginning, it was difficult for some of us to play the role of Congolese because ... they felt ill-at-ease in their personal ego above all when we had to reproduce certain remarks that the DRC government makes to the Rwandan government, but over time, they all came to understand that we were in a simulation and that the objective of the professor was to evaluate our spirit of creativity."

That is not quite right, in that I was looking for empathy more than creativity. (as that same student indicated in his answer to another question).

Economics or Development (N=5)

One of the strongest students summarized Congo's economic problems, then wrote, "the aims of the development group were to discuss whether sub-Saharan Africa in particular and the whole Africa in general was to remain in such economic situation. Whether African would continue to depend on international institutions like World Bank, International Monetary Fund (IMF) and foreign countries like USA, France and others." Or could Africa build sustainable development by strengthening her financial institutions like the African development bank as well as regional organizations as such as SADC, ECOWAS, and the East African Community? This student was able to recall the argument advanced by ICONS Simcon to a much greater extent than his colleagues were.

Another member mentioned that the economics group wanted to discuss Rwanda's involvement in the Congo conflict; the group wanted to show that Rwanda's justifications were baseless and that Rwanda was interested in Congo's minerals. (This answer surprised me; I had considered asking about linkages among the three issue areas but did not do so.) This student mentioned as an obstacle the fact that most teams in the simulation displayed a "self-interested nature," putting forward the position of his country and paying little or no attention to other negotiators' points of view.

Another added the objective, "to convince the other side of our Congolese realities, to be open to suggestions from the other side," and to arrive at a compromise.

In this group as in the conflict group, the weaker students were less able to discuss the simulation as a process.

Health Group (N=6)

The best answer began by listing various diseases rampant in Congo, mentioned also the economic crisis, then stated that "the objective of our group was to see how we could, with other countries of the continent, fight against these diseases... and then see how, with the aide of resolution of the conflicts we would come to fight against the diseases related to the conflicts." Most of the others were able to list the various diseases but unable to articulate a strategy for fighting them.

Q. 2 -- What did you learn from playing the role of Congo-Kinshasa (DRC)? (N=15)

I am satisfied that the question was clear. Nonetheless, a few students misunderstood and gave overly general answers such as "I learned to do research via the Internet."

One of the best answers was as follows:

"In playing this role, although it was frustrating for a Rwandan, we learned many things. We learned, in the first place, that there was a divergence of views as to the creation of an African organization, other than the OAU, which would have greater dissuasive powers.

"We encountered accusations, hardly veiled, coming from the principal belligerents in the Great Lakes conflict. This enabled us to understand the positions and the interests of the different parties.

"The role also was beneficial in that it gave us a chance to express ourselves, to exteriorize our thoughts, to present arguments and defend one's position.

"It also allowed us to appreciate the argument of the other parties in the negotiation, … to grasp the interest of the subject.

"We also learned to manage our feelings and to control our emotions facing some comfortable and some uncomfortable situations."

This student (a military officer) concludes by writing, "Putting myself in the skin of the Congolese, I also understood their points of view, their emotion, their anxiety, their anger: and the sound basis of their arguments." (This man obviously knew how to give me the answer I was looking for. But under question 5, he asked, "wouldn't it be better to play the role which fall to us naturally (that of Rwanda)? That would allow us to apply the theories we had learned.")

Another good student wrote that it would have been easier to play the role of Rwanda because he knew many things about its foreign policy. To play the role of Congo, he had to do a lot of research, in order to know about its economic, political and social problems. In so doing, he acquired valuable research skills.

To play the Congolese role in the negotiations, he had "to be conscious of what I was writing or sending as messages." This showed this political science student how diplomats behave, something that could be useful later if he becomes a diplomat or is sent to defend the interests of his country.

As a Rwandan, he found it beneficial to go beyond slogans put forward by Rwanda's leaders as to why Rwanda is in Congo. Combining what is "preached" (his term) with the views of Congolese and international opinion, one can be open and see the roots of the problems.

Another strong student also wrote about the future, when he might be a politician or a political scientist, applying what he had learned in this course. The arguments of Fisher, about identifying interests, proved very valuable in this simulation. Playing the role of a Congolese diplomat, this student had learned that the Congolese and Rwandan perceptions of the same situations are very different.

Yet another student said that he had learned that Congo is important, by noting the attention paid by other countries and by OAU, to what DR Congo had to say.

It had not occurred to me that some of the students, Rwandans today, had lived in Congo earlier. Two such people identified themselves in their answers. One of them (a weak student) put forward not just one but two clichés in his short answer: mineral-rich Congo as a "scandale géologique" and Africa as a revolver, whose trigger is in Congo.

Q. 3 -- Which theoretical approach or approaches were most helpful to you, in preparing for the negotiation? (N=16)

All of these mentioned one or more ideas drawn from Getting to Yes by Fisher & Ury: separating the people from the problem, the value of brainstorming etc. Some of the answers were more detailed and more clearly expressed than others, but there was less variability in the answers to this question than any other. No one attempted to use Zartman's Ripe for Resolution.

Q. 4 -- How does the ICONS Africa simulation differ from typical instruction at NUR? What are the advantages and disadvantages or such experiential learning? (N=18)

After summarizing the traditional lecture course (cours magistral), the strongest student wrote that ICONS "brought us something new." First, it brought us empathy, the ability to put oneself in the place of the other, to feel what he feels. The student enriches his personal knowledge, because he must do research in order to perfect the role he is called on to play. Also, it permits the professor to evaluate the spirit of creativity and personal initiative of each student.

As disadvantage, this student mentioned the difficulty of "separating the person from the problem" (as Fisher suggests) when one cannot see the person. If insults are employed, personnel at Maryland will screen them out.

Another disadvantage is that one is at the mercy of the "caprices" of the computer (slowness, frequent disconnection etc.)

Other students made the same points. One added that the Internet research, as well as the negotiation as such, opened the student to the African world. The professor is not obliged to remain in front of the students the whole time; the students conduct research individually and in small groups.

Several argued that while information learned in a "cours magistral" would be forgotten soon after the examination, what they learned via the ICONS simulation would stay with them much longer.

Q. 5 -- If NUR participates in the ICONS simulation again in 2001-2002, what changes should be made, to maximize the educational value of this activity? (N=20)

Two-thirds of the students chose this question and I see no reason to think that the other one-third had different opinions.

More than half the respondents mentioned the need to increase and improve computer facilities at NUR: the number of machines, the hours of access to the machines, the number of rooms with computers, the reliability and speed of Internet connection, and not least, the reliability of electrical current. Several suggested purchase of a generator specifically connected to computer facilities so that events like being cut off in the middle of an ICONS conference would not recur. One mentioned the need for more technicians, so that technical problems could be resolved rapidly.

Much of this was sound. I disagree with the idea that each Icons participant should have a computer or monitor in front of him; working in pairs is preferable.

Several students stressed the problem of coordinating room assignment or reserving a room for Icons. Many times, they arrived only to find some other students using the facilities.

Several students mentioned a need for better preparation on computer and Internet use. They said they were handicapped by slow typing or inadequate knowledge of Internet research.

Several students discussed teaching materials. Some said the library should have newspapers and books that they could use to prepare their position papers. I think this is valid; Internet research will not take the place of hard copies, particularly when the students do not have access to a printer. (None of them mentioned the lack of a printer.)

One said that NUR should recognize the importance of ICONS in the university program, by buying "Getting to Yes" (or other textbooks).

Many students focused on preparation for the negotiation. Some said they should have received a better explanation of what they were going to do and why. Several put this point in terms of students needing to do more research, or more work in general, before the negotiation. One claimed that group work had been slowed down by the presence of some students who had not done enough preparation, and asked that those who had used the computer for "recreational or pornographic" activities be excluded from the simulation!

One said I should have organized debates between the three issue groups (conflict, health, etc.), both as a means of students informing students and as a means of the instructor evaluating student work.

Some said there should be more than one simulation per year. ICONS should be made available to more students, through other appropriate courses. Some saw that this would require training more professors and assistants in direction of ICONS simulations.

Several students mentioned the problem of language. Texts were drafted in French, then translated into English, which was a slow process. Two students wanted to be able to use French as well as English, in ICONS negotiations.

Several asked for more indication of the results of the conferences. (This is a valid complaint; I should have scheduled more time for "debriefing.") Some wanted official recognition, perhaps a certificate from Maryland attesting to their participation, perhaps even prizes.

One student, who seems to have an exaggerated idea of the importance of this activity, thought NUR should arrange to inform the Rwandan government of the conclusions reached by ICONS participants.

Evaluation Sheet

Evaluator Name: Amy M. Mach

Evaluator Title/Position: Ph.D. graduate student in pharmacology at Georgetown University

Date: 9/17/01

Evaluator telephone contact: 202-687-1242 (w) 703-908-0266 (h)

Evaluator e-mail contact: macha@georgetown.edu

Module/Content Evaluated: Introductory Chemistry

Description of the Module/Content:
Basics concepts of introductory chemistry. Each section included objectives, notes and concepts, and a set of questions and problems.

Assessment of the Module/Content (please **BOLD** yes or no for the first three questions):

a) Is the module/content recognizable as mainstream content for the discipline? **Yes** No

Which discipline?__Introductory Chemistry_____

b) Is the module/content an appropriate teaching/learning tool within the discipline? **Yes** No

What is your general assessment of the course/module?
All sections were very thorough, especially the problem sets. Those were very detailed and really tested the concepts taught. However, I found some of the concept modules to be slightly disorganized, and found parts of modules to be repetitious with later modules. A few of the more difficult modules could have had a little more detail as well.

Please include your recommended changes here: (changes listed by module number)
3a: section H. The concept of energy and themochemistry is only briefly discussed. A more detailed thermochemistry module is needed, or could include this information with the colligative properties in mod. 12a.
3c: There are problems about moles, but have yet to define what a mole is in the notes.
4a: Should include a brief introduction about how to read and use the periodic table.
5a: Lewis dot structures are briefly discussed, but they have not shown how to draw and use them.
6 p.5: This section is repetitious with the section previous to it.
8a: Typo on bottom of p. 21. Equation not balanced correctly (should be 6Cl- as the reactant).
7 p.6: Directions are confusing. Left out part "b".
9, 10: This module could be included earlier in the note set, possibly after module 5.
10 c: Typo on p. 13 #25. Should read "5.2719 moles **H2O**".
12a: Mistake on the description of a phase diagram. Part c should read "solid-**liquid** boundary". There should also be a picture of a phase diagram, marking the important points.
13b: Parts of this module were previously discussed in module 4c and 7 (orbitals, photons, and waves) although the topics are discussed in more detail in mod. 13b. Those sections could possibly be combined.

Module/Content Evaluated: Biology Module

Evaluator Name: Eugene Kaplan
Tel 631 261 - 6720

MODULE EVALUATED: Experimental Science Biology Module

Mainstream content: YES
Science and biological science Appropriate YES
Recommended changes YES

- Specific changes included in edited version sent to Billeter.
- Content is excellent and appropriate. Writing style excellent.
- Asking frequent questions requiring participant to rationalize why he or she has made a specific answer causes the person working on the module to address the process of science. Deliberate attention to scientific method is admirable. Specific reference to the nature of the hypothesis and dependent and independent variables, etc. are outstanding. This module is unique in its deliberate and extensive efforts to foster understanding of the processes underlying the discoveries in science.
- The module content has been chosen for its relevance to Rwandans.

In general it must be assumed the professors, and subsequently teachers and students, have been taught by traditional methods. This module is an attempt to introduce an understanding of the methodology behind the facts (scientific discoveries). Participants have studied science by rote...even professors who have gone to Sorbonne and Oxford. The material in the module is hard for them, as they are not used to this mode of thinking ... and being forced to answer questions that require complex understanding of scientific method. I believe that the approach should be more fully described with careful effort made to clarify reference to such words as glycogen and proteolytic enzymes which are referred to and defined afterwards. (Glycogen is never referred to before being part of a question. The assumption is made that the professors are familiar with the concept that it is a storage molecule for glucose. The participating professors will probably be specialists in one field of biology. They will not necessarily understand the molecular references referred to, e.g. enzyme synthesis. If the participants are science educators, they will not have a basic understanding of the biology presented. **While the applications section is difficult, it adds an excellent review and of the concepts discussed (and the reasoning behind the elucidation of the concepts).** It is recommended that the last section (p.20-26) be taken home to be turned in as a "lab report." This will allow the participants to consult reference books and discuss the material among themselves. In fact they should be encouraged to discuss the material out of class. Thus, one of the profs, who understands some of the material, will be able to teach the others. Another will understand a separate set of concepts and fill in where the other leaves off. For example, the material presented requires some knowledge of enzyme action (the description provided is too cursory and a chapter on enzyme action

would be too long for this module ... unless a textlike discussion can be included on the CD). A textbook should be included in the package sent to the distance learning participants

How will the module be presented as distance learning? Will kits be provided to be sent to teachers? It is admirable that the module is constructed to include simple substances such as can be found in local stores. This should be kept in mind when subsequent modules are constructed

D. My experience has been that profs and teachers do not have training in scientific method and the level of content provided.

E. Little effort will be required to "improve" the edited copy, as specific recommendations have been made.

F. Resulting benefits: Make module suited to level of participants.

G. Other comments: Outstanding module. If implemented in teacher training courses will have a profound influence on the educational level of science teaching in Rwanda

d) Why do you feel these changes should be made?

These changes would make the modules easier to follow and more organized. Some of the changes are simply minor misprints that should be corrected to prevent any confusion.

e) What level of effort or how much time would be required to make the modifications you recommend?

f) What would be the resulting benefits of making the modifications you recommend?

I think the modifications would make the modules easier to follow for beginning chemistry students. These modules should be extremely organized in order for students to be able to use them properly and effectively.

g) Other comments:

Another suggestion would be to include an additional module on electrochemistry. This topic is not discussed in these modules. This module would include topics such as: voltaic cells, electrolytic cells, relationships between ΔE, ΔG, and K, and solving redox equations. This would require a lot of work to generate a new module, along with a new problem set.