GEORGIA STATE UNIVERSITY
Proposal for the Use of FY2004 Technology Fees

Human Movement Analysis
“Computer-assisted and Video-based Instruction and Learning in Kinesiology”

Ben Johnson, Ed.D.
Associate Professor

Andy Doyle, Ph.D.
Associate Professor

Department of Kinesiology and Health
College of Education
1. **Project Short Title**

   Computer-assisted and Video-based Instruction and Learning in Kinesiology

2. **Total Requested Amount (reference to funding for “Years Following” removed)**

   | Fiscal Year 2004 | $ 77,500 |

3. **Executive Summary**

<table>
<thead>
<tr>
<th>Project Description (Three or four sentences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The purpose of this project is to integrate computer-assisted instruction and video-based learning for Human Movement Analysis in anatomy, biomechanics, physiology, physical education and therapeutic recreation throughout the Kinesiology curriculum. This will be accomplished by purchasing discipline-specific hardware and software, and by establishing and staffing a computer learning center with 14 workstations (for undergraduate and graduate student access) that require software and a DV video camera only for development of course/lab materials and easy communication with students on projects utilizing the technology.</td>
</tr>
</tbody>
</table>

4. **Project Description**

   Kinesiology is defined as the study of movement, usually related to human movement in pursuit of physical activity including activities of daily living, occupations, exercise and sport. This diverse and interdisciplinary field draws from many academic disciplines, but a common core of knowledge that permeates the Kinesiology curriculum is a thorough understanding of the structure and function of the human body, particularly in response to movement, work and exercise. These concepts are initiated in early foundation courses in the curriculum, and are repeated, reinforced and expanded upon in more advanced courses in both the undergraduate and graduate degree programs.

   A fundamental basis for understanding Kinesiology is a comprehensive knowledge of the structure and function of the human body and how it responds and adapts to movement. Integration of state-of-the-art digital video-based movement analysis software with existing multimedia anatomy and physiology programs will allow for consistent presentation of these concepts throughout the curriculum, and will allow student access to this specialized software in an independent, interactive environment. A key component of the Kinesiology curriculum is experiential learning, determining through direct observation and measurement individual responses and adaptations of the body to movement and the environment. The goal of incorporating specialized hardware and software is to involve students through participation in physical and biomechanical data acquisition and analysis rather than simple demonstration. More advanced courses would build on this base of participation, and would provide the tools to encourage student learning by guided inquiry.

   The goal of this proposal is to purchase discipline-specific digital video movement analysis hardware and software for use in anatomy, biomechanics, physiology, physical education and therapeutic
classes and to assist faculty in incorporating these tools into appropriate courses in order to improve instruction and learning. A further goal is to create student access to these same tools by establishing a 16-workstation computer (primarily laptop computers to enable mobility of data captures in field-based settings) learning center (our labs typically have between 15 and 20 students enrolled). This learning center will provide now-unavailable access to these specialized tools for assigned laboratory tasks of data acquisition and analysis, searching research databases and organizing results, independent study and inquiry, and self-paced multimedia learning.

The Dartfish digital video analysis software in this proposal has a 3-fold function. This software can be incorporated into classroom or laboratory lectures to enhance presentation and understanding of anatomical, biomechanical and physiological material. This award winning multimedia program is particularly well-suited for quickly and easily capturing, visualizing and measuring human movement. The program also functions well as stand-alone learning modules that students can explore at their own pace in an independent environment. Finally, the software can be easily used to incorporate images or animations into student presentations, reports, handouts, etc.

Because this common core of knowledge permeates the Kinesiology curriculum, this proposal has the potential to have a large impact on instruction and learning in at least 14 undergraduate and graduate courses, and some level of impact on approximately 15 other courses.

5. Relevance to Regents Guidelines

The implementation of this proposal speaks directly to items 1, 2, 3, and 6 in the Regent’s Technology Fee Guidelines:

1. The outcome of this proposal would be to provide discipline-specific hardware and software for the direct benefit of students in the Kinesiology academic programs, as well as for a number of students from other academic programs that take KH courses. The software and hardware would be used in the classroom in a number of classes in the curriculum, in laboratories, and by students working independently. This equipment and software will be used in basic and advanced undergraduate courses as well as in graduate courses.

2. The establishment of a small computer learning center within the existing Biomechanics and Ergonomics Laboratory will provide students with access to computer-based educational tools that they do not now have easy access to, and to discipline-specific software and hardware that for which they currently have no access.

3. This proposal includes software and hardware that will allow for the development of specialized laboratory activities emphasizing guided inquiry, rather than observation of demonstrations.

6. A component of this proposal includes staffing the new computer learning center with doctoral-level graduate assistants. It is anticipated that this staffing will allow for increased access of students to the computer-based material, and will provide individualized instruction and assistance that should greatly improve student orientation to the technology-based resources, reduce student frustration, and increase student productivity and learning.

6. Relevance to Strategic Plan(s)

This proposal seeks resources for program enhancement that align directly with specific points of the Strategic Plans of the University, College of Education, and Department of Kinesiology and Health. Excerpts from these plans are quoted below, but this plan proposes to meet these goals and objectives in
2 ways:

1) incorporating appropriate technology-based instructional methods into the classroom and laboratory in order to improve instruction and understanding; and

2) to increase access to and utilization of computer-based technology by students to enhance learning.

University Strategic Plan
- "... become and remain current in the application of computing and information technologies”
- "All students should have ready access to computing resources and an opportunity to develop information management skills for lifelong learning”

University Information Technology Strategic Plan
5.2 A University Goal: Technology-enabled Faculty, Staff and Students
   5.2.1 Ensure Faculty and Staff Development in Technology
   5.2.2 Provide Appropriate Workstation Support for Faculty and Staff
   5.2.3 Promote Effective Research Computing
   5.2.4 Foster Technology Experimentation
   5.2.5 Provide Effective Information Technology Services for Students

5.3 A University Goal: Technology-enhanced Education
   5.3.1 Establish Appropriate Levels of Technology in Classrooms
   5.3.2 Ensure Availability of Information Technology Resources for Students
   5.3.3 Engage the Academic Community in the Use of Technology

College of Education Strategic Plan
Principles of Professional Education
- Inquiry – faculty involve students in making the university a center of inquiry

Goals – Quality
- Continue to strengthen subject matter knowledge in the academic disciplines
- Ensure our ... graduates have expert knowledge ... of technology
- Continue to enhance and strengthen programs within the college which prepare professionals working in contexts other than schools
- Strengthen collaborative and interdisciplinary programs such as ... exercise science, sports medicine, biomechanics ...

Department of Kinesiology and Health Strategic Plan
Departmental Planning Priorities
- “Increase accessibility to and use of technology in teaching and research”

Short Range Objectives
- “Identify and obtain instructional materials, technology, equipment and space which would enhance classroom effectiveness”
- “Improve faculty knowledge and use of alternative methods of teaching”
- “Improve faculty knowledge and use of instructional technology and services available in the university”

Long Range Objectives
- “Explore and support ways for faculty to develop interdisciplinary instructional programs”

7. Impact on Students Served

There are over 400 undergraduate and graduate students in the Department of Kinesiology and Health, with a large number of additional students from other programs that take selected courses
offered by our department. The incorporation of the proposed discipline-specific software throughout our curriculum has the potential to influence instruction in approximately 17 undergraduate courses and 12 graduate courses. This proposal has the potential to impact students in the academic disciplines of Exercise Science, Sports Medicine, Physical Education, and Recreation from our department, as well as students from allied health sciences such as Physical Therapy.

The software would be available to faculty for incorporation into relevant courses. Students will have access to the software and laboratory hardware in the proposed computer learning on weekdays during specific times. The facility will be available on selected evenings, usually associated with courses or laboratories taught in the evening.

The workstations will have the Dartfish Movement Analysis software installed, and the students will either check out the appropriate data acquisition hardware (Laptop and DV Video Camera) for the assigned laboratory activity or use the equipment in the Laboratory. A combination of laptop and desktop computers will be employed to assure maximum utilization of the technology. Each computer will have a dedicated DV video camera for human movement capture.

8. Justification of Funding Requirements for Fiscal Year 2003

<table>
<thead>
<tr>
<th>Object of Expense</th>
<th>Itemized Descriptions</th>
<th>Quantity</th>
<th>Extended $ Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Salaries</td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Fringe Benefits</td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Student Salaries</td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Equipment (Note: Use standard dollar amounts and replacement thresholds from sections 10/11, or provide explanation in sections 10/11)</td>
<td>Workstations (Windows) – Desktop 4</td>
<td>$ 8,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workstations (Windows) – Laptop 6</td>
<td>$ 18,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workstation Chairs 10</td>
<td>$ 1,200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printers – HP LaserJet – Network 1</td>
<td>$ 1,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Video Projector 1</td>
<td>$ 3,500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sony DV Cameras 10</td>
<td>$ 10,000</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>Dartfish Pro Suite Package 11 licenses</td>
<td>$ 32,450</td>
<td></td>
</tr>
<tr>
<td>Maintenance or Contractual Services</td>
<td>Annual cleaning/replacement of video camera heads</td>
<td>$ 2,500</td>
<td></td>
</tr>
<tr>
<td>Supplies</td>
<td>DV Video tapes</td>
<td>$ 500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Firewire cables</td>
<td>$ 350</td>
<td></td>
</tr>
<tr>
<td>Construction Services (Requires review of Planning &amp; Facilities)</td>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Connections and Infrastructure Costs (Requires review of UCCS)</td>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Expenses (explain)</td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$ 77,500</td>
<td></td>
</tr>
</tbody>
</table>
9. Consequences of Partial Funding

Only 75% funded:

The proposed project would remain viable at 75% funding ($58,125), with the obvious result being a reduction in the availability of the hardware and software to the students and supervision and staffing. To reduce $19,375 from the proposed budget, 1 (partial) Maintenance Contract ($1,475), 3 Desktop Workstations ($6,000), 1 Laptop Workstation ($3,000), and 3 Dartfish Software Licenses ($8,850) (TOTAL = $19,375) would be eliminated.

Only 50% funded:

Components of the proposed project would be viable at 50% funding, but with severely reduced student access to these technology tools. To achieve 50% funding of $38,750 both software and computer equipment purchases would be drastically reduced and this would creating access issues for students needing to perform laboratory activities. The other major reduction would be the elimination of the GRA funding which would make implementation of the proposal more difficult, and daily supervision of student access and activities impossible with current resources. To reduce $38,750 from the proposed budget, 1 (partial) Maintenance Contract ($1,200), 3 Laptop Workstations ($9,000), 5 DV Cameras ($5,000), 2 Desktop Workstations ($4,000), 1 Printer ($1,000), 10 Workstation Chairs ($1,200) and 5 Dartfish Software Licenses ($14,750) (TOTAL = $38,750) would be eliminated.

10. Standard Dollar Amounts

The Sports Arena, location of most Kinesiology classes and labs, currently has four student-accessible computer workstations that are dedicated to anatomy and physiology labs/instruction. This proposal would fund 10 Windows workstations (4 Desktop and 6 Laptop) at standard amounts (Desktop 4@$2,000=$8,000 and Laptop 6@$3,000=$18,000) to form a small computer learning center that can be accessed by students during laboratory activities, or during specific scheduled times during the day to utilize the proposed discipline-specific hardware and software. Dell machines are acceptable for the Desktop computers, however, NEC Laptop Computers are preferred because of superior “viewability” of the screens in outdoor settings where these laptops would be used on occasion. Both the Desktop and Laptop computers require larger than the “norm” with regard to Hard Disk Drive and RAM Memory size due to the intensive nature and large volume of space of the video applications for which they will be used. In addition, each computer must be equipped with a video card or PCMCIA card with dual-port IEEE 1394 (Firewire/I-Link) input/output. Therefore, the costs per computer will exceed the amount specified in the RFP.

11. Standard Replacement Thresholds

- Not applicable

12. Prerequisite, Non-Technology Fee, Funding

- Not applicable

13. Matching Funds

- None

14. Staffing and Other Support Availability
Faculty and Graduate Research and Teaching Assistants that would regularly use the technology would be trained to use the system. These faculty/staff members would provide training to students as necessary. Training seminars for students would be scheduled and announced each semester in classes in which the technology would be utilized. An existing staff position within the department, our Research Equipment Specialist, may be available to assist with technical computer issues (installation, troubleshooting, etc.) on a limited basis. The unit responsible for this facility would be the Department of Kinesiology and Health, supervised by Dr. Jeffrey C. Rupp, Department Chair.

15. Space Availability

It is proposed that the computer learning center (14 workstations) be placed in the Sports Arena, Room G15, the Biomechanics and Ergonomics Laboratory of the Department of Kinesiology and Health. This space is currently assigned to the Department of Kinesiology and Health, and serves a major instructional role in the curriculum of the department. It is logical to locate this computer learning center in an area where most of the laboratory activities occur, and where students can access the equipment for independent study and learning scheduled during times. The space is sufficient in size, and will not require any renovation. There are existing network outlets available for each of the computers.

16. Impact on Facilities

None beyond current levels. The area allocated has sufficient space for 14 computer workstations and has adequate HVAC capabilities for this function, which would not require a change in the current function of the room. The proposed project does not have any renovation or construction requirements.

17. Impact on Computing/Network Infrastructure

None beyond current levels. The space already has 10 network drops available for the workstations.

18. Post-Project Assessment Criteria

1. Inclusion of technology-based resources into course content:
   • Determine the specific departmental courses that may benefit from inclusion of this technology
   • Review course materials and interview faculty to determine degree of inclusion into course content

2. Survey student response to inclusion of technology in course content – this can be accomplished anonymously through the WebCT survey tool in each course; current student evaluation instrument does not have a question specific to technology, but students can be encouraged to comment in the open comment area of the instrument

3. Track student use of computer workstations and software – this can be accomplished because students will be required to check out the CD ROMs

19. Review and Acknowledgements

• Attach electronic notes or documentation showing that the following units or administrators have reviewed or acknowledged this proposal:
  o Dean or functional unit endorsement
• Matching funds commitment from appropriate fiscal officer
• CBSAC approval, if necessary
- University Computing and Communications Services review or acknowledgement, if necessary
  Planning and Facilities review or acknowledgement, if necessary