NDSU Technology Action Plan Request

I. Action Plan Introduction and Authorizations

NDSU ORGANIZATION OR UNIT
Department of Health, Nutrition and Exercise Sciences

TITLE OF PROJECT
Golf Simulation Teaching and Training Lab

Project Duration (3 years maximum)  From: 1/16  To: 1/17

Type of Project (Check one)  New x  Previously Submitted  Renewal

Total Technology Fee Request  $39,900

Project Director  (Must be NDSU faculty or staff)
Brad Strand

Campus Address: FLC 417
Phone: 19718  Fax: 18872
E-mail: Bradford.strand@ndsu.edu

Name (Type or Print)  Signature  Date

Project Director  Brad Strand  1/11/16

Unit Head  Yeong Rhee  1/11/16

IT Division Consultant  Signature  Date
Melissa Stotz  1/15/16

Executive Summary (maximum of 175 words)

The goals of the project are to 1) implement golf simulation technology and training in the curriculum for physical education teacher candidates, athletic training students, and exercise science majors, 2) enhance current Health, Nutrition, and Exercise Sciences (HNES) faculty instruction, and 3) prepare PE teacher candidates and HNES graduate students with 21st century skills that will contribute to K-12 and higher education student learning. This technology will compliment the resources we obtained last year as we developed our pedagogical lab.

We will only accept for consideration Technology Action Plan Request forms which are fully completed and signed according to the guidelines listed in the Instructions, pages 1 and 2.
Technology Action Plan Request forms will be opened and reviewed after the submission deadline.

NDSU Technology Action Plan Request

II. Project Overview

1. How does this project meet student needs?

This project will:
A. Implement golf simulation technology and training in the curriculum of physical education teacher candidates, athletic training students, and exercise science majors,
B. enhance current Health, Nutrition, and Exercise Sciences (HNES) faculty instruction, and
C. prepare PE teacher candidates and HNES graduate students with 21st century skills that will contribute to K-12 and higher education student learning.

2. What audience does this project directly serve? What audience is indirectly served? How many students are affected?

The project directly serves:
A. 65 undergraduate HE and/or PE majors (primary)
B. 60 graduate students
C. 15 HNES faculty
D. 250 undergraduate exercise science students
E. Potential for students outside of the Department of HNES to use the equipment and technology.

3. For projects that target a subset of NDSU’s students, please describe the possibility for broader application in the future.

Requests to use the golf simulation lab could be made by outside departments and athletics. The simulation lab will be used by physical education teacher candidates in training sessions with students outside the department.

4. Describe both the immediate and long-term impact of this project.

Immediate impact:
A. Instructors will be able to use the latest golf technology to enhance instruction.
B. Students will have direct access to the latest golf technologies.

Long-term impact:
A. Undergraduate HNES students will have competency in a new and innovative sport technology.
B. Graduate students will be greater prepared for professional careers as well as instructional roles in higher education.

5. Who will pay for ongoing expenses following the technology fee funded portion of this project (e.g., who will replace hardware or software after it has reached its end of life)?

The HNES department will fund maintenance and equipment replacement.

6. Describe how this project will follow NDSU’s best practices in information technology. (Please make sure the NDSU IT Division staff you consulted signs in Part I of this form.)

I met with ITS staff to discuss this project and best practices.

7. What service on campus is most similar to the one proposed here? How does this project differ?

There is no service on campus that is similar to the one proposed here.
III. Project Description (5 pages maximum)

Include information on the background of this project: how did it come to fruition?

Until this past year the HE/PE program had few specialized technologies. Funding obtained through a successful Technology Fee award resulted in the establishment of a pedagogical lab that includes an instrumented classroom (Desktop computer, projector, document camera, smart board, iPad minis, FITNESSGRAM/ACTIVITYGRAM software license, FitBit Flex (10), and iPod Nano. The next step in the implementation of innovative sport technology for teaching and learning is the establishment of labs for specific sports.

The gymnasium in the Bentson Bunker Fieldhouse is used for the teaching of many of our physical education teacher preparation courses. Certain activities however cannot be fully taught or practiced in that setting. For example, it is difficult, if not impossible, to teach physical education teacher candidates how to teach and/or coach golf. We currently have students travel to Edgewood Golf Course to participate in a couple of on-site practice sessions. However, even if they get a basic training at that site there is not an opportunity to peer-teach or to include golf in on-campus teaching experiences.

Accurate and affordable golf launch monitors provide a new teaching and research tool for teachers and coaches. Until recently the inexpensive launch monitors lacked accuracy while the accurate monitors were expensively priced. In addition, Blue Tooth technology has allowed the monitors to be moved and positioned both indoors and outdoors without bothersome wires. Golf launch monitors allow golfers to determine the distance the ball landed, total distance, launch angle, club speed, side spin, side angle, back spin, and offline while providing a visual display of the shot.

This pedagogical lab would be unique to NDSU as I am not familiar with such a lab within a multi-state area. This lab will provide HNES faculty with a teaching and research niche. Every year new golf training products arrive on the market. We would certainly be in a position to be a test center for the developers of those products.

A Summary of Items Requested for Project Include:

• S4 Golf Simulator = $25,900 plus taxes
  o Software
  o Projector
  o Hitting screen
  o Touchscreen
  o Computer
  o Computer cabinet
  o Hitting area

• 30 Course upgrade = $3,000

• Miscellaneous golf supplies = $1000
  o Golf ball
  o Weighted golf clubs
  o Swing ring
  o Mirrors
  o Smash bag
• Freight and install charges = $10,000

**Project will Address the Above Needs by:**
• Provide access to golf technology applications and instructional sources to HNES physical education, athletic training, exercise science, and sport management faculty.
• Facilitating teacher candidate competencies in HNES and EDUC PE courses.
• Facilitate graduate technology education and pedagogical application during graduate seminar.

**Training and Expertise**
• One PE faculty member is already trained in the use of a golf simulator and will be able to provide consultation for other HNES faculty. We will also lead the HNES graduate seminar classes on technology use and pedagogical applications.

**Expected Outcomes**
• All equipment received and installed
• Assessment artifacts designed to meet designated teacher candidate competencies
• At least 9 HNES faculty will use lab equipment in the first year
• Graduate students will be educated in technologies and their pedagogical applications

**Number of Students Impacted**
A. 65 undergraduate HE and/or PE majors (primary)
B. 60 graduate students
C. 15 HNES faculty
D. 250 undergraduate exercise science students
E. Potential for students outside of the Department of HNES to use the equipment and technology.

**Additional Supports Already Acquired to Facilitate Project:**
• None
NDSU Technology Action Plan Request

IV. Milestones

List the date for each project milestone. These milestones should represent the significant accomplishments that will be associated with the action plan. For each milestone, please indicate its expected outcome and the means for assessing that outcome. (The table may be extended as needed.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
<th>Expected Outcomes</th>
<th>Means of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 1, 16</td>
<td>Space secured for the golf simulation lab</td>
<td>Dedicated space</td>
<td></td>
</tr>
<tr>
<td>March 1, 16</td>
<td>Equipment purchased</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 15, 16</td>
<td>Lab completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1, 16</td>
<td>Use of lab by HNES faculty and students</td>
<td>At least 5 HNES faculty will use lab equipment</td>
<td>Usage log</td>
</tr>
<tr>
<td>Sept 16</td>
<td>Technology classes within HNES graduate seminar</td>
<td>Graduate students will be educated in technologies and their pedagogical applications</td>
<td>Usage log</td>
</tr>
<tr>
<td>Sept 16</td>
<td>PE major teaching non-PE students</td>
<td>PE majors will gain teaching experiences</td>
<td>Usage log</td>
</tr>
</tbody>
</table>
NDSU Technology Action Plan Request

V. Supporting Documentation
Program Standards/Competencies Addressed

National PETE Standards

Outcomes—Teacher Candidate Will:
2.5 Analyze and correct critical elements of motor skills and performance concepts.

COMPETENCIES:
2.5 A Analyze, detect, and corrects all students’ fundamental movement skills using skill cues linked to the identified critical elements.
2.5 B Provide specific, corrective feedback on critical elements for both motor skills and tactics.
2.5 C Identify objectives related to decision-making and the effective use of strategies and tactics and plans practice activities congruent to objectives.
2.5 D Provides specific, corrective feedback on the effective use of strategies and tactics to students.
2.5 E Demonstrate knowledge of current technology available and its use in the physical education setting.
2.5 F Emphasize the process as well as the product.

Outcomes—Teacher Candidate Will:
3.8 Design and implement student learning experiences that integrate technology.

COMPETENCIES:
3.8 A Integrate learning experiences that require students to use various technologies in a physical activity setting.
3.8 B Incorporate current technologies to enhance student learning.

Outcomes—Teacher Candidate Will:
4.1 Demonstrate effective verbal and nonverbal communication skills across a variety of instructional formats.

COMPETENCIES:
4.1 A Use of proper grammar and appropriate verbal communication.
4.1 B Incorporate multiple forms of communication during lesson.
4.1 C Use alternative forms of communication such as task sheets, bulletin boards, etc. to communicate content.
4.1 D Incorporate technology to provide feedback to students (such as pedometers and video).
4.1 E Demonstrate best practices.
Outcomes—Teacher Candidate Will:

6.2 Participate in activities that lead to professional growth and development

COMPETENCIES:

6.2 A Participate in professional development opportunities for professional growth.

6.2 B Participate in professional opportunities beyond the program requirements (such as presentations at professional conventions, providing leadership in student groups, and planning activities such as Hoops for Heart.)

6.2 C Use technology on a regular basis to communicate, network and locate resources.

InTASC

Standard #5: Application of Content
The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

5(k) The teacher understands the demands of accessing and managing information as well as how to evaluate issues of ethics and quality related to information and its use.

5(l) The teacher understands how to use digital and interactive technologies for efficiently and effectively achieving specific learning goals

5(n) The teacher understands communication modes and skills as vehicles for learning (e.g., information gathering and processing) across disciplines as well as vehicles for expressing learning.

5(p) The teacher knows where and how to access resources to build global awareness and understanding, and how to integrate them into the curriculum.

Standard #6: Assessment
The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher’s and learner’s decision making.

6(c) The teacher works independently and collaboratively to examine test and other performance data to understand each learner’s progress and to guide planning. (Fitnessgram)

6(g) The teacher effectively uses multiple and appropriate types of assessment data to identify each student’s learning needs and to develop differentiated learning experiences.

6(i) The teacher continually seeks appropriate ways to employ technology to support assessment practice both to engage learners more fully and to assess and address learner needs.
Standard #7: Planning for Instruction
The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

7(k) The teacher knows a range of evidence-based instructional strategies, resources, and technological tools and how to use them effectively to plan instruction that meets diverse learning needs.

Standard #8: Instructional Strategies
The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

8(g) The teacher engages learners in using a range of learning skills and technology tools to access, interpret, evaluate, and apply information.
8(h) The teacher uses a variety of instructional strategies to support and expand learners’ communication through speaking, listening, reading, writing, and other modes.
8(m) The teacher understands how multiple forms of communication (oral, written, nonverbal, digital, visual) convey ideas, foster self-expression, and build relationships.
8(n) The teacher knows how to use a wide variety of resources, including human and technological, to engage students in learning.

Standard #9: Professional Learning and Ethical Practice
The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

9(d) The teacher actively seeks professional, community, and technological resources, within and outside the school, as supports for analysis, reflection, and problem-solving.
9(f) The teacher advocates, models, and teaches safe, legal, and ethical use of information and technology including appropriate documentation of sources and respect for others in the use of social media.
9(h) The teacher knows how to use learner data to analyze practice and differentiate instruction accordingly. (video analysis and self-evaluations of teaching)

Standard #10: Leadership and Collaboration
The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

10(g) The teacher uses technological tools and a variety of communication strategies to build local and global learning communities that engage learners, families, and colleagues.

ESP Standards

Standard 08025.5. Communication
The program requires the study of effective verbal, nonverbal, and media communication techniques to enhance learning and engagement in physical activity settings. Teacher candidates demonstrate sensitivity to all learners, and model appropriate behavior. The program uses a variety of performance assessments of candidates' understanding and ability to apply that knowledge.

Standard 08025.6 Planning and Instruction
The program requires the study of how to plan and implement a variety of developmentally appropriate instructional strategies to develop physically educated individuals, based on state and national standards. This standard deals specifically with pedagogical knowledge and application. The core of this standard will be a series of sequential and progressive field experiences that allow teacher candidates to refine, extend, and apply their teaching skills. The program uses a variety of performance assessments of candidates’ understanding and ability to apply that knowledge.

The program requires the study of reflective practice, with evaluation of the effects of the educator’s actions on others (e.g., learners, parents/guardians, fellow professionals). Teacher candidates seek opportunities to grow professionally. This standard can be met through a series of learning experiences that promote self-reflection on the part of teacher candidates. The program uses a variety of performance assessments of candidates’ understanding and ability to apply that knowledge.

Standard 08025.9. Technology
The program requires the study of current, appropriate instructional technologies to enhance learning and to enhance personal and professional productivity. The program uses a variety of performance assessments of candidates’ understanding and ability to apply that knowledge.

National K-12 Standards (ND is currently adapting)

- Uses available technology to self-monitor quantity of exercise needed for a minimal health standard and/or optimal functioning based on current fitness level. (S3.M8.8)
- Analyzes and applies technology and social media as tools to support a healthy, active lifestyle. (S3.H2.L2)
- Adjusts pacing to keep heart rate in the target zone, using available technology (e.g., pedometer, heart rate monitor), to self-monitor aerobic intensity. (S3.H10.L2)
NDSU Technology Fee Action Plan Request
VI. Budget
(double-click on the form to begin entering data)

1. NDSU ORGANIZATION OR UNIT
   Health, Nutrition and Exercise Sciences

2. PROJECT DIRECTOR(S)
   (Must be NDSU faculty or staff)
   Brad Strand

3. SALARIES AND WAGES
<table>
<thead>
<tr>
<th>Personnel description</th>
<th>Number employed</th>
<th>Number of months</th>
<th>Funds Requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Staff</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
</tr>
<tr>
<td>B. Graduate students</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
</tr>
<tr>
<td>C. Undergraduate students</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

4. TOTAL SALARIES AND WAGES
   $0.00

5. FRINGE BENEFITS
   $0.00

6. TOTAL SALARY, WAGES AND BENEFITS
   $0.00

7. EQUIPMENT
   S4 Golf Simulator
   $25,000.00

8. TOTAL EQUIPMENT
   $25,000.00

9. MATERIALS AND SUPPLIES
<table>
<thead>
<tr>
<th>Description</th>
<th>Funds Requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping and Installation</td>
<td>$10,000.00</td>
</tr>
<tr>
<td>50 course upgrade</td>
<td>$3,000.00</td>
</tr>
</tbody>
</table>

10. TOTAL MATERIALS AND SUPPLIES
    $13,000.00

11. TOTAL TECHNOLOGY FEE REQUEST
    $38,000.00

12. MATCH (Describe in Match Section)
    $1,000.00

13. TOTAL PROJECT EXPENDITURE
    $39,000.00
NDSU Technology Action Plan Request

VII. Budget Justification

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4 Golf Simulator</td>
<td>• HNES currently does not have any technology for teaching and practicing golf</td>
</tr>
<tr>
<td>30 course upgrade</td>
<td>• The equipment is necessary for teaching HEPE students how to golf and how to teach golf.</td>
</tr>
<tr>
<td>Golf supplies</td>
<td>• The lab will provide NDSU with a niche teaching and research lab</td>
</tr>
</tbody>
</table>

Additional Equipment

NDSU Technology Action Plan Request

VIII. Budget Match

1. Attempted Budget Matches:
   None

2. Actual Budget Matches:
   $1000

3. Additional Budget Match information:
   The budget match will come from HNES, the HEPE program, and HDE.
WHO'S HITTING FULL SWING?

WOODS
"Their new technology is impressive, as it allows me to shape my shots the way I want to."

SPIETH
"The FSG unit is the closest thing to being out on the course."

POULTER
"My time is precious and I don't like to compromise. That's why I chose the Full Swing simulator."

HAAS
"My sim continues to surprise me. I love this machine!"

MAHAN
"I use my Full Swing sim several times a week to fine tune my game."

WILSON
"probably the most important aspect is that the shot data is consistent."
S4 Simulator
Accurate. Reliable. Affordable.
The perfect solution for the discerning client who wants the best quality at a value price. Experience the technology used by the pros.

OVERVIEW
Compact Depth Enclosure
Patented Tracking System
Light & Sound Immersion Technology
Halo Vision Technology
Pro Studio - Driving Range
Standard Resolution Projector
Golf Hitting Screen
High Performance Computer
LCD Touchscreen Monitor
Professional Grade Hitting Mat

OPTIONS
- Golf Course Packages
  - Packages of 20, 50, and 90 available
  - Commercial Enclosures
  - Upgraded High Definition Projector
  - Pro Studio / Club Compare

BASE PRICE
$25,900*
* Freight & install charges are not included.
* Duties, federal, state and local taxes and other costs are extra.
* Specifications and features are subject to change.

CONTACT
IES 675-1111
www.l4testing.golf.com

DETAILS
ENCLOSURE
- Compact Depth - wall & ceiling panels are shallow depth, floor panels are full depth.
- Sign fusion structure with durable stretch fabric.
- Durables light absorbent surface.
- Easily installs in many locations and applications.

STANDARD OPTIMAL SIZE REQUIREMENTS
- S4 Actual Size: 12'W x 5'H x 12'D
- Optimal Space Needed: 12'W x 10'H x 10'D

- S4 Commercial Actual size: 15'W x 9'H x 16'D
- Optimal Space Needed: 15'W x 10'H x 10'D

PATENTED DUAL TECHNOLOGY TRACKING
- InfraRed/Realtime technology accurately measures ball speed, launch angle, and direction.
- High speed camera technology accurately measures ball spin and club head data.

SOFTWARE
- Ground Breaking Golf Software
- Live motion environment.

PROJECTOR
- Standard Resolution, HD Capable,
- High Lumens.

SCREEN
- Quiet hitting screen.

TOUCHSCREEN
- 22" LCD touchscreen system controller.

COMPUTER
- Custom built gaming computer featuring an Intel processor and high-end graphics card.

COMPUTER CABINET
- Sleek, minimal design houses the computer, keyboard, mouse, and tracking controller.

HITTING AREA
- Highly durable, factory-sealed, hitting mat.
DUAL TRACKING TECHNOLOGY

INTUITIVE CLUB HEAD DATA
Io2 Vision Technology gives you club head speed, club face angle, and club path information with an intuitive on-screen illustration of your club, so you can better understand your swing.

TAKE BALL SPIN SERIOUSLY
Io2 collects real-time spin data, including back spin, side spin, and spin axis. Measuring true spin and displaying it on-screen allows you to make better equipment choices and shot decisions.

WORK THE BALL YOUR WAY
Full Swing prides itself on ball flight accuracy and realism of the golf shot. Focusing only on ball spin and club head, Io2 allows the ball path to be shaped exactly as if it were outdoors.

INFRARED TECHNOLOGY + HIGH-SPEED CAMERAS

SUPERIOR Speed and Trajectory Measurement

SUPERIOR Spin and Club Head Measurement

Full Swing has developed a third generation extension to its existing infrared tracking system. Utilizing a single high-speed camera to focus solely on ball spin and club head data, Full Swing has truly mastered the art and science of ball flight.
Full Swing’s new Pro Studio practice and club comparison suite is a streamlined solution that makes game improvement and club fitting efficient and fun.

- Includes Driving Range, Chipping Range, and Club Comparison.
- Get immediate and extensive feedback with intuitive and easy-to-read visual graphs.
- Compare the club's efficiency between each club type and found by analyzing key data points.

- In-game Swing Studio
- Custom Practice
- Compare Clubs
- Analyze Driving
- In-game Chipping Range
- In-game Club Comparison

In-game Swing Studio

Custom Practice

Compare Clubs

Analyze Driving

In-game Chipping Range

In-game Club Comparison
UPGRADE OPTIONS
FOR S4 SIMULATORS

A 2ND TON2... FOR LEFTIES
Dial in your lefty friends and family.
All Full Swing simulators already come loaded with the lane Vision Technology, but the smaller enclosure requires a second tone. If you want bally and club head data for the lefties, it's just one way to maintain the smallest footprint in the industry.

CHAMPIONSHIP GOLF COURSES
The best quality courses and environments in the industry.
Full Swing's live motion software package is the most comprehensive and realistic motion graphics innovation in the golf simulation industry.

COMMERCIAL ENCLOSURE
A full-depth enclosure provides privacy and added durability.
These fully enclosed simulators allow indoor centers and businesses to provide a more desirable and substantive environment for heavy traffic situations.

PRO STUDIO: CLUB COMPARE
A simplified and streamlined club fitting experience.
Full Swing's new Pro Studio Club Comparisons tool is a beautifully designed and efficient solution for golfers and retailers.
SOFTWARE DETAILS

CHAMPIONSHIP COURSES

18 breath-taking and challenging golf courses from around the world are available, including Pebble Beach, Oakland, and The Old Course at St Andrews. Every hole, bunker, and patch of grass is beautifully depicted, bringing out the subtleties of the terrain that make each course a true work of art.

CONTEST CAPABILITIES

Each Full Swing simulator is equipped with a full-color display, custom games, and more. With high-definition graphics and precise ball tracking, the Full Swing platform offers unparalleled realism.

PRACTICE RANGE

The practice range is designed to provide a realistic simulation of real-world conditions. With a variety of targets and obstacles, you can fine-tune your swing and work on your accuracy.

SHOT CONTROL

Each shot is automatically saved, allowing you to review your performance and make improvements. The shot control feature helps you analyze your swing and adjust your approach.

DETAILED ENVIRONMENT

The Full Swing environment includes a detailed course layout, with realistic terrain and obstacles. The world-class graphics bring the course to life, providing an immersive experience.

Load time and performance are outstanding, ensuring a smooth and enjoyable experience. Whether you're a seasoned pro or a casual golfer, Full Swing offers a level of realism and accuracy that no other simulator can match.