FOUNDATION FOR Professional Ergonomics

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The Foundation for Professional Ergonomics (FPE) Criteria for the Dieter W. Jahns Student Practitioner Award

The Dieter W. Jahns Student Practitioner Award is open to all in Ergonomics and Ergonomics-related programs. Students who have completed their degrees in the past year are also eligible.

Important Dates

Dates change, always check the latest summary at www.ergofoundation.org

Criteria

As this is a practitioner award, the student (or students) should describe and document a research or intervention project that includes:

- Explanation and demonstration of how the Core Competencies (SEE below) were used.
- Clear identification of the problem in the target community, including importance (magnitude, e.g. incidence, severity, prevalence, impact).
- Identification of the target community.
- Defined objectives.
- Rationale and background for the design (intervention) that is understandable and comprehensive.
- Design description that enables replication (who, what, when, where, how, safety considerations, milestones, etc.).
- Evaluation that is relevant, meaningful information, in accordance with the problem identification and expected effects of the implementation (examples: descriptive data, compliance data, acceptability, performance data, knowledge improvement, cost, etc.).
- Evaluation/outcome measures that are well defined, valid, and reliable. If not, an explanation for their selection should be given.

- Analytic measures that are described adequately and are appropriate to the hypothesis or objectives.
- The full program impact that was considered, if possible. For example, were both beneficial and adverse effects included, unexpected outcomes captured, costs included?
- Limitations should be stated.
- Other issues, if pertinent to the project, including: implementation issues (barriers and enablers, policy changes, stakeholder involvement, etc.); lessons learned; hazards or concerns associated with changes; generalizability of results, acceptability, sustainability, etc.

Submissions can be individual or a group (maximum size is four participants).

No specific format is required. Submissions should be at least 5 pages but no more than 8; Font size, at least 10 pt) and include:

- Title
- Role of each author, if more than one
- Advisor (major Professor)
- University or Institution Affiliation
- Inclusive dates when study was conducted
- Study Objective
- Methodology
- Results (include illustrations and pictures)
- Discussion
- Impact (describe specific benefits)

Submissions should provide adequate descriptions, illustrations or photos, and details that address the judging criteria. The project can be drawn from a laboratory study, a field study, a practicum, or an apprentice assignment. The FPE judging committee recognizes that a laboratory or a field study may not provide the scope necessary to demonstrate the full aspects of an Ergonomics practitioner. Thus, the student must describe the results of such studies in the context of an applied situation. For example, the project should address the analysis of the user population and/or situation that would have generated the idea for the study, the design principles and/or theories that structured the approach, and the validation and implementation processes/principles that would be used to determine the effectiveness of the study results in an applied setting. The Ergonomics Core Competencies will serve as the foundation for determining whether or not the submitted project falls within the broad category areas of Ergonomics and is a viable submission.

Submission should be sent electronically to:

Robert J. Smillie, PhD, CPE
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Ergonomics Core Competencies

The following core competencies list the critical tasks associated with each of the three Core Competency areas. Each task includes examples of knowledge and skills that support each task.

Analysis

1. Conduct user research and/or assessment to identify, document, and prioritize ***requirements*** for individuals and groups to achieve their goals.

Knowledge and skill in:

- Ergonomic design principles, regulations, guidelines, and standards, including those that focus on user accessibility.
- User research, usability testing, field projects, psychometric approaches, ecological and contextual analysis, observational methods, and performance metrics.

2. Identify and employ relevant ***organizational factors*** impacting individuals and groups interacting within an organization, to produce recommendations to enhance quality of performance and wellbeing, including efficiency, effectiveness, health and safety.

Knowledge and skill in:

- Fundamentals of organizational structure, organizational behavior and group dynamics, and principles of work.
- Macro-ergonomic analysis methods, socio-technical systems theory, and methods for assessing work systems.
- Sociotechnical systems theory, and methods for assessing work systems
- Communication, leadership, stress and motivation.

3. Identify and measure the relevant ***physical, physiological, and biomechanical*** aspects of individuals and groups performing their activities and environments with particular reference to efficiency, effectiveness, health, and safety.

Knowledge and skill in:

- Biomechanics, physiology, functional anatomy, circadian rhythm effects, and adaptation to stress and workload.
- Physical measures and psychophysical/subjective measures
- Anthropometric, demographic, cultural, and human development attributes of the user population.

- Design criteria/strategies for anthropometric data.

4. Identify ***cognitive, behavioral and social characteristics*** of individuals and groups that impact health, performance and wellbeing, including efficiency, effectiveness, health, safety, attitudes, value belief systems, and motivation.

Knowledge and skill in:

- Cognitive task and error analysis methods.
- Cognitive function and process measurement methods, workload and situational awareness, social causation, network analysis, and assessment of teams.

5. Identify and apply methods of evaluation of ***cognitive aspects of human-technology interfaces*** to reduce human error, optimize mental workload, and enhance performance and wellbeing, including efficiency, effectiveness, health, and safety.

Knowledge and skill in:

- Cognitive factors, performance metrics, and evaluation methods for design, systems, and human performance.
- Human-technology performance modeling, inspection methods, and participatory methods.

6. Identify and apply methods of evaluation of ***physical aspects of human-technology interfaces*** to reduce human error, optimize physical workload, and enhance performance and wellbeing, including efficiency, effectiveness, health, and safety.

Knowledge and skill in:

- Performance metrics for human-technology interfaces, and evaluation methods for design, systems, and human performance.
- Measurement techniques in climatic and perceptual environments, analysis of risk factors, workplace assessment tools, and analysis of tasks, scenarios, user profiles, personas, and Return-On-Investment.

7. Identify and analyze ***training and education*** to enhance performance and wellbeing, including efficiency, effectiveness, health and safety.

Knowledge and skill in:

- Assessing training/education knowledge and skills requirements.
- Methods to gather data, such as, performance metrics, surveys, observations, and interviews.

Design

1. Apply ***ergonomic principles and data*** appropriate to developing and fulfilling a set of requirements to achieve an efficient, effective, safe, and usable human-centered design.

Knowledge and skill in:

- Ergonomics design principles, regulations, guidelines, and standards to fulfill design and user requirements.
- Applying applicable collected and historical data and information to the design.
- Human-centered design techniques and process for conceptual, prototype, operational model design alternatives, and iterative methods.

2. Design the ***hardware product***, which includes functions, information displays, interactions, communication modalities etc., within the constraints and capabilities, and context to enable individuals and groups to accomplish a particular set of goals.

Knowledge and skill in:

- Requirements, regulations, principles, guidelines, and standards for hardware design.
- Input/output modalities, interfaces, and feedback mechanisms for hardware design principles and specifications.
- Design principles of safety and warning systems, including perceptual environments.
- Systems design processes, including modeling, prototyping and iterative methods.

3. Design the ***software product***, which includes functions, information displays, interactions, communication modalities etc., within the constraints and capabilities of the hardware and the context to enable individuals and groups to accomplish a particular set of goals.

Knowledge and skill in:

- Requirements, regulations, principles, guidelines, and standards for software architecture and design.
- Information architecture, interaction design, and visual design principles.
- Software and systems design processes, including prototyping and iterative methods.

4. Design ***tasks*** within human capabilities and limitations, and the workplace context to enable individuals and groups to accomplish a particular set of goals, and manage stress and fatigue.

Knowledge and skill in:

- Designing for physiological, cognitive and biomechanical capabilities and limitations, and stress responses.
- Individual and group decision making (e.g. formal and naturalistic) and decision making strategies.

5. Design ***jobs*** using systematic procedures, principles, and techniques in developing and combining tasks into jobs to make them safe, efficient, effective, and motivating, to better utilize human capabilities, and manage stress and fatigue.

Knowledge and skill in:

- Principles, guidelines, and regulations of job design, shiftwork and automation effects, and human performance measurement.
- Design processes and tradeoffs with job design, redesign and team design.
- Planning successful implementation by identifying data and performance metrics.

6. Design the ***organization*** within human capabilities and limitations, and the social context to enable to accomplish a particular set of goals, and manage stress and fatigue.

Knowledge and skill in:

- Organizational behavior, group dynamics and organizational theory.
- Design strategies to promote and facilitate individual, team and organizational processes and change.

7. Design the ***environment***, within human capabilities and limitations, and the wider context to enable to accomplish a particular set of goals, and manage human stress and fatigue.

Knowledge and skill in:

- Environmental design principles, regulations, guidelines, and standards for indoor and outdoor spaces, tools, and equipment (e.g. acoustic, visual, noise, lighting, vibration, acceleration/deceleration, temperature).
- Environmental design to achieve desired effects on physiological and cognitive systems and responses, and human performance.

8. Design ***training and education*** to enhance performance and wellbeing, including efficiency, effectiveness, health and safety.

Knowledge and skill in:

- Instructional systems design of training, education, and communication

processes and methods as applied to products, tasks, jobs, organization and environment.
- Planning successful implementation by identifying data and performance metrics.

Integration

1. Implement and test ***products*** and related systems, for predictive, stable, reliable, and effective products.

Knowledge and skill in:
- Testing of low and high fidelity prototypes and simulations and products to ensure that design criteria are met.
- Determining whether standards, specifications and guidelines are met.
- Collecting data and analyzing performance metrics for determining successful implementation.

2. Implement and test ***tasks and jobs*** and related systems, for predictive, stable, reliable, and effective tasks.

Knowledge and skill in:
- Test and validation methods for independent and integrated tasks, jobs and systems.
- Assessment tools and testing environments, including prototypes and simulations.
- Human performance measurement methods for validating task and job design, including workload balance and structure.

3. Implement and test ***organizations*** and related systems, for predictive, stable, reliable and effective organizations.

Knowledge and skill in:
- Awareness of test and validation methods for organizations.
- Organizational analytics, performance metrics, and economic analyses.
- Awareness of change management and aligning change with organizational structure.

4. Implement and test ***environments*** and related systems, for predictive, stable, reliable and effective environments.

Knowledge and skill in:
- Test and validation methods for environments to ensure that requirements and intended design are satisfied.
- Determining whether standards, specifications and guidelines are met.

5. Implement and test ***training and education*** materials to support effective and efficient individual, group, and organizational adoption of design.

Knowledge and skill in:

- Test and validation methods for training and education to ensure that requirements and intended design are satisfied.
- Determining whether standards, specifications and guidelines are met.